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INDUSTRI-PLEX SITE REMEDIAL TRUST

WOBURN, MASSACHUSETTS

100% DESIGN REPORT PART I

INDUSTRI-PLEX SITE WOBURN, MASSACHUSETTS

Volume 2 of 8

Prepared by:

Golder Associates
Mt. Laurel, New Jersey

In Association with:

Jordan, Jones and Goulding
Normandeau Associates
Sasaki Associates
Husch & Eppenberger
Environmental Systems Group Monsanto

SRT-DESIGN-11
)03-6400

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100% DESIGN REPORT
PART I

INDUSTRI-PLEX SITE
WOBURN, MASSACHUSETTS

VOLUME 2 OF 8

ISRT-DESIGN-11

Prepared for:

Industri-Plex Site Remedial Trust
36 Commerce Way
Woburn, Massachusetts

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April 1992

Project No.: 903-6400

100% DESIGN REPORT
PART I

INDUSTRI-PLEX SITE

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CHAPTER 10
SURFACE WATER MANAGEMENT

10.1 INTRODUCTION

The surface water hydrology of the Industri-Plex Site in Woburn, Massachusetts, was investigated as part of the basic information required for remedial design. The main objectives of this investigation were to determine the effects of remediation on the flooding hazard of the streams around the Site, and to obtain the data required for the hydraulic design of some elements of the remedy.

Analyses were conducted for the existing conditions for off-Site and on-Site watersheds. Proposed conditions for the on-Site watersheds have also been evaluated. The existing conditions for the off-Site watersheds remain unaltered by the proposed remedy. The hydraulic effects of remediation were determined by comparing the peak discharges for the existing conditions with the peak discharges after remediation. At certain critical locations the pre- and post-remedy flood stages were also compared.

The analysis of the existing conditions, off-Site and on-Site, included in this report was developed using the following information:

- Topographic maps from the USGS;
- Drainage study for the Town of Reading (Whitman and Howard, 1976);
- Soils maps from the Middlesex County Soil Survey (1986);
- As-built plans of Commerce Way and Atlantic Avenue (Dana F. Perkins and Associates Inc., 1978.);

- Topographic maps presented as Sheets 11-1A through 11-1D of this report;
- Woburn Environmental Studies Supplemental Report to Floodplains and Wetlands Assessment Study (Stauffer Chemical Company and Roux Associates, 1986);
- Expedient Bathymetric Study (TWM Northeast, Inc., March - August 1991) (see Appendix 10-H); and,
- Field observations.

The analysis of the proposed conditions on-Site after remediation included in this report was developed using the following information:

- Soils maps from the Middlesex County Soil Survey (1986);
- As-built plans of Commerce Way and Atlantic Avenue (Dana F. Perkins and Associates Inc., 1978);
- Topographic maps presented as Sheets 11-1A through 11-1D of this report; and,
- Cover grading plan presented as Sheets 11-7A through 11-7D of this report.

Additionally, the 100-year flood analysis for the City of Woburn, prepared by Anderson-Nichols (Federal Emergency Management Administration (FEMA), 1980) was reviewed. Since several significant alterations to the Northern Branch of the Aberjona River have been made within the last 10 years, it was felt that the peak discharge used in the Anderson-Nichols study may not be representative of the present runoff potential, therefore, an independent hydrological analysis was undertaken as described in this report.

10.2 HYDROLOGIC CHARACTERISTICS

10.2.1 Climate

The mean annual precipitation for this area is approximately 41 inches, while the mean annual evaporation from lakes and shallow reservoirs is approximately 32 inches (Viessman et al, 1989). Gabler, et al (1987), describe this climate as humid continental with a growing season of approximately 150 days. The temperature range and humidity for the area are affected by marine influences. The most significant differences in climate are between the long, hot, humid summers and the unpredictable winters which experience the greatest frequency of sudden weather contrasts. Gadoury and Wandle (1985) discuss March and April as the period during which the region suffers the worst floods of record; this has been attributed primarily to snowmelt runoff. The Hydraulic Atlas for the region lists four major floods, two in March and the others in August and October. These floods of record reveal that flooding associated with storm precipitation is comparable to the flooding due to snowmelt.

10.2.2 Soils

The Soil Conservation Service (SCS) categorizes soils hydrologically into four types based upon the soil's ability to drain. The hydrologic soil groups, assigned to the soils in this area in the Middlesex County Soil Survey, have been used in determining the runoff potential. The soils for the watersheds consist of all four hydrologic soil types, ranging from type A which has a low runoff potential to type D which has a high runoff potential. The loamy sands, comprising less than 5 percent of the area, are typically type A soils. The very fine sandy loams with scattered bedrock outcrops, comprising about 15 percent of the area, are identified in the Soil Survey as type B

soils. The extremely stony or fine loamy sands and sandy loams, and the urban land complex, comprising nearly 70 percent of the area, are type C soils. Finally, muck and soils associated with swamps and rivers, which comprise the remaining 10 percent, are type D soils. The urban land complex was classified as type C soils in this analysis because these areas are located near type C or type D soils, or the areas are reclaimed streams or swamps.

10.2.3 Land Use

The land use in the watersheds which drain through the Site consists of approximately 50 percent residential development, 25 percent industrial development, and the remaining 25 percent of the land is forested and swamp areas. The residential development is concentrated in western Reading and western Woburn (see Figure 10-1) and comprises Watersheds 1, 2, 3, 6, 7, and 8. The industrial development is concentrated in eastern Woburn and comprises Watersheds 3, 5, 9, and 10. The swamp and forested areas are scattered primarily throughout the residential developments. The slopes in the study area generally range from zero to 25 percent.

10.2.4 Hydrologic Features

Several significant hydrologic features occur within the watersheds. First, the channels conveying the Aberjona River and Halls Brook have been man-modified in some areas. Additionally, these channels are grass or gravel lined. Second, numerous swamps and man-made depressions act as detention areas because the culverts which drain them restrict their discharge. Third, municipal storm sewers assist with the collection of the runoff from the residential developments and discharge into swamp/storage areas.

10.2.5 General Watershed Characteristics

The two major watercourses associated with the Site are the Aberjona River and Halls Brook (see Figure 10-1). The Aberjona River begins approximately two miles northeast of the Site. Entering the Site from the east, the Aberjona River flows south through the Site to Mishawum Road. Halls Brook passes the southwest corner of the Site before it discharges into the Halls Brook Holding Area. The Halls Brook Holding Area discharges into the Aberjona River at Mishawum Road. The Aberjona River continues south after crossing Mishawum Road and discharges into the Upper Mystic Lake approximately five miles south of the Site.

The watersheds which drain into these watercourses typically contain several swamps which act as storage areas. These storage areas are regulated by outlets which generally consist of culverts which attenuate the peak discharges. Each of the swamps, along with its accompanying drainage area, was modelled as a subwatershed.

10.2.6 Drainage Pattern

The Aberjona River begins northeast of the Site in the town of Reading in the vicinity of Memorial High School (see Figure 10-1), and flows southwest through three swamp/storage areas until it reaches a swamp near Austin School. In this swamp, the river splits into Northern and Southern Branches. The Northern Branch flows northwest and, then, southwest through two swamp/storage areas before reaching Interstate 93 (I-93). After crossing under I-93, the Northern Branch continues to flow southwest until its confluence with the Western Branch that drains Wetland 1C located between the East and West Hide Piles. After this confluence, the River flows south until its confluence with the Southern Branch of the Aberjona River.

From the swamp near Austin School, the Southern Branch of the Aberjona River flows southwest through two swamp/storage areas before reaching I-93. After crossing under I-93, the Southern Branch discharges into Phillips Pond and then flows west until its confluence with the Aberjona River at Commerce Way. From this point of confluence, the Aberjona River flows south and then west toward the Halls Brook Holding Area. The path of the Aberjona River then turns south, flowing parallel to the Halls Brook Holding Area to Mishawum Road, where the Halls Brook Holding Area discharges into the Aberjona River. The river then continues in a southerly direction, draining into Upper Mystic Lake approximately five miles south of the Site.

Several smaller channels contribute to form Halls Brook. Halls Brook begins in Woburn southwest of the Site. The southern branch of Halls Brook (See Figure 10-1), passing through four swamp/storage areas, flows north until its confluence with the northern branch of Halls Brook. The northern branch of Halls Brook, passing through four swamp/storage areas, flows north, and then south before the confluence. After the confluence, Halls Brook flows east passing through a storage area before reaching Halls Brook Holding Area.

The New Boston Street Drainway (see Figure 10-10), which drains northwestern Woburn and southern Wilmington, flows south as an open channel, then it continues culverted and finally it connects to Wetland 8 through a swale. Wetland 8 discharges into Halls Brook.

The Atlantic Avenue Drainway (see Figure 10-10), collecting runoff from a surrounding industrial park, flows south, draining into the Halls Brook Holding Area.

In summary, the Site is drained by the following five channels:

- The Northern Branch of the Aberjona River;
- The Western Branch of the Aberjona River;
- The Southern Branch of the Aberjona River;
- The Atlantic Avenue Drainway; and
- The New Boston Street Drainway.

10.3 SELECTION OF ANALYSIS METHODS

The watersheds analyzed have natural complexities which present difficulties for their analysis. The HEC-1 computer program, written by the U. S. Army Corps of Engineers, Hydrologic Engineering Center, was selected to compute the peak discharges for the various streams throughout and around the Site. This program is considered appropriate because it can simulate the Site's hydrologic drainage pattern with its multiple and sequential detention areas. The analysis can also simulate a diversion of a known discharge from a river (a simplified way of analyzing the Aberjona River bifurcation). A discussion of the HEC-1 analysis is provided in Section 10.4.

After determining the peak discharges with HEC-1, the flood profiles or flood boundaries of channels scheduled to be modified as part of the remedy were evaluated. The HEC-2 computer program, written by the U. S. Army Corps of Engineers, Hydrologic Engineering Center, was selected to compute the flood profiles. This program uses a step backwater analysis to evaluate the hydraulic changes in the flood profiles due to physical changes in stream parameters. A discussion of the HEC-2 analysis is presented in Section 10.5.

10.4 HEC-1 HYDROLOGIC ANALYSIS

10.4.1 Input Parameters

HEC-1 input parameters consist of the following:

- Watershed delineation;
- Subwatershed delineation;
- Subwatershed areas;
- Curve numbers;
- Lag Time;
- Storage capacities of swamps, channels, basins;
- Invert elevation, size, and type of outlet structure for each storage area; and
- Cross-sectional size of each stream reach.

Both the watershed and subwatersheds were delineated since some input parameters were evaluated for the watershed as a whole, but applied to each of the subwatersheds. The procedures followed to determine these parameters are described in the following sections. The specific values of the input parameters are listed in Tables 10-1 through 10-5. The output of the computer analyses appears in Appendices 10-A through 10-E.

10.4.1.1 Watershed Delineation

Watersheds were delineated using the U.S. Geologic Survey topographic maps at a scale of 1:25,000 and a contour interval of 10 feet. The outlet points for each watershed were selected as the points of convergence or divergence of two channels. Topographic information was supplemented with local storm water management plans where available. Following this procedure, ten watersheds which drain towards the Aberjona River and Halls Brook, and are related

to the Site, were delineated as presented in Figure 10-2. The area of each watershed was estimated using a planimeter.

Watersheds 1, 2, and 3, containing 1,319 acres, encompass the drainage area for Halls Brook. These watersheds collect water from high density residential and industrial developments. The southwest corner of the Site, in the vicinity of Merrimac and New Boston Streets, discharges into Watershed 3 via overland flow and through Wetland 8. The portion of Watershed 3 which is on-Site was analyzed. However, the remainder of the area encompassed by Watersheds 1, 2, and 3 was not analyzed, since Halls Brook discharges south of the Site.

Watershed 4, containing 356 acres, is the drainage area for the New Boston Street Drainway. This watershed collects runoff from low density industrial and residential developments and from the Woburn Landfill. There are two swamp/storage areas within this watershed.

Watershed 5, containing 167 acres, collects runoff from the industrial development north of the Site. This water discharges into Wetland 1C between the East and West Hide Piles within the Site. There are two swamp/storage areas within this watershed.

Watershed 6, containing 324 acres including the Northern Branch of the Aberjona River, collects runoff from medium density residential developments. There are four swamp/storage areas within this watershed. This watershed connects to the Site via reinforced concrete pipes under I-93.

Watershed 7, containing 580 acres including the northernmost reach of the Aberjona River, collects runoff from high density residential developments. There are six swamp/storage areas within this watershed.

Watershed 8, containing 335 acres including the Southern Branch of the Aberjona River, collects runoff from high density residential developments. There are two swamp/storage areas within this watershed. Watershed 8 connects to the Site via a 7.5-foot by 14-foot box culvert under I-93.

Watershed 9, containing 422 acres including the most of the Site, collects runoff from industrial and high density residential developments. There are several swamp/storage areas within this watershed.

Watershed 10, containing 71 acres including part of the Site, collects runoff from low density industrial development.

Ultimately, the Aberjona River and Halls Brook converge as they pass through a culvert under Mishawum Road. The total watershed area draining through this point is 4,100 acres.

10.4.1.2 Subwatershed Delineation

The subwatersheds were delineated using the same information and methods as those used for the watershed delineation. Subwatersheds are used to define input which is applicable to a particular reach of a channel or swamp/storage area. The subwatersheds, comprising smaller areas than the watersheds, contain a drainage area with a storage area and/or river reach. The area of each subwatershed was estimated using a planimeter. The limits of the off-Site subwatersheds are shown in Figure 10-3 and

the limits of the on-Site subwatersheds for the existing conditions are shown in Sheet 10-10.

10.4.1.3 Curve Number Determination

The curve number (CN), which assists in the estimation of the runoff, was evaluated using the land use in combination with the soil descriptions and hydrologic classifications from the Middlesex County Soil Survey. The CN values were obtained from the CN tables presented in the manual for TR-55 (U. S. Department of Agriculture, 1986). The percentage of each hydrologic soil type within a watershed and the percentage of each land use within a soil type were determined. Weighted average CN values were determined for each subwatershed taking into account relative areas of particular soil types and land uses.

10.4.1.4 Lag Time

The lag time is the time difference between the center of mass of the effective rainfall and the center of mass of the produced runoff. The lag time is typically six-tenths the time of concentration. The time of concentration for each subwatershed was determined by evaluating the time that is required for water to travel from the hydrologically most distant point in the subwatershed to the storage or outlet structure. After selecting this point, the time of concentration was estimated by summing the travel times for sheet flow, shallow concentrated flow and pipe flow, where applicable. The calculations for these travel times were performed using methods outlined in the manual for TR-55 (U. S. Department of Agriculture, 1986). All of these computations involve the surface roughness, the length and the slope of the path selected.

10.4.1.5 Storage Capacities

To determine a swamp/storage area's volume, the slope of the banks of the storage area above the water level was assumed to remain the same below the water level, until the bottom of the storage area, or the invert elevation of the outlet structure, was reached. The maximum storage elevation was selected assuming that neither adjacent roads nor houses would be flooded. For the beginning of the specified storm event, the water level in the detention storage areas was assumed as the invert elevation of the outflow structure, unless the use of another elevation could be substantiated. Using these assumptions, the surface area-elevation relationship for each storage area within each watershed was estimated.

The stage-discharge relationships were generated by HEC-1 after the program was given the elevation-surface area relationships and the hydraulic characteristics of the outlet structure. The descriptions of the outlet structures were based upon field measurements and/or engineering plans, where available.

A total of thirty seven swamp/storage areas were analyzed. The number of swamp/storage areas within each watershed was discussed in Section 10.3.2.1 and is summarized below:

Watershed	Number of Swamp/Storage Areas
4	2
5	2
6	4
7	6
8	2
On-Site (Existing)	11
On-Site (Proposed)	10

10.4.1.6 Channel Cross-Sections

The required river routing input of HEC-1 consists of channel cross-sections, roughness coefficients for the channels and their overbanks, channel lengths, and channel slopes. Typical cross-sections for each channel reach within each watershed were generated, based upon topographic information, field inspections, and design drawings, as appropriate.

10.4.2 Analysis

The three storm events that have been analyzed are the 25-year, 50-year and 100-year recurrence interval storms with a 24-hour duration. Storm events with these frequencies were analyzed in order to design storm drains for the 25-year storm, and culverts for the 50-year storm, with consideration being given to damage avoidance for the 100-year storm. The precipitation depths for the storm events were taken from National Weather Service Technical Paper No. 40 (National Oceanic and Atmospheric Administration, 1961) (TP40). These are 5.2, 6.0, and 6.6 inches for the 25-year, 50-year, and 100-year storms, respectively.

A characteristic of the HEC-1 program is the expectation that some of the stream flow will be lost to or gained from groundwater. The model coefficient representing this behavior was entered as zero because the low permeability of the soils near the streams, as identified by the Middlesex County Soil Conservation Survey, produces a significant time lag between precipitation and groundwater response. Groundwater interactions are therefore not likely to materially affect peak discharges. Furthermore, under peak flow conditions, groundwater interactions are more likely to be recharge to groundwater than discharge from groundwater, hence the assumption of the coefficient being zero yields a conservative value of the stream flow.

Finally, one of the difficulties presented in modelling this system is the bifurcation of the Aberjona River in Reading near Austin School. Since HEC-1 does not permit analysis of a stage-dependent discharge bifurcation, two alternative flow patterns were analyzed. By routing the discharge from Watershed 7 through Watershed 8, higher peak discharges for the Aberjona River resulted without flooding the point of bifurcation, and this condition has been assumed for subsequent analyses so as to provide conservative estimates.

The analysis was conducted by first evaluating the inflows to the Site from the watersheds upstream from the Site. By first analyzing the inflows to the Site, these flows could be reviewed and evaluated prior to routing them through the Site. After obtaining these inflows, the Site was evaluated for storm runoff, storage capabilities and outflow for existing and proposed conditions. The results of the analyses are included in Appendices 10-A through 10-E, and are summarized below.

10.4.2.1 Upstream Watershed Analysis

Watersheds 4 through 8 drain towards the Site and produce incoming flows localized in six points as discussed below. These flows remain unaltered by the proposed conditions on the Site.

10.4.2.1.1 Watershed 4

Watershed 4 is formed by five Subwatersheds, 4A through 4E. Subwatersheds 4A through 4D discharge into a depression north of the New Boston Street Drainway; Subwatershed 4E discharges into a channel draining into the New Boston Street Drainway from the west. The drainage areas, CN values, storage-elevation relationships, and times of

concentration were based upon field observations and the U.S.G.S. Wilmington Quadrangle.

The input parameters for this watershed appear in Table 10-1. The calculations for the input parameters and the output from the HEC-1 analysis are presented in Appendix 10-D.

10.4.2.1.2 Watershed 5

Watershed 5 consists of five Subwatersheds, 5A through 5E. Subwatersheds 5A through 5D discharge into the wetland between the East and West Hide Piles, and Subwatershed 5E discharges into the North Branch of the Aberjona River. The input data for this watershed was taken from a report titled Proposed Pond Reconstruction at Sheehy Industrial Park in Woburn, Massachusetts (GHR Engineering Corporation, 1982). Since the proposed conditions specified in this report appear to have been constructed, the drainage areas, CN values, storage-elevation relationships, and times of concentration contained within the report were assumed to remain valid.

The input parameters for this watershed appear in Table 10-2. The calculations for the input parameters and the output from the HEC-1 analysis are presented in Appendix 10-B.

10.4.2.1.3 Watersheds 6, 7, and 8

Modelling the bifurcation of the Aberjona River in Reading presents significant difficulty, since the bifurcation occurs within a swamp area. The area draining to this bifurcation point consists of Watershed 7. The two outflow structures for this swamp discharge into two separate swamps that are parts of Watersheds 6 and 8. The outlet connecting to the upstream limit of Watershed 6 is a 15

inch reinforced concrete pipe. The outlet connecting to the upstream limit of Watershed 8 is a 72 inch corrugated metal pipe with an invert two feet below the invert of the 15 inch pipe.

In order to analyze this complex condition, routing of Watersheds 6, 7, and 8 has been modelled for the 25, 50, 100 year storm events assuming two different hypotheses. The input parameters for both hypotheses appear in Tables 10-3A and 10-3B. In the first hypothesis, the runoff from Watershed 7 was assumed to discharge entirely through Watershed 8. In the second hypothesis, the runoff from Watershed 7 was assumed to discharge entirely through Watershed 6.

When modelling the first hypothesis, the peak discharge for the Southern Branch of the Aberjona River at I-93 was 525 cubic feet per second (cfs), while the peak discharge for the Northern Branch at I-93 was 177 cfs for the 100-year storm event. When modelling the second hypothesis, the peak discharge of the Southern Branch at I-93 was 425 cubic feet per second (cfs), while the peak discharge of the Northern Branch at I-93 was 184 cfs for the 100-year storm event.

The peak discharge for the Northern Branch at I-93 is 7 cfs higher under the second hypothesis versus the first hypothesis. Detailed review of the physiographic characteristics of the subwatersheds involved shows that the peak discharge for the Northern Branch in the second hypothesis does not increase significantly in spite of a larger drainage area. The reason for this result is that, when introducing additional water to Watershed 6, two of the swamp/storage areas within this watershed accommodate the additional volume instead of increasing the peak

discharge. However, it should be noted that the second hypothesis results in the flooding of the swamp/storage area where the bifurcation occurs, which is not considered to be realistic. Since the first hypothesis produces the same or higher peak discharges for the Aberjona River without flooding the point of bifurcation, this hypothesis has been assumed to be true in order to maintain conservative estimates.

The input parameters for the three watersheds appear in Tables 10-3A and 10-3B. The calculations for the input parameters and outputs from these HEC-1 analyses are presented in Appendix 10-C.

10.4.2.2 On Site Watershed Analysis

10.4.2.2.1 Existing Conditions

The area within the Site limits was modelled first for existing conditions. This area contains part of Watersheds 3, 9, and 10. The drainage areas, CN values, storage-elevation relationships and times of concentration were based upon topographic maps at one inch equals 200 feet with a 2 foot contour interval. The input parameters for existing conditions appear in Table 10-4.

As previously stated, the Site is drained by the following five channels:

- The Northern Branch of the Aberjona River;
- The Western Branch of the Aberjona River;
- The Southern Branch of the Aberjona River;
- The Atlantic Avenue Drainway; and
- The New Boston Street Drainway.

The Northern Branch of the Aberjona River collects runoff from the subwatersheds with the 'NB' prefix (see Figure 10-

10). The Western Branch of the Aberjona River collects runoff from subwatersheds with an 'HP3' prefix. The Northern and Western Branches of the Aberjona River converge at Commerce Way. The Aberjona River flows along Commerce Way collecting runoff from Subwatersheds CW1, CW2, SB3&4 and SB5. The runoff from Subwatersheds SB1, SB6 and SB7 discharges into Phillips Pond. The outflow from Phillips Pond, the Aberjona River in Commerce Way, and the runoff from Subwatershed SB2 discharge into the Southern Branch of the Aberjona River. The Southern Branch of the Aberjona River discharges into the Aberjona River in Commerce Way which flows to the south off-Site and eventually discharges into the Upper Mystic Lake.

The runoff from Subwatersheds HB3B, HB3C, HB4A, HP4 and HP5 is collected by the Atlantic Avenue Drainway which discharges into Halls Brook Holding Area.

Subwatersheds HB1A and HB1B combine with inflow from upstream sources to discharge into the New Boston Street Drainway. The outflow from this drainway in turn flows through a culvert that discharges into Wetland 8 which flows into Halls Brook. The runoff from HB2A also flows into Wetland 8.

The runoff from Subwatersheds HB4B and HB2B discharges off-Site over land. These areas were analyzed in order to determine the change in peak discharge due to remediation.

The input parameters for the on-Site subwatersheds appear in Table 10-4. The calculations for the input parameters and outputs from these HEC-1 analyses are presented in Appendix 10-D.

10.4.2.2.2 Calibration

The HEC-1 model was calibrated using several data sources. First, the generalized peak discharge equations provided in Water Resources Investigation 77-39 by Wandle (1977) were applied to the entire watershed affecting the Site. The equations incorporate the total drainage area and main channel slope, and were based upon data from rural areas in Massachusetts. Wandle states that a multiplication factor between 2 and 8 should be applied to these equations for suburban and urban areas. With the exception of the Atlantic Avenue Drainway, the peak discharges estimated by HEC-1 correspond to the Wandle estimates with multiplication factor adjustments of between 1 and 2 which is considered reasonable for the mixed land use of the watersheds. These equations are not applicable to the area discharging into the Atlantic Avenue Drainway because this area is smaller than the minimum drainage area considered by Wandle. These calculations appear in Appendix 10-I.

Second, the Hydraulic Atlas for the region also provides general equations incorporating drainage area, main channel slope and mean annual precipitation. These equations also rely upon rural data. The peak discharges from HEC-1 are approximately three times the peak discharges predicted using the equations presented in the Hydraulic Atlas. This correlation seems reasonable given the semi-urban nature of the Site and the calculations appear in Appendix 10-I.

Therefore, the results of the analyses are within the expected range of flows evaluated using the Wandle (1977) and Hydraulic Atlas general equations confirming that the HEC-1 model is suitably calibrated.

10.4.2.2.3 Proposed Conditions

Since the portion of the Site west of Commerce Way is undergoing remediation by means of a soil or asphalt cover, the grading and vegetation of this area will be altered. Due to these alterations, the subwatersheds within the Site boundary were redelineated and, subsequently, renamed to correspond with the proposed cover grading plan (see Figure 10-11). As a result of this redelineation, the CN values and times of concentration were reevaluated.

Subwatersheds 12P, 13P, 14P, 19P and 20P discharge into the Northern Branch of the Aberjona River before its confluence with the Western Branch of the Aberjona River at Commerce Way.

Due to the wetland mitigation design (discussed in Chapter 14), the discharge from Subwatershed 6PN, which contains Wetland 1C, is split between the Western Branch of the Aberjona River and a new compensatory wetland. The storage routing through Wetland 1C was performed using POND-2 as shown in Appendix 10-G. The flow entering the Western Branch of the Aberjona River combines with the runoff from Subwatersheds 7P and 8P at the confluence with the Northern Branch of the Aberjona River at Commerce Way.

The runoff from Subwatersheds 15P, 1617P and 10P combines with the flow from the Aberjona River in Commerce Way and discharges into the Southern Branch of the Aberjona River. Additionally, the runoff from Subwatersheds 18P, 21P, 22P and 23P directly discharges into Phillips Pond. The outflow from Phillips Pond discharges into the continuation of the Aberjona River in Commerce Way.

The discharge from Wetland 1C entering the mitigation area combines with the runoff from Subwatershed 6PS and is

routed through the mitigation area. The outflow from the mitigation area combines with the runoff from Subwatersheds 5PN, 5PS and 9P and the discharge from the groundwater treatment plant at the Atlantic Avenue Drainway.

The remedy proposed for the P/X Realty Trust property (see Sheet 11-3) is above grade asphalt. In order to avoid increasing the discharge from this area, a detention basin has been included in the analyses to attenuate the flow. The calculations for this basin appear in Appendix 10-7. The discharge from this basin flows into the New Boston Street Drainway.

Subwatersheds 2PN, 2PS and 1P combine with flow from upstream sources and the detention basin on the PX Realty Trust property to discharge into the New Boston Street Drainway. The outflow from this drainway flows through a culvert that discharges into the continuation of the New Boston Street Drainway at Wetland 8 which in turn flows into Halls Brook. The runoff from Subwatershed 4P also flows into Wetland 8.

The runoff from Subwatershed 11P discharges off-Site over land. This area was analyzed in order to determine the change in peak discharge due to remediation.

Finally, the runoff from Subwatershed 3P has been analyzed draining into a detention basin which discharges into an existing storm sewer in New Boston Street without draining into any of the five channels on the Site. This area was analyzed in order to determine the change in peak discharge due to remediation.

The input parameters for the proposed conditions appear in Table 10-5. The calculations for the input parameters and

outputs from these HEC-1 analyses are presented in Appendix 10-E.

10.4.3 Results of HEC-1 Analysis

The peak discharges for the Site are presented in pictorial form in Figures 10-4 through 10-9 for the existing and proposed conditions, and for 25, 50, and 100 year storms. These figures should be reviewed in conjunction with the flow patterns shown in Figure 10-3. The peak discharges for the 100-year, 24 hour storm are summarized below.

PEAK DISCHARGES – 100 yr 24 hr Storm

	Flow Path	Existing (cfs)	Proposed (cfs)	Percent Difference
off-Site:	4A-4D	116	116	0.0%
	4E	75	75	0.0%
	5A-5D	54	54	0.0%
	5E	84	84	0.0%
	6A-6D	184	184	0.0%
	7&8	572	572	0.0%
on-Site:	AR	471	488	3.6%
	AAD	95	93	-2.1%
	NBSD	134	135	0.7%
	HB2B/3PEW	19	19	0.0%
	HB4B/11P	127	128	0.8%
TOTAL		1931	1948	0.9%

Note: AR – Aberjona River after leaving the Site
AAD – Atlantic Avenue Drainway after leaving the Site
NBSD – New Boston Street Drainway after leaving the Site

10.5 HEC-2 HYDRAULIC ANALYSIS

Review of the current Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) for the City of Woburn (see Appendix 10-K), indicates that the area corresponding to the Site is classified as being in flood Zone C. This Zone is outside both the 100 year and 500 year storm flood plains, although the FEMA map does not appear to reflect the current Site conditions.

As determined in the HEC-1 analysis, stormwater flows leaving the Site will remain of the same magnitude after remediation as before remediation. This has been accomplished by increasing the size of the existing stormwater storage areas and providing additional storage areas to detain runoff from the Site. Additional stormwater storage is being provided by the proposed Wetland Mitigation Area, and the proposed detention areas adjacent to the New Boston Street Drainway, and the Boston Edison Right-of-Way No. 9. (See Sheet 13-1)

Within the Site itself, only two stream sections are being significantly modified to reduce their cross-sectional area thereby potentially modifying the flood profile. The affected streams are the Western Branch of the Aberjona River that flows from Wetland 1C and the New Boston Street Drainway at Wetland 8. These stream reaches have been analyzed to determine any changes in the flood stage that may occur as a result of the remedial construction.

10.5.1 Input Parameters

The peak discharges used for input to the flood storage analysis were the 100 year recurrence flows generated by the HEC-1 analysis discussed in Section 10.4. Downstream starting water elevations were taken to correspond with the critical flow depth for each location. Stream cross-

sections were obtained from Site bathymetric data included in Appendix 10-H.

10.5.2 Analysis

HEC-2 analysis has been used to determine the water surface profile for the existing conditions and post-remediation conditions in the New Boston Street Drainway adjacent to Wetland 8. For the Western Branch of the Aberjona River, the step back water analysis computed with HEC-2 is not appropriate for determining the flood profile since this model does not evaluate the storage capabilities of the adjacent Wetland 1C. In the existing condition, flow restricting culverts are present in the Western Branch of the Aberjona River so that storm flows are contained within Wetland 1C which provides a large storage volume. In the remediated condition, the storage volume provided by creation wetland is connected to Wetland 1C by a rip-rap lined channel. This additional storage volume allows the reduction of the peak discharge and therefore, a reduction in flood boundaries along Western Branch of Aberjona River. Modelling of this area has been performed using the Modified Puls reservoir routing method.

The detailed input and output data from the flood stage analyses are presented as Appendix 10-L.

10.5.3 Results of HEC-2 Analysis

In summary, the calculated changes to the 100-year flood water surface elevations are as follows:

Western Branch of the Aberjona River:

Existing 100 year flood elevation: 74.45 feet

Pre-post remedy change: -1.97 feet

New Boston Street Drainway adjacent to Wetland 8:
Existing 100 year flood elevation: 60.4 feet
Pre-post remedy change: +0.93 feet

These results indicate that the reduction in the cross-sectional area for the New Boston Street Drainway at Wetland 8 increases the flood stage elevation by less than one foot. Similar reduction of the cross-sectional area of the Western Branch of the Aberjona River does not increase the flood stage due to the increase in flood storage associated the the created wetland. The changes in the flood stage are such that the streams remain within their banks during the 100 year storm event in the post-remediation condition.

10.6 CONCLUSIONS

Comparison of the results of the analyses for the proposed conditions with those for the existing conditions indicates that the effects of remediation in the peak flows at the five points where storm water runoff leaves the Site is minimal. This has been achieved by using the storage capabilities of the compensatory wetland discussed in Chapter 14 and the additional storage provided by the proposed detention basins.

Comparison of the results of the analysis for the flood profiles reveals that the changes to the water surface elevations are within generally accepted limits and remain within the banks of the channels analyzed.

REFERENCES

Dana F. Perkins and Associates, Inc. As-Built Plan and Profile of Commerce Way and As Built Plan and Profile of Atlantic Avenue, December, 1978.

Delaney, David F. and Frederick B. Gay. Hydrology and Water Resources of Coastal Drainage Basins of Northeastern Massachusetts from Castle Neck River, Ipswich, to Mystic River, Boston, 1980, USGS Hydraulic Atlas 589.

Federal Emergency Management Agency, Firm Flood Hazard Insurance Rate Map, City of Woburn, Community Panel #250229, July, 1980.

Gabler, Robert E. , Robert J. Sager, Sheila M. Brazier, and Daniel L. Wise. Essentials of Physical Geography. New York: CBS College Publishing, 1987.

Gadoury, Russel A. and S. William Wandle, Jr. Massachusetts Surface Water Resources, National Water Survey, 1985, USGS Water Surface Paper 2300.

GHR Engineering Corporation, 1982. Proposed Pond Reconstruction at Sheehy Industrial Park in Woburn, Massachusetts, June 1982.

Middlesex County Conservation District, 1986. Middlesex County Massachusetts Interim Soil Survey Report, July 1986.

National Oceanic and Atmospheric Administration, 1977. Five- to 60-Minute Precipitation Frequency for the Eastern and Central United States, June 1977.

National Oceanic and Atmospheric Administration, 1961. National Weather Service Technical Paper No. 40 Rainfall Frequency of the United States, 1961.

Stauffer Chemical Company and Roux Associates, 1986. Woburn Environmental Studies Supplemental Report to Flood Plain and Wetlands Assessment Study Submitted July, 1986, August 1986.

U. S. Army Corps of Engineers, The Hydrologic Engineering Center, 1985. HEC-1 Flood Hydrograph Package, January, 1985.

U. S. Army Corps of Engineers, The Hydrologic Engineering Center, 1989. HEC-2 Water Surface Profiles, April, 1989.

U. S. Department of Agriculture, Soil Conservation Service, Engineering Division, 1986. TR-55 Urban Hydrology for Small Watersheds, June 1986.

U. S. Department of the Interior, Geological Survey, 1979. North Boston Quadrangle. Reston, VA: Interior Geological Survey.

U. S. Department of the Interior, Geological Survey, 1979. Reading Quadrangle. Reston, VA: Interior Geological Survey.

U. S. Department of the Interior, Geological Survey, 1979. Wilmington Boston Quadrangle. Reston, VA: Interior Geological Survey.

Viessman, Jr., Warren, Gary L. Lewis, and John W. Knapp. Introduction to Hydrology. New York: Harper & Row Publishing, 1989.

Wandle, S. William, Jr. Estimating the Magnitude and Frequency of Floods on Natural-Flow Streams in Massachusetts, 1977, USGS Water Resources Investigations 77-39.

Whitman and Howard, Inc., 1976. Master Drainage Study, Town of Reading Massachusetts, December 1976.

TABLE 10-1
HYDROLOGICAL INPUT DATA FOR HEC-1 ANALYSIS
OFFSITE - EXISTING CONDITIONS
WATERSHED 4

SUBWATERSHED IDENTIFICATION	AREA (Sq. Mi.)	CN	Tc (Hr)	Tlag (Hr)	ROUTING NAME	STORAGE BASIN		LOW LEVEL SPILLWAY:		EMERGENCY SPILLWAY:	
						CONTOUR ELEV. (FT. MSL)	CONTOUR AREA (Ac.)	D.S.C.L. ELEV. (Ft. MSL)	X-SECT AREA (SF)	INVERT ELEV. (Ft. MSL)	LENGTH (Ft)
4A	0.033	76	0.49	0.29	CHAN4A						
4B	0.069	76	0.49	0.29	4BSWP	76 80	12.351 19.299			76.0	5.00
4C	0.110	76	0.90	0.54	4CSWP	76 80	4.632 9.263	76.0	3.14	80.0	0.00
4D	0.047	76	0.50	0.30	4DCHAB						
4E	0.298	76	0.42	0.25	CHAN4E	65 70	0.190 0.570	65.2	7.07	74.0	0.00

TABLE 10-2
HYDROLOGICAL INPUT DATA FOR HEC-1 ANALYSIS
OFFSITE - EXISTING CONDITIONS
WATERSHED 5

SUBWATERSHED IDENTIFICATION	AREA (Sq. Mi.)	CN	Tc (Hr)	Tlag (Hr)	ROUTING NAME	STORAGE BASIN		LOW LEVEL SPILLWAY:		EMERGENCY SPILLWAY:	
						CONTOUR ELEV. (FT. MSL)	CONTOUR AREA (Ac.)	D.S.C.L. ELEV. (Ft. MSL)	X-SECT AREA (SF)	INVERT ELEV. (Ft. MSL)	LENGTH (Ft)
5A	0.019	90	0.33	0.20							
5B	0.113	85	0.42	0.25							
5C	0.042	90	0.18	0.11	5SWP	70.0 70.1 76.0 77.0	1.435 4.316 5.181 5.312	69.9	3.14	74.0	25.0
5D	0.088	75	0.80	0.48	5DSWP	67.5 68.0 70.0 72.0 74.0	0.000 1.448 5.969 6.221 6.474	68.5	6.28	72.6	25.0
5E	0.066	75	0.65	0.39							

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ISRT SITE HYDROLOGY
12/07/91

TABLE 10-3A
HYDROLOGICAL INPUT DATA FOR HEC-1 ANALYSIS
OFFSITE - EXISTING CONDITIONS
WATERSHEDS 6, 7 & 8
(ROUTING 7 THROUGH 8)

SUBWATERSHED IDENTIFICATION	AREA (Sq. Mi.)	CN	Tc (Hr)	Tlag (Hr)	ROUTING NAME	STORAGE BASIN		LOW LEVEL SPILLWAY:		EMERGENCY SPILLWAY:	
						CONTOUR ELEV. (FT. MSL)	CONTOUR AREA (Ac.)	D.S.C.L. ELEV. (Ft. MSL)	X-SECT AREA (SF)	INVERT ELEV. (Ft. MSL)	LENGTH (Ft)
6A	0.096	72	0.85	0.51	6ASWP	82	0.10	85.0	4.50	85.9	0.00
						84	1.16				
						85	3.98				
						86	7.54				
6B	0.176	72	0.30	0.18	6BSWP	79	9.64	79.5	0.79	81.9	0.00
						80	23.83	80.6	11.30		
						82	37.42				
6C	0.234	72	0.49	0.29	6CSWP	74.5	0.00	74.5	19.64	81.9	0.00
						76	2.33				
						78	12.55				
						80	24.40				
						82	33.53				
6D	0.421	72	0.84	0.50	6DSWP	80	1.54	80.0	12.57	90.0	0.00
						90	14.41				

TABLE 10-3A
HYDROLOGICAL INPUT DATA FOR HEC-1 ANALYSIS
OFFSITE - EXISTING CONDITIONS
WATERSHEDS 6, 7 & 8
(ROUTING 7 THROUGH 8)

SUBWATERSHED IDENTIFICATION	AREA (Sq. Mi.)	CN	Tc (Hr)	Tlag (Hr)	ROUTING NAME	STORAGE BASIN		LOW LEVEL SPILLWAY:		EMERGENCY SPILLWAY:	
						CONTOUR ELEV. (FT. MSL)	CONTOUR AREA (Ac.)	D.S.C.L. ELEV. (Ft. MSL)	X-SECT AREA (SF)	INVERT ELEV. (Ft. MSL)	LENGTH (Ft)
7A	0.133	77	0.48	0.29	7ASWP	110	0.80	110.0	3.53	113.9	0.00
						111	1.94				
						112	4.34				
						113	11.31				
						114	18.24				
7B	0.116	77	0.87	0.52	7BSWP	103	0.26	101.0	1.77	105.9	0.00
						104	0.65				
						106	2.16				
						108	3.58				
						109	5.77				
7C	0.053	77	0.41	0.25	7CHNL						
7D	0.104	77	0.64	0.38	7DSWP	88	0.57	90.6	4.91	92.0	10.00
						90	1.42				
						92	2.49				
						94	3.86				
7E	0.046	77	0.23	0.14	7ECHN						
7F	0.206	77	0.49	0.29	7FCHNL						

TABLE 10-3A
HYDROLOGICAL INPUT DATA FOR HEC-1 ANALYSIS
OFFSITE - EXISTING CONDITIONS
WATERSHEDS 6, 7 & 8
(ROUTING 7 THROUGH 8)

SUBWATERSHED IDENTIFICATION	AREA (Sq. Mi.)	CN	Tc (Hr)	Tlag (Hr)	ROUTING NAME	STORAGE BASIN		LOW LEVEL SPILLWAY:		EMERGENCY SPILLWAY:	
						CONTOUR ELEV. (FT. MSL)	CONTOUR AREA (Ac.)	D.S.C.L. ELEV. (Ft. MSL)	X-SECT AREA (SF)	INVERT ELEV. (Ft. MSL)	LENGTH (Ft)
7G	0.063	77	0.51	0.31	7GSWP	85	0	85.8	16.25	88.0	0.00
						86	0.57				
						87	2.53				
						88	5.16				
7H	0.186	77	0.51	0.31	7HSWP	84	0.39			84.0	10.00
						86	3.08				
						87	9.24				
						88	15.26				
8A	0.076	74	0.39	0.23	8ASWP	78	0	78.9	28.30	83.9	0.00
						80	2.42				
						82	5.19				
						84	9.82				
8B	0.332	74	0.68	0.41	8BCHL						
8C	0.116	74	0.43	0.26	8CSWP	64	1.12			64.0	12.00
						66	1.91				
						68	3.28				
						70	5.70				
						72	8.79				
						74	11.08				

TABLE 10-3B
HYDROLOGICAL INPUT DATA FOR HEC-1 ANALYSIS
OFFSITE - EXISTING CONDITIONS
WATERSHEDS 6, 7 & 8
(ROUTING 7 THROUGH 6)

SUBWATERSHED IDENTIFICATION	AREA (Sq. Mi.)	CN	Tc (Hr)	Tlag (Hr)	ROUTING NAME	STORAGE BASIN		LOW LEVEL SPILLWAY:		EMERGENCY SPILLWAY:	
						CONTOUR ELEV. (FT. MSL)	CONTOUR AREA (Ac.)	D.S.C.L. ELEV. (Ft. MSL)	X-SECT AREA (SF)	INVERT ELEV. (Ft. MSL)	LENGTH (Ft)
6A	0.096	72	0.65	0.51	6ASWP	82	0.10	85.0	4.50	85.9	0.00
						84	1.16				
						85	3.98				
						86	7.54				
6B	0.176	72	0.30	0.18	6BSWP	79	9.64	79.5	0.79	81.9	0.00
						80	23.83	80.6	11.30		
						82	37.42				
6C	0.234	72	0.49	0.29	6CSWP	74.5	0.00	74.5	19.64	81.9	0.00
						76	2.33				
						78	12.56				
						80	24.40				
						82	33.53				
6D	0.421	72	0.84	0.50	6DSWP	80	1.54	80.0	12.57	90.0	0.00
						90	14.41				

TABLE 10-3B
HYDROLOGICAL INPUT DATA FOR HEC-1 ANALYSIS
OFFSITE - EXISTING CONDITIONS
WATERSHEDS 6, 7 & 8
(ROUTING 7 THROUGH 6)

SUBWATERSHED IDENTIFICATION	AREA (Sq. Mi.)	CN	Tc (Hr)	Tlag (Hr)	ROUTING NAME	STORAGE BASIN		LOW LEVEL SPILLWAY:		EMERGENCY SPILLWAY:	
						CONTOUR ELEV. (FT. MSL)	CONTOUR AREA (Ac.)	D.S.C.L. ELEV. (Ft. MSL)	X-SECT AREA (SF)	INVERT ELEV. (Ft. MSL)	LENGTH (Ft)
7A	0.133	77	0.48	0.29	7ASWP	110	0.80	110.0	3.53	113.9	0.00
						111	1.94				
						112	4.34				
						113	11.31				
						114	18.24				
7B	0.116	77	0.87	0.52	7BSWP	103	0.26	101.0	1.77	105.9	0.00
						104	0.65				
						106	2.16				
						108	3.58				
						109	5.77				
7C	0.053	77	0.41	0.25	7CHNL						
7D	0.104	77	0.64	0.38	7DSWP	88	0.57	90.6	4.91	92.0	10.00
						90	1.42				
						92	2.49				
						94	3.86				
7E	0.046	77	0.23	0.14	7ECHN						
7F	0.206	77	0.49	0.29	7FCHNL						

TABLE 10-3B
HYDROLOGICAL INPUT DATA FOR HEC-1 ANALYSIS
OFFSITE - EXISTING CONDITIONS
WATERSHEDS 6, 7 & 8
(ROUTING 7 THROUGH 6)

SUBWATERSHED IDENTIFICATION	AREA (Sq. Mi.)	CN	Tc (Hr)	Tlag (Hr)	ROUTING NAME	STORAGE BASIN		LOW LEVEL SPILLWAY:		EMERGENCY SPILLWAY:	
						CONTOUR ELEV. (FT. MSL)	CONTOUR AREA (Ac.)	D.S.C.L. ELEV. (Ft. MSL)	X-SECT AREA (SF)	INVERT ELEV. (Ft. MSL)	LENGTH (Ft)
7G	0.063	77	0.51	0.31	7GSWP	85	0	85.8	16.25	88.0	0.00
						86	0.57				
						87	2.53				
						88	5.15				
7H	0.186	77	0.51	0.31	7HSWP	84	0.39			84.0	10.00
						86	3.08				
						87	9.24				
						88	15.26				
8B	0.332	74	0.68	0.41	8BCHL						
8C	0.116	74	0.43	0.26	8CSWP	64	1.12			64.0	12.00
						66	1.91				
						68	3.26				
						70	5.70				
						72	8.79				
						74	11.08				
8AA	0.06	74	0.39	0.23	8AASWP	78	0.00				
						80	2.42				
						82	5.19				
						84	9.28				
8AB	0.016	74	0.39	0.23	8ABCHL						

TABLE 10-4
HYDROLOGICAL INPUT DATA FOR HEC-1 ANALYSIS
ONSITE - EXISTING CONDITIONS

SUBWATERSHED IDENTIFICATION	AREA (Sq. Mi.)	CN	Tc (Hr)	Tlag (Hr)	ROUTING NAME	STORAGE BASIN		LOW LEVEL SPILLWAY:		EMERGENCY SPILLWAY:	
						CONTOUR ELEV. (FT. MSL)	CONTOUR AREA (Ac.)	D.S.C.L. ELEV. (Ft. MSL)	X-SECT AREA (SF)	INVERT ELEV. (Ft. MSL)	LENGTH (Ft)
NB1	0.015	78	0.73	0.44	NB1CHL						
NB2	0.009	70	0.81	0.49	NB2CHL						
NB3	0.004	70	0.56	0.34	NB3CHL						
NB4	0.036	78	0.75	0.45	NB4CHL	61.6	0.000	62.6	3.14	64.9	0.0
						64.0	0.514				
						64.5	0.743				
						65.0	0.912				
						66.0	1.300				
NB5	0.017	79	0.54	0.32	NB5SWP	66.5	1.084			68.1	30.0
						67.2	1.586				
						68.2	3.737				
SB1	0.032	88	0.25	0.15	PHPND	57.0	3.914	57.5	14.14	65.9	40.0
						59.5	4.830				
						60.6	5.514				
						62.0	7.530				
						64.0	8.809				
						66.0	11.892				
SB2	0.011	95	0.10	0.06	SB1267						

TABLE 10-4
HYDROLOGICAL INPUT DATA FOR HEC-1 ANALYSIS
ONSITE - EXISTING CONDITIONS

SUBWATERSHED IDENTIFICATION	AREA (Sq. Mi.)	CN	Tc (Hr)	Tlag (Hr)	ROUTING NAME	STORAGE BASIN		LOW LEVEL SPILLWAY:		EMERGENCY SPILLWAY:	
						CONTOUR ELEV. (FT. MSL)	CONTOUR AREA (Ac.)	D.S.C.L. ELEV. (Ft. MSL)	X-SECT AREA (SF)	INVERT ELEV. (Ft. MSL)	LENGTH (Ft)
SB3&4	0.017	87	0.12	0.07	SB34PD	63.5	0.228			66.9	40.0
						65.7	0.484				
						66.0	1.708				
					SB34CH	59.1	0.000	61.4	12.57	66.9	0.0
						60.0	0.033				
						62.0	0.064				
						64.0	0.095				
						66.0	0.123				
SB5	0.015	85	0.44	0.26	SB5SWP	62.0	1.020	62.4	1.23	64.9	30.0
						63.0	2.247				
						64.0	3.131				
						65.0	3.834				
SB6	0.004	73	0.35	0.21	SB1267						
SB7	0.014	73	0.42	0.25	SB7CH						
HB1AN	0.008	81	0.47	0.28	PXDPR	68.0	0.000	68.9	7.07	70.9	30.0
						69.0	0.291				
						70.0	0.721				
						71.0	0.938				

TABLE 10-4
HYDROLOGICAL INPUT DATA FOR HEC-1 ANALYSIS
ONSITE - EXISTING CONDITIONS

SUBWATERSHED IDENTIFICATION	AREA (Sq. Mi.)	CN	Tc (Hr)	Tlag (Hr)	ROUTING NAME	STORAGE BASIN		LOW LEVEL SPILLWAY:		EMERGENCY SPILLWAY:	
						CONTOUR ELEV. (FT. MSL)	CONTOUR AREA (Ac.)	D.S.C.L. ELEV. (Ft. MSL)	X-SECT AREA (SF)	INVERT ELEV. (Ft. MSL)	LENGTH (Ft)
HB1AS	0.006	90	0.78	0.47	HB1CH	66.4	0.000	59.65	7.07	69.3	0.0
						66.5	0.016				
						67.0	0.019				
						67.5	0.033				
						68.0	0.041				
						69.0	0.066				
						69.4	0.074				
HB1B	0.021	84	0.52	0.31	EWCHPX						
HB2A	0.020	86	0.69	0.41	HB2ASP	59.3	0.801			59.0	10.0
						60.0	1.178				
						62.0	1.929				
HB2B	0.013	77	0.40	0.24	HB2B						
HB3A	0.020	85	0.43	0.26	SHD10C						
HB3B	0.010	88	0.17	0.10	HB3BSP	68.8	0.000			69.4	40.0
						69.2	0.745				
						69.5	1.368				
HB3C	0.010	76	0.47	0.28	CRMLGN	59.0	0.298			62.9	40.0
						60.2	0.425				
						62.0	0.735				
						63.0	1.211				
HB4A	0.023	84	0.41	0.25	SHD10C						

TABLE 10-4
HYDROLOGICAL INPUT DATA FOR HEC-1 ANALYSIS
ONSITE - EXISTING CONDITIONS

SUBWATERSHED IDENTIFICATION	AREA (Sq. Mi.)	CN	Tc (Hr)	Tlag (Hr)	ROUTING NAME	STORAGE BASIN		LOW LEVEL SPILLWAY:		EMERGENCY SPILLWAY:	
						CONTOUR ELEV. (FT. MSL)	CONTOUR AREA (Ac.)	D.S.C.L. ELEV. (Ft. MSL)	X-SECT AREA (SF)	INVERT ELEV. (Ft. MSL)	LENGTH (Ft)
HB4B	0.066	93	0.53	0.32	HB4BCL	57.8	0.000	59.0	12.57	66.7	0.0
						59.0	0.047				
						61.0	0.067				
						63.0	0.088				
						65.0	0.110				
						66.8	0.128				
HP3A	0.036	80	0.83	0.50	HP3ASP	69.0	1.885	70.2	1.23	74.2	0.0
						70.0	3.173				
						71.5	7.358				
HP3B	0.013	76	0.31	0.19	HP3BCH						
HP4	0.013	76	0.56	0.34	HP4SWP	68.0	0.334			69.9	30.0
						69.0	0.632				
						70.0	1.897				
HP5	0.015	84	0.31	0.19	HP5SWP	68.0	0.000			69.9	15.0
						69.0	0.304				

TABLE 10-4
HYDROLOGICAL INPUT DATA FOR HEC-1 ANALYSIS
ONSITE - EXISTING CONDITIONS

SUBWATERSHED IDENTIFICATION	AREA (Sq. Mi.)	CN	Tc (Hr)	Tlag (Hr)	ROUTING NAME	STORAGE BASIN		LOW LEVEL SPILLWAY:		EMERGENCY SPILLWAY:	
						CONTOUR ELEV. (FT. MSL)	CONTOUR AREA (Ac.)	D.S.C.L. ELEV. (Ft. MSL)	X-SECT AREA (SF)	INVERT ELEV. (Ft. MSL)	LENGTH (Ft)
CW1	0.011	80	0.29	0.17	CW1CHL	61.0	0.000	62.6	12.57	65.9	0.0
						63.0	0.017				
						64.0	0.135				
						65.0	0.214				
						66.0	0.260				
CW2	0.026	92	0.27	0.16	CW2CH	59.9	0.000	61.8	12.57	67.5	30.0
						61.0	0.082				
						63.0	0.129				
						65.0	0.178				
						67.0	0.225				
						67.7	0.241				

TABLE 10-5
HYDROLOGICAL INPUT DATA FOR HEC-1 ANALYSIS
ONSITE - PROPOSED CONDITIONS

SUBWATERSHED IDENTIFICATION		AREA (Sq. Mi.)	CN	Tc (Hr)	Tlag (Hr)	ROUTING NAME	STORAGE BASIN: CONTOUR ELEV. (FT. MSL)	STORAGE BASIN: CONTOUR AREA (Ac.)	LOW LEVEL SPILLWAY: D.S.C.L. ELEV. (Ft. MSL)	LOW LEVEL SPILLWAY: X-SECT AREA (SF)	EMERGENCY SPILLWAY: INVERT ELEV. (Ft. MSL)	EMERGENCY SPILLWAY: LENGTH (Ft)
(HB1B)	1P	0.021	87	0.52	0.31	EWCLPX						
(HB1AN)	2PN	0.008	85	0.47	0.28	PXDPR	68.0	0.000	69.7	9.62	72.3	0.0
							69.0	0.291				
							70.0	0.721				
							71.0	0.936				
(HB1AS)	2PS	0.006	96	0.04	0.02	2PSDB	66.0	0.069	66.0	0.79	69.9	0.0
							67.0	0.088				
							68.0	0.108				
							69.0	0.130				
							70.0	0.154				
						2PSCHL	66.4	0.000	59.7	7.07	69.3	0.0
							66.5	0.016				
							67.0	0.019				
							67.5	0.033				
							68.0	0.041				
							69.0	0.066				
							69.4	0.074				

TABLE 10-5
HYDROLOGICAL INPUT DATA FOR HEC-1 ANALYSIS
ONSITE - PROPOSED CONDITIONS

SUBWATERSHED IDENTIFICATION	AREA (Sq. Mi.)	CN	Tc (Hr)	Tlag (Hr)	ROUTING NAME	STORAGE BASIN:		LOW LEVEL SPILLWAY:		EMERGENCY SPILLWAY:	
						CONTOUR ELEV. (FT. MSL)	CONTOUR AREA (Ac.)	D.S.C.L. ELEV. (Ft. MSL)	X-SECT AREA (SF)	INVERT ELEV. (Ft. MSL)	LENGTH (Ft)
3PE	0.002	98	0.04	0.02	3PEDB	63.0	0.035	63.5	0.79	66.9	0.0
						64.0	0.046				
						65.0	0.060				
						66.0	0.075				
3PW	0.010	78	0.40	0.24							
4P	0.017	91	0.69	0.41	4PSWP	60.6	0.801			60.6	10.0
						61.3	1.178				
						62.0	1.430				
						63.3	1.939				
4PS	0.003	97	0.13	0.08	4PSDB	59.0	0.048	59.0	0.44	61.9	0.0
						60.0	0.063				
						61.0	0.079				
						62.0	0.097				
5PN	0.008	78	0.72	0.43	AADWEX						
5PS	0.051	83	0.87	0.52	SHD10C						
6PN	0.037	89	0.25	0.15	WETLAND 1C	69.0	2.190				
						70.0	4.320				
						71.0	5.850				
						72.0	7.250				

TABLE 10-5
HYDROLOGICAL INPUT DATA FOR HEC-1 ANALYSIS
ONSITE - PROPOSED CONDITIONS

SUBWATERSHED IDENTIFICATION	AREA (Sq. Mi.)	CN	Tc (Hr)	Tlag (Hr)	ROUTING NAME	STORAGE BASIN:		LOW LEVEL SPILLWAY:		EMERGENCY SPILLWAY:	
						CONTOUR ELEV. (FT. MSL)	CONTOUR AREA (Ac.)	D.S.C.L. ELEV. (Ft. MSL)	X-SECT AREA (SF)	INVERT ELEV. (Ft. MSL)	LENGTH (Ft)
6PS	0.015	79	0.26	0.16	MAWL	66.0	0.936	66.0	0.79	72.9	0.0
						67.0	1.861	68.0	1.77		
						69.0	2.498				
						71.0	2.765				
						73.0	3.188				
7P	0.002	81	0.18	0.11	7PCHL	63.4	0.000	63.4	3.14	80.0	0.0
						67.1	0.006				
						68.0	0.008				
						69.0	0.017				
						70.0	0.022				
						71.0	0.028				
						72.0	0.033				
8P	0.022	81	0.41	0.25	8PCHL	61.0	0.000	62.6	12.57	67.9	0.0
						63.0	0.014				
						64.0	0.101				
						65.0	0.187				
						66.0	0.241				
						67.0	0.294				
						68.0	0.349				

TABLE 10-5
HYDROLOGICAL INPUT DATA FOR HEC-1 ANALYSIS
ONSITE - PROPOSED CONDITIONS

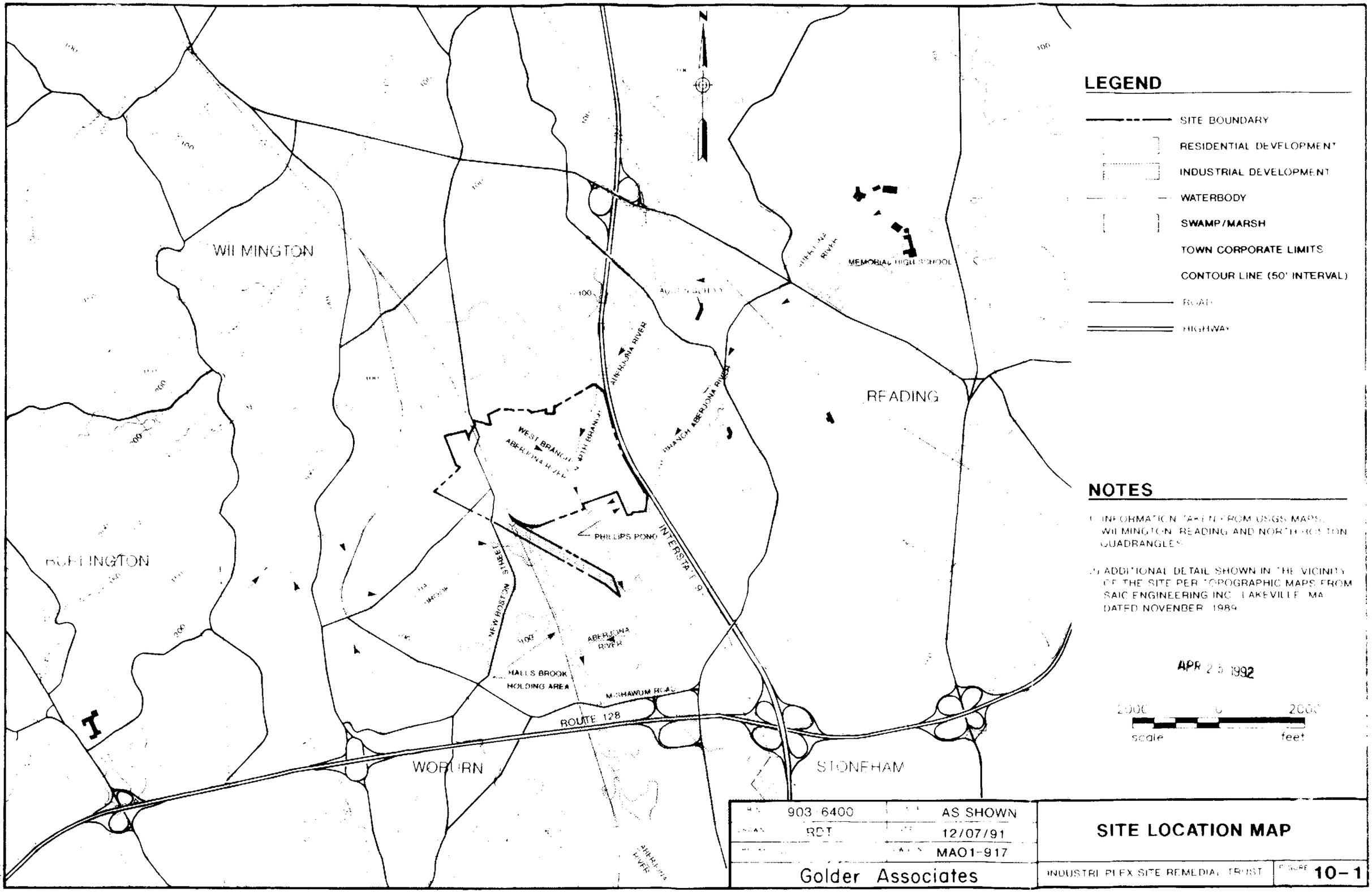
SUBWATERSHED IDENTIFICATION	AREA (Sq. Mi.)	CN	Tc (Hr)	Tlag (Hr)	ROUTING NAME	STORAGE BASIN: CONTOUR ELEV. (FT. MSL)	STORAGE BASIN: CONTOUR AREA (Ac.)	LOW LEVEL SPILLWAY: D.S.C.L. ELEV. (Ft. MSL)	LOW LEVEL SPILLWAY: X-SECT AREA (SF)	EMERGENCY SPILLWAY: INVERT ELEV. (Ft. MSL)	EMERGENCY SPILLWAY: LENGTH (Ft)
9P	0.011	82	0.31	0.19	AADWEX	60.0	0.003	61.9	37.70	67.9	0.0
						62.5	0.011				
						63.5	0.028				
						64.5	0.058				
						65.5	0.096				
						66.5	0.136				
						67.5	0.176				
						68.0	0.196				
(CW2) 10P	0.026	92	0.37	0.22	10PCHL	59.9	0.000	61.8	12.57	67.5	30.0
					(CW2CHL)	61.0	0.082				
						63.0	0.129				
						65.0	0.178				
						67.0	0.225				
						67.7	0.241				
11P	0.068	91	0.53	0.32	11PCHL	57.8	0.000	59.0	12.57	66.7	0.0
					(HB4BCL)	59.0	0.047				
						61.0	0.067				
						63.0	0.088				
						65.0	0.110				
						66.8	0.128				
(NB1) 12P	0.015	78	0.73	0.44	12PCHL						
(NB2) 13P	0.009	70	0.81	0.49	19PCHL						

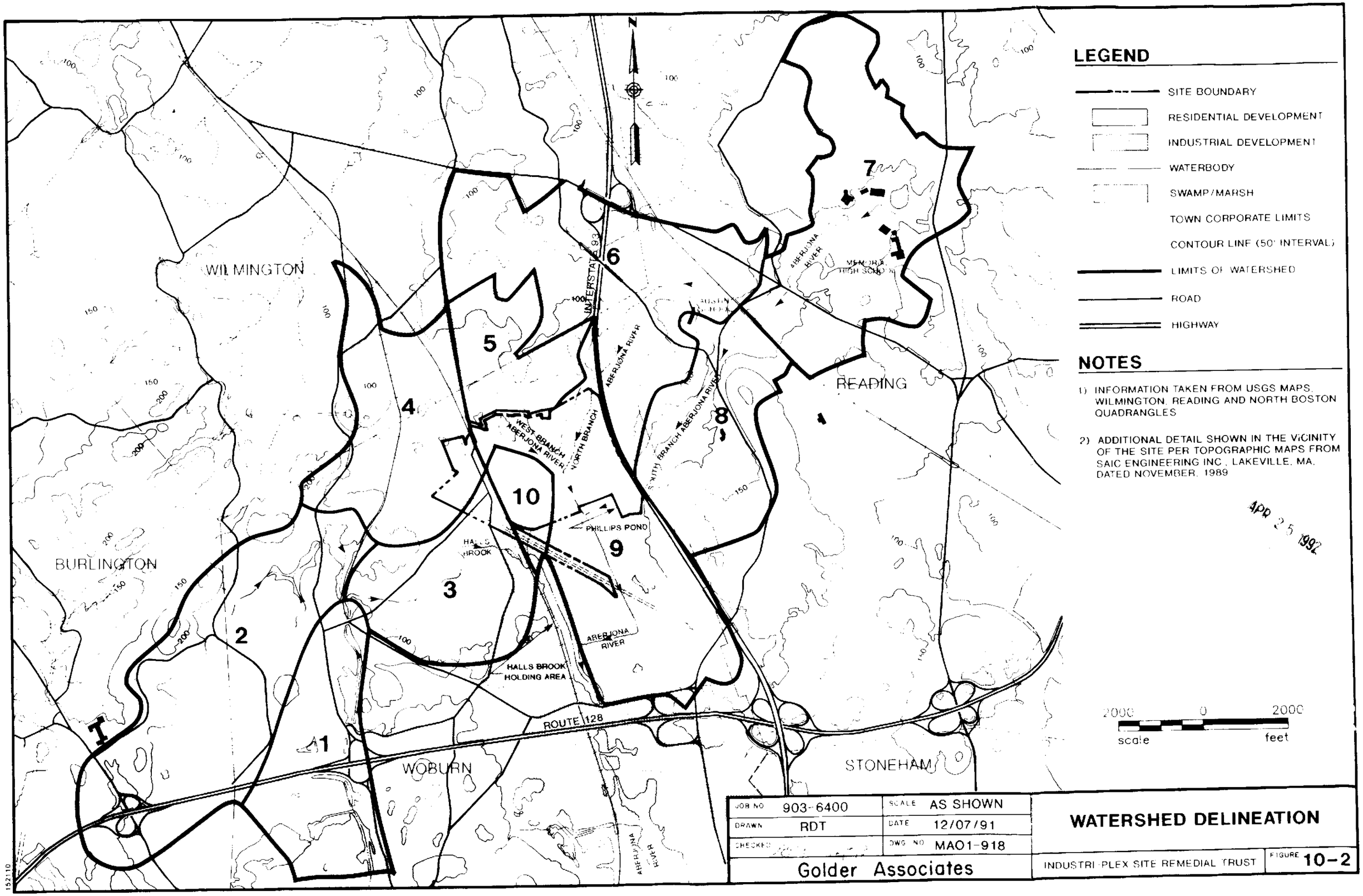
TABLE 10-5
HYDROLOGICAL INPUT DATA FOR HEC-1 ANALYSIS
ONSITE - PROPOSED CONDITIONS

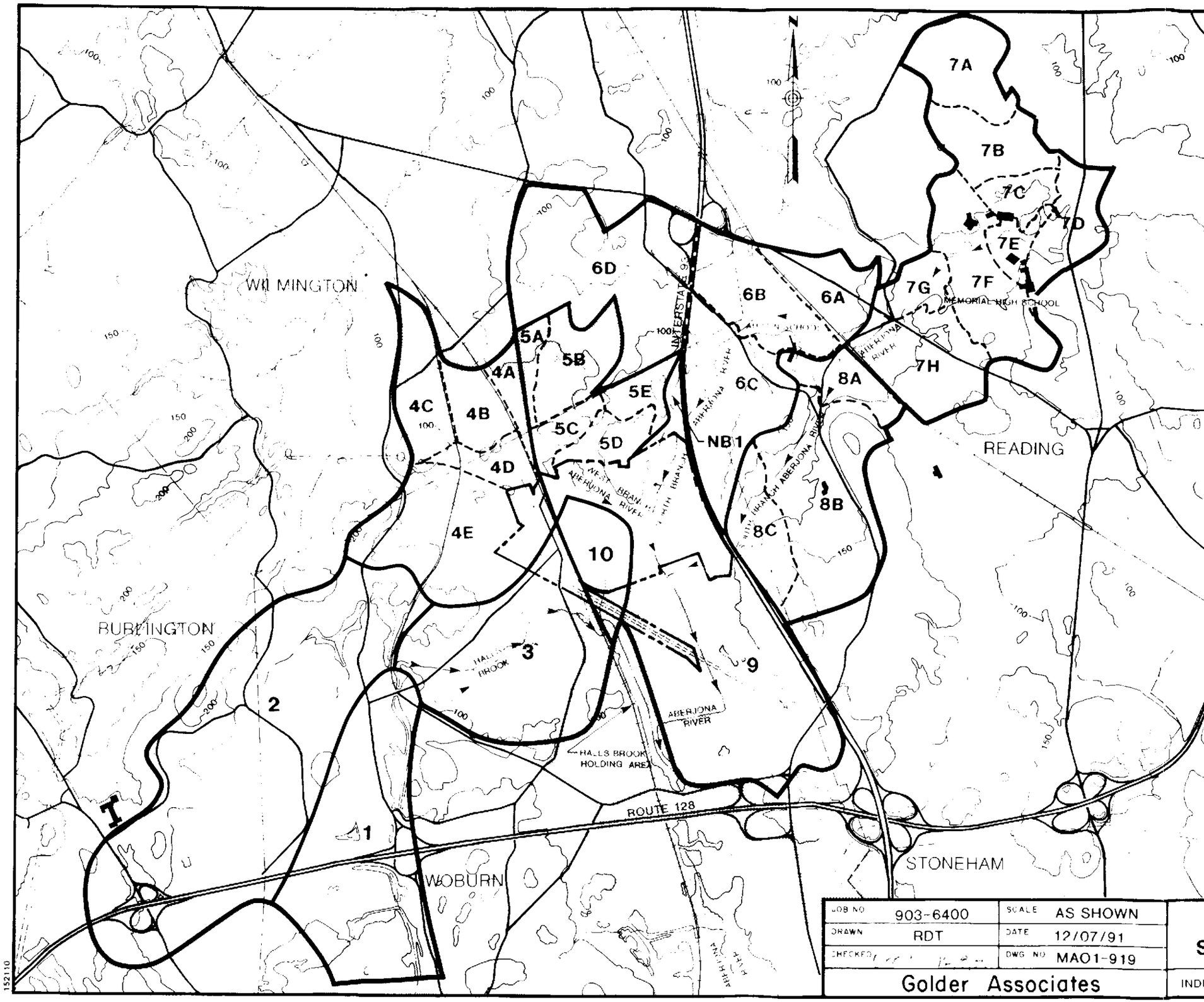
SUBWATERSHED IDENTIFICATION		AREA (Sq. Mi.)	CN	Tc (Hr)	Tlag (Hr)	ROUTING NAME	STORAGE BASIN: CONTOUR ELEV. (FT. MSL)	STORAGE BASIN: CONTOUR AREA (Ac.)	LOW LEVEL SPILLWAY: D.S.C.L. ELEV. (Ft. MSL)	LOW LEVEL SPILLWAY: X-SECT AREA (SF)	EMERGENCY SPILLWAY: INVERT ELEV. (Ft. MSL)	EMERGENCY SPILLWAY: LENGTH (Ft)
(NB4)	14P	0.036	78	0.75	0.45	14PCHL	61.6	0.000	62.6	3.14	64.9	0.0
						(NB4CHL)	64.0	0.514				
							64.5	0.743				
							65.0	0.912				
							66.0	1.300				
(SB5)	15P	0.016	86	0.44	0.26	15PSWP	62.0	1.020	62.4	1.23	64.9	30.0
						(SB5SWP)	63.0	2.247				
							64.0	3.131				
							65.0	3.834				
(SB3&4)	16&17P	0.017	87	0.12	0.07	1617PD	63.5	0.228			65.9	40.0
						(SB34PD)	65.7	0.484				
							66.0	1.708				
						1617CH	59.1	0.000	61.4	12.57	65.9	0.0
						(SB34CH)	60.0	0.033				
							62.0	0.064				
							64.0	0.095				
							66.0	0.123				
(SB2)	18P	0.011	95	0.10	0.06							
(NB3)	19P	0.004	70	0.56	0.34	19PCHL						

TABLE 10-5
HYDROLOGICAL INPUT DATA FOR HEC-1 ANALYSIS
ONSITE - PROPOSED CONDITIONS

SUBWATERSHED IDENTIFICATION	AREA (Sq. Mi.)	CN	Tc (Hr)	Tlag (Hr)	ROUTING NAME	STORAGE BASIN: CONTOUR ELEV. (FT. MSL)	STORAGE BASIN: CONTOUR AREA (Ac.)	LOW LEVEL SPILLWAY: D.S.C.L. ELEV. (Ft. MSL)	LOW LEVEL SPILLWAY: X-SECT AREA (SF)	EMERGENCY SPILLWAY: INVERT ELEV. (Ft. MSL)	EMERGENCY SPILLWAY: LENGTH (Ft)
(NB5) 20P	0.017	79	0.54	0.32	20PSWP	66.5	1.084			68.1	30.0
					(NB5SWP)	67.2	1.586				
						68.2	3.737				
(SB7) 21P	0.014	73	0.42	0.26	21PCHL						
(SB6) 22P	0.004	73	0.35	0.21	21PCHL						
(SB1) 23P	0.032	88	0.25	0.16	PHPOND	57.0	3.914	57.5	14.14	65.9	40.0
						59.5	4.830				
						60.6	5.514				
						62.0	7.530				
						64.0	8.809				
						66.0	11.892				


LEGEND
SITE BOUNDARY
RESIDENTIAL DEVELOPMENT
INDUSTRIAL DEVELOPMENT
WATERBODY
SWAMP/MARSH
TOWN CORPORATE LIMITS
CONTOUR LINE (50' INTERVAL)
ROAD
HIGHWAY
NOTES
1. INFORMATION TAKEN FROM USGS MAPS, WILMINGTON, READING AND NORTH BOSTON QUADRANGLES.
2. ADDITIONAL DETAIL SHOWN IN THE VICINITY OF THE SITE PER TOPOGRAPHIC MAPS FROM SAIC ENGINEERING INC. LAKEVILLE, MA DATED NOVEMBER 1989.
APR 2 5 1992
2000 0 2000
scale feet
WILMINGTON
READING
BURLINGTON
WOBURN
STONEHAM
MEMORIAL HIGH SCHOOL
ABERJONA RIVER
WEST BRANCH ABERJONA RIVER
PHILLIPS POND
INTERSTATE 93
NEW BOSTON STREET
HALLS BROOK HOLDING AREA
MISHAWUM ROAD
ROUTE 128
903-6400
AS SHOWN
RDT
12/07/91
MA01-917
Golder Associates
SITE LOCATION MAP
INDUSTRIPLEX SITE REMEDIAL TRUST
FIGURE 10-1


LEGEND
SITE BOUNDARY
RESIDENTIAL DEVELOPMENT
INDUSTRIAL DEVELOPMENT
WATERBODY
SWAMP/MARSH
TOWN CORPORATE LIMITS
CONTOUR LINE (50' INTERVAL)
LIMITS OF WATERSHED
ROAD
HIGHWAY
NOTES
1) INFORMATION TAKEN FROM USGS MAPS, WILMINGTON, READING AND NORTH BOSTON QUADRANGLES
2) ADDITIONAL DETAIL SHOWN IN THE VICINITY OF THE SITE PER TOPOGRAPHIC MAPS FROM SAIC ENGINEERING INC., LAKEVILLE, MA, DATED NOVEMBER, 1989
APR 25 1992
WILMINGTON
BURLINGTON
WOBURN
READING
STONEHAM
INTERSTATE 93
ROUTE 128
ABERJONA RIVER
WEST BRANCH ABERJONA RIVER
NORTH BRANCH
SOUTH BRANCH ABERJONA RIVER
PHILLIPS POND
HALLS BROOK
HALLS BROOK HOLDING AREA
MENOTOMY HIGH SCHOOL
1
2
3
4
5
6
7
8
9
10
2000 0 2000
scale feet
JOB NO 903-6400
SCALE AS SHOWN
DRAWN RDT
DATE 12/07/91
CHECKED
DWG NO MA01-918
Golder Associates
WATERSHED DELINEATION
INDUSTRI-PLEX SITE REMEDIAL TRUST
FIGURE 10-2
152110



LEGEND

- SITE BOUNDARY
- RESIDENTIAL DEVELOPMENT
- INDUSTRIAL DEVELOPMENT
- WATERBODY
- SWAMP/MARSH
- TOWN CORPORATE LIMITS
- CONTOUR LINE (50' INTERVAL)
- LIMITS OF WATERSHED
- SUBWATERSHED LIMITS
- ROAD
- HIGHWAY
- DIRECTION OF FLOW

NOTES

1) INFORMATION TAKEN FROM USGS MAPS WILMINGTON, READING AND NORTH BOSTON QUADRANGLES

2) ADDITIONAL DETAIL SHOWN IN THE VICINITY OF THE SITE PER TOPOGRAPHIC MAPS FROM SAIC ENGINEERING INC., LAKEVILLE, MA, DATED NOVEMBER, 1989

APR 25 1992

2000 0 2000
scale feet

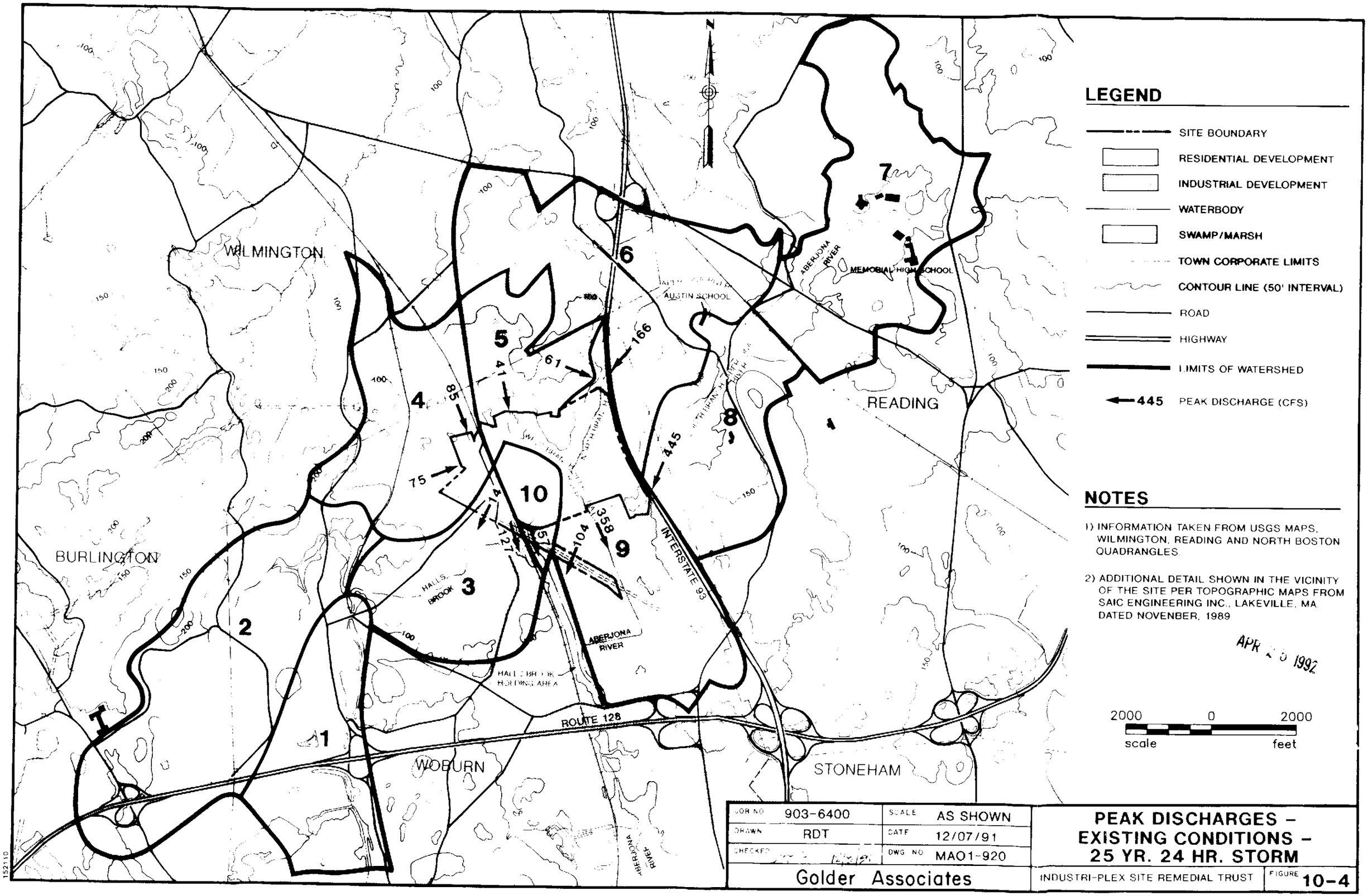
JOB NO	903-6400	SCALE	AS SHOWN
DRAWN	RDT	DATE	12/07/91
CHECKED		DWG NO	MA01-919
Golder Associates			

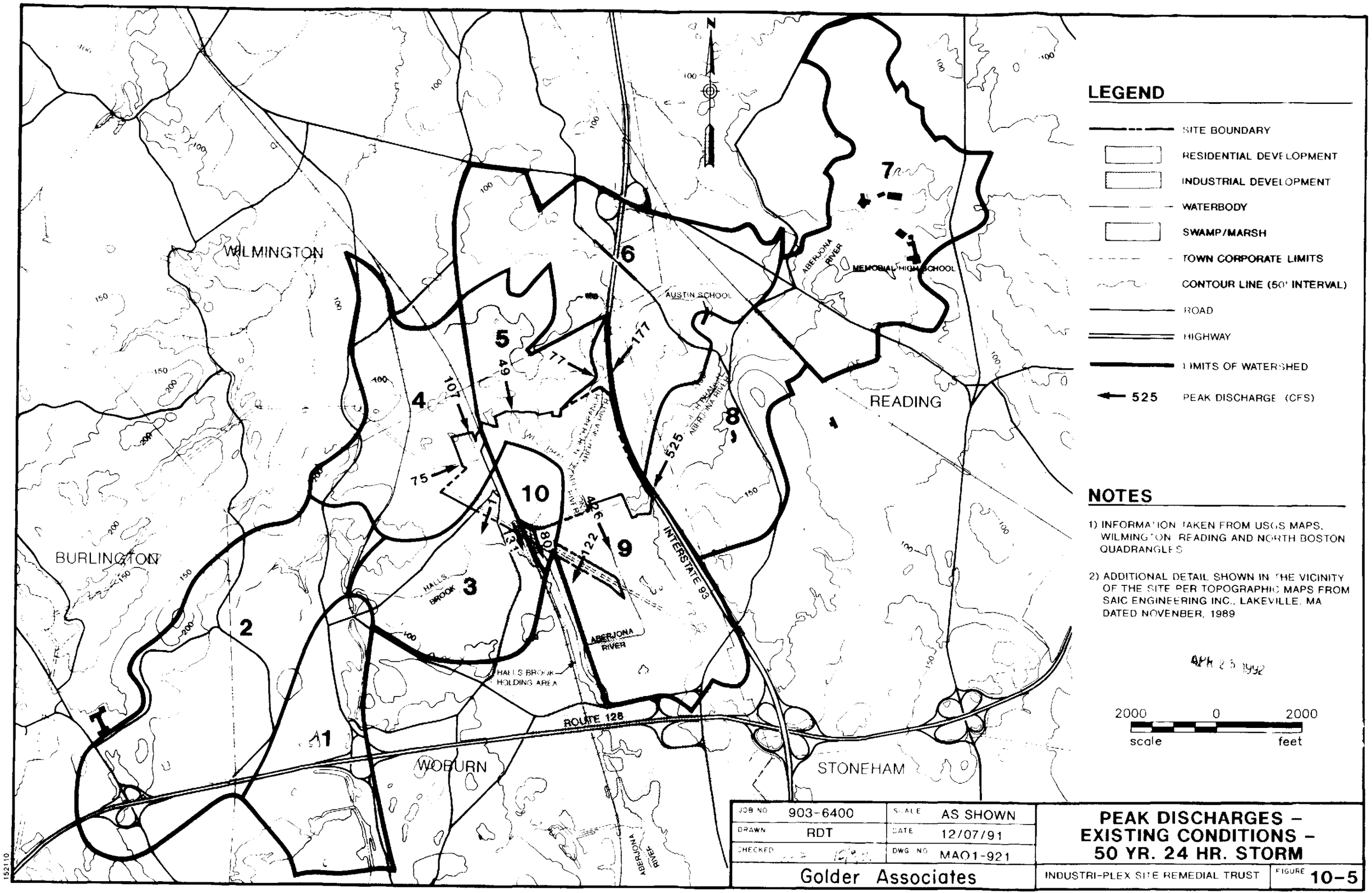
OFF-SITE SUBWATERSHED DELINEATION

INDUSTRI-PLEX SITE REMEDIAL TRUST

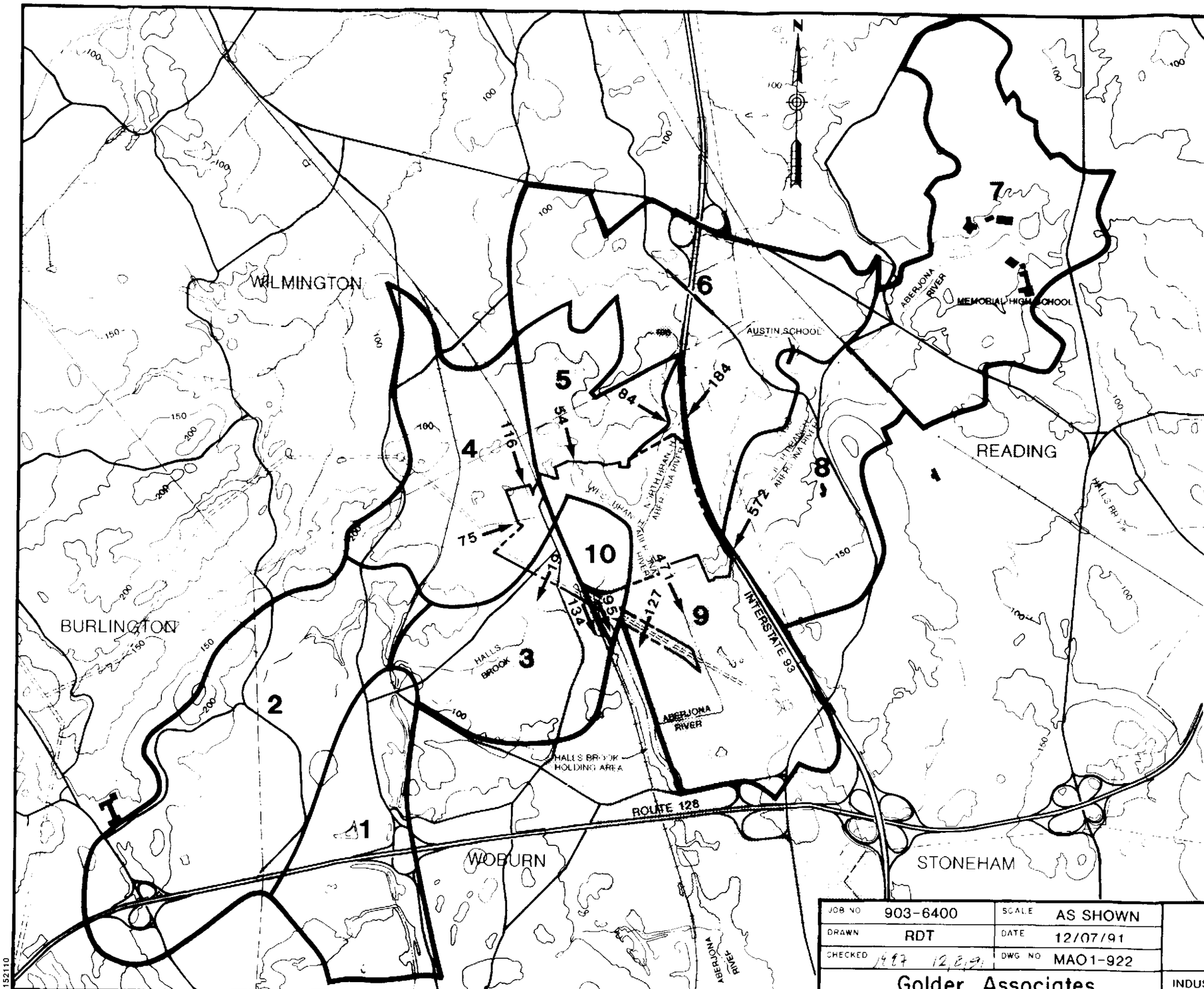
FIGURE 10-3

152110


LEGEND
SITE BOUNDARY
RESIDENTIAL DEVELOPMENT
INDUSTRIAL DEVELOPMENT
WATERBODY
SWAMP/MARSH
TOWN CORPORATE LIMITS
CONTOUR LINE (50' INTERVAL)
ROAD
HIGHWAY
LIMITS OF WATERSHED
445 PEAK DISCHARGE (CFS)
NOTES
1) INFORMATION TAKEN FROM USGS MAPS, WILMINGTON, READING AND NORTH BOSTON QUADRANGLES.
2) ADDITIONAL DETAIL SHOWN IN THE VICINITY OF THE SITE PER TOPOGRAPHIC MAPS FROM SAIC ENGINEERING INC., LAKEVILLE, MA DATED NOVENBER, 1989
APR 20 1992
2000 0 2000
scale feet
WILMINGTON
READING
BURLINGTON
WOBURN
STONEHAM
AUSTIN SCHOOL
MEMORIAL HIGH SCHOOL
ABERJONA RIVER
HALLS BROOK
HALLS BROOK HOLDING AREA
INTERSTATE 93
ROUTE 128
1
2
3
4
5
6
7
8
9
10
166
61
41
85
75
14
127
57
104
358
445
JOB NO 903-6400
SCALE AS SHOWN
DRAWN RDT
DATE 12/07/91
CHECKED
DWG NO MAO1-920
Golder Associates
PEAK DISCHARGES – EXISTING CONDITIONS – 25 YR. 24 HR. STORM
INDUSTRI-PLEX SITE REMEDIAL TRUST
FIGURE 10-4
152110



WILMINGTON
BURLINGTON
READING
WOBURN
STONEHAM
AUSTIN SCHOOL
MEMORIAL HIGH SCHOOL
ABERJONA RIVER
HALLS BROOK
HALLS BROOK HOLDING AREA
INTERSTATE 93
ROUTE 128
1
2
3
4
5
6
7
8
9
10
107
49
77
177
525
75
426
122
80
131
N
LEGEND
SITE BOUNDARY
RESIDENTIAL DEVELOPMENT
INDUSTRIAL DEVELOPMENT
WATERBODY
SWAMP/MARSH
TOWN CORPORATE LIMITS
CONTOUR LINE (50' INTERVAL)
ROAD
HIGHWAY
LIMITS OF WATERSHED
525 PEAK DISCHARGE (CFS)
NOTES
1) INFORMATION TAKEN FROM USGS MAPS, WILMINGTON, READING AND NORTH BOSTON QUADRANGLES
2) ADDITIONAL DETAIL SHOWN IN THE VICINITY OF THE SITE PER TOPOGRAPHIC MAPS FROM SAIC ENGINEERING INC., LAKEVILLE, MA DATED NOVENBER, 1989
APR 25 1992
2000 0 2000
scale feet
JOB NO 903-6400
SCALE AS SHOWN
DRAWN RDT
DATE 12/07/91
CHECKED
DWG NO MAO1-921
Golder Associates
PEAK DISCHARGES – EXISTING CONDITIONS – 50 YR. 24 HR. STORM
INDUSTRI-PLEX SITE REMEDIAL TRUST
FIGURE 10-5
152110



LEGEND

- SITE BOUNDARY
- RESIDENTIAL DEVELOPMENT
- INDUSTRIAL DEVELOPMENT
- WATERBODY
- SWAMP/MARSH
- TOWN CORPORATE LIMITS
- CONTOUR LINE (50' INTERVAL)
- ROAD
- HIGHWAY
- LIMITS OF WATERSHED
- 572 PEAK DISCHARGE (CFS)

NOTES

1) INFORMATION TAKEN FROM USGS MAPS, WILMINGTON, READING AND NORTH BOSTON QUADRANGLES.

2) ADDITIONAL DETAIL SHOWN IN THE VICINITY OF THE SITE PER TOPOGRAPHIC MAPS FROM SAIC ENGINEERING INC., LAKEVILLE, MA DATED NOVENBER, 1989.

APR 2 7 1992

2000 0 2000
scale feet

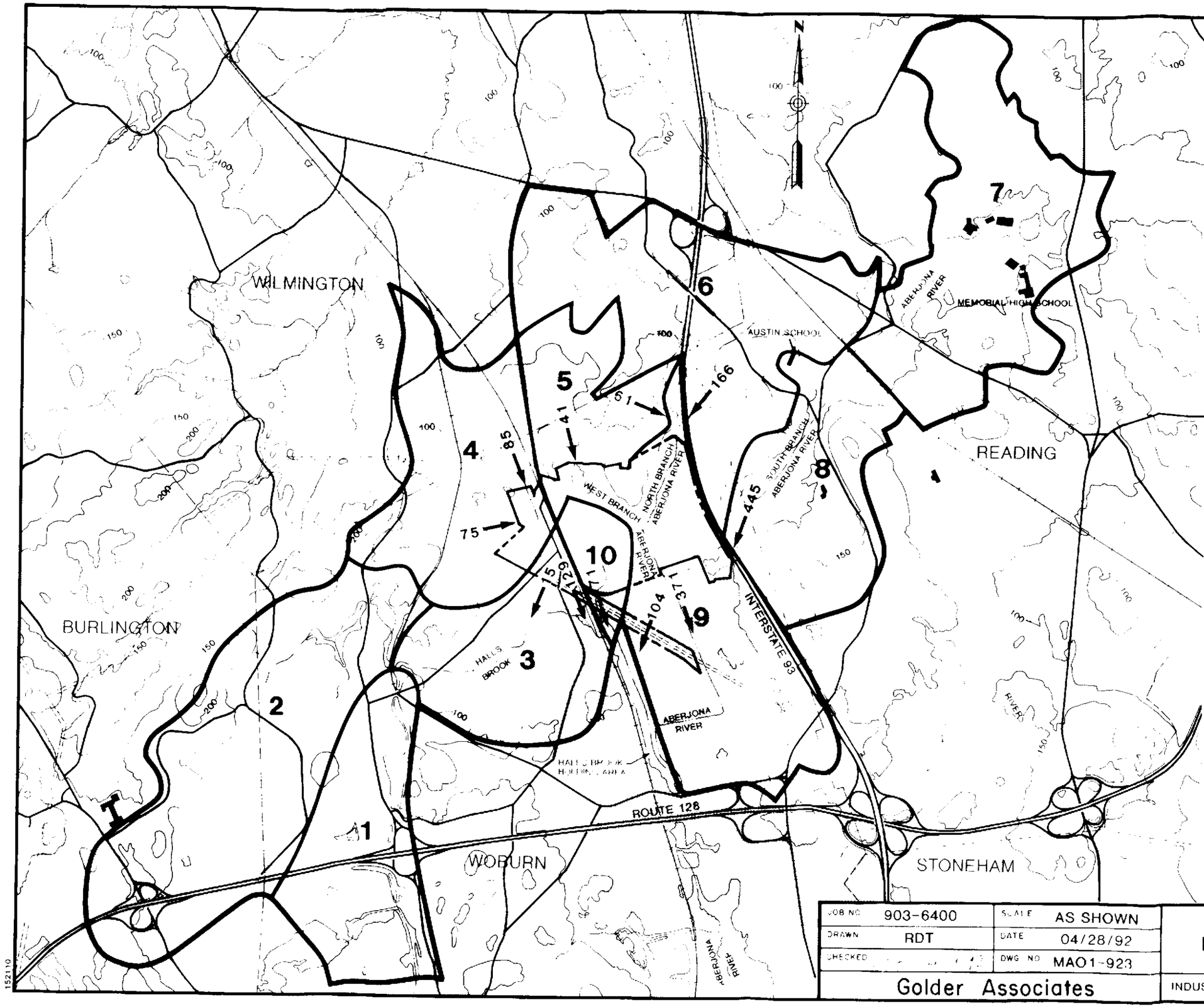
JOB NO	903-6400	SCALE	AS SHOWN
DRAWN	RDT	DATE	12/07/91
CHECKED	12/8/91	DWG NO	MA01-922
Golder Associates			

PEAK DISCHARGES – EXISTING CONDITIONS – 100 YR. 24 HR. STORM

INDUSTRI-PLEX SITE REMEDIAL TRUST

FIGURE 10-6

152110



LEGEND

- SITE BOUNDARY
- RESIDENTIAL DEVELOPMENT
- INDUSTRIAL DEVELOPMENT
- WATERBODY
- SWAMP/MARSH
- TOWN CORPORATE LIMITS
- CONTOUR LINE (50' INTERVAL)
- ROAD
- HIGHWAY
- LIMITS OF WATERSHED
- 572 PEAK DISCHARGE (CFS)

NOTES

1) INFORMATION TAKEN FROM USGS MAPS, WILMINGTON, READING AND NORTH BOSTON QUADRANGLES.

2) ADDITIONAL DETAIL SHOWN IN THE VICINITY OF THE SITE PER TOPOGRAPHIC MAPS FROM SAIC ENGINEERING INC., LAKEVILLE, MA. DATED NOVENBER, 1989

APR 28 1992

2000 0 2000
scale feet

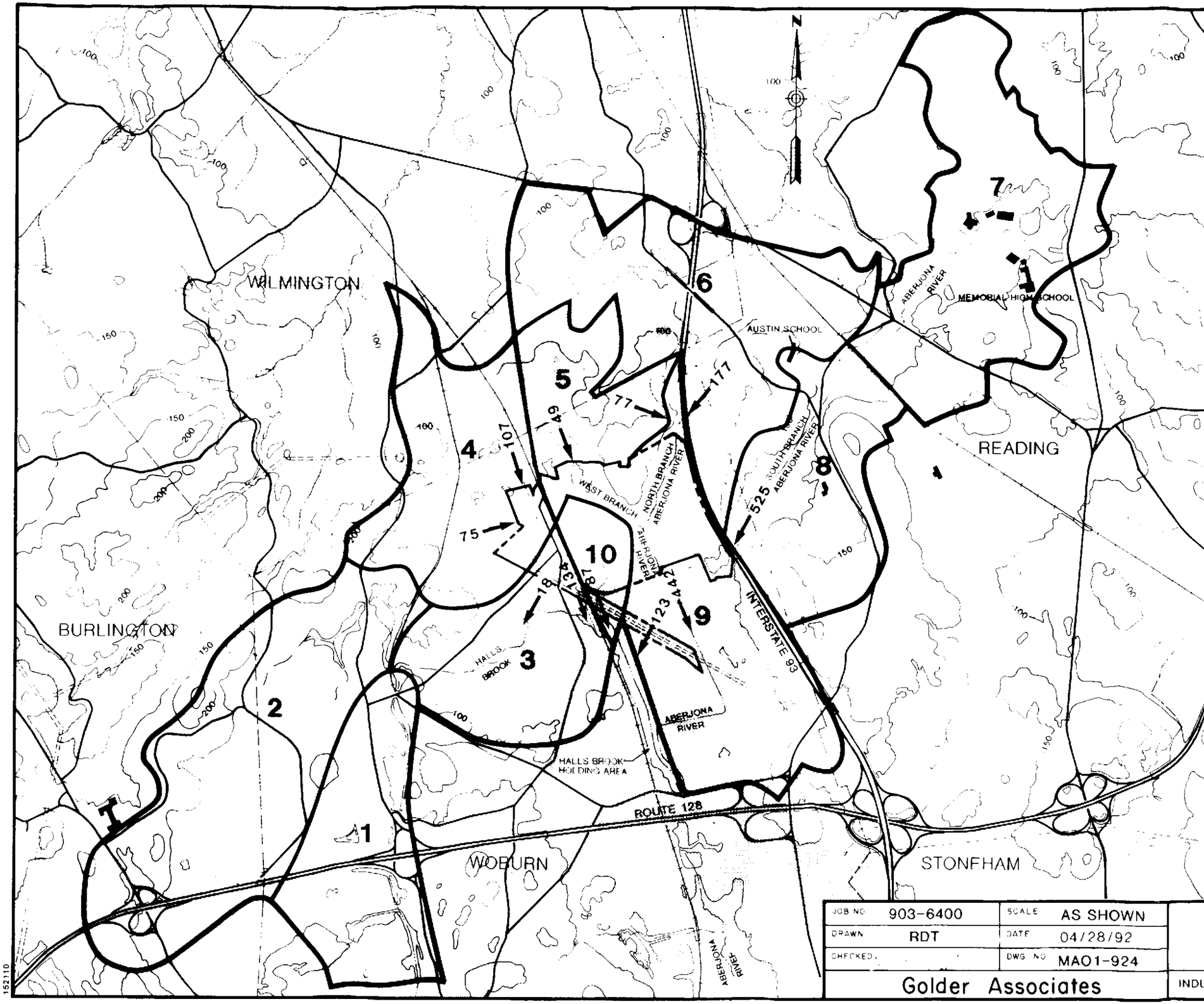
JOB NO	903-6400	SCALE	AS SHOWN
DRAWN	RDT	DATE	04/28/92
CHECKED		DWG NO	MAO1-923
Golder Associates			

PEAK DISCHARGES – PROPOSED CONDITIONS – 25 YR. 24 HR. STORM

INDUSTRI-PLEX SITE REMEDIAL TRUST

FIGURE 10-7

152110



LEGEND

- SITE BOUNDARY
- RESIDENTIAL DEVELOPMENT
- INDUSTRIAL DEVELOPMENT
- WATERBODY
- SWAMP/MARSH
- TOWN CORPORATE LIMITS
- CONTOUR LINE (50' INTERVAL)
- ROAD
- HIGHWAY
- LIMITS OF WATERSHED
- 572 PEAK DISCHARGE (CFS)

NOTES

1) INFORMATION TAKEN FROM USGS MAPS, WILMINGTON, READING AND NORTH BOSTON QUADRANGLES

2) ADDITIONAL DETAIL SHOWN IN THE VICINITY OF THE SITE PER TOPOGRAPHIC MAPS FROM SAIC ENGINEERING INC., LAKEVILLE, MA DATED NOVENBER, 1989

2000 0 2000
scale feet

JOB NO	903-6400	SCALE	AS SHOWN
DRAWN	RDT	DATE	04/28/92
CHECKED		DWG NO	MA01-924

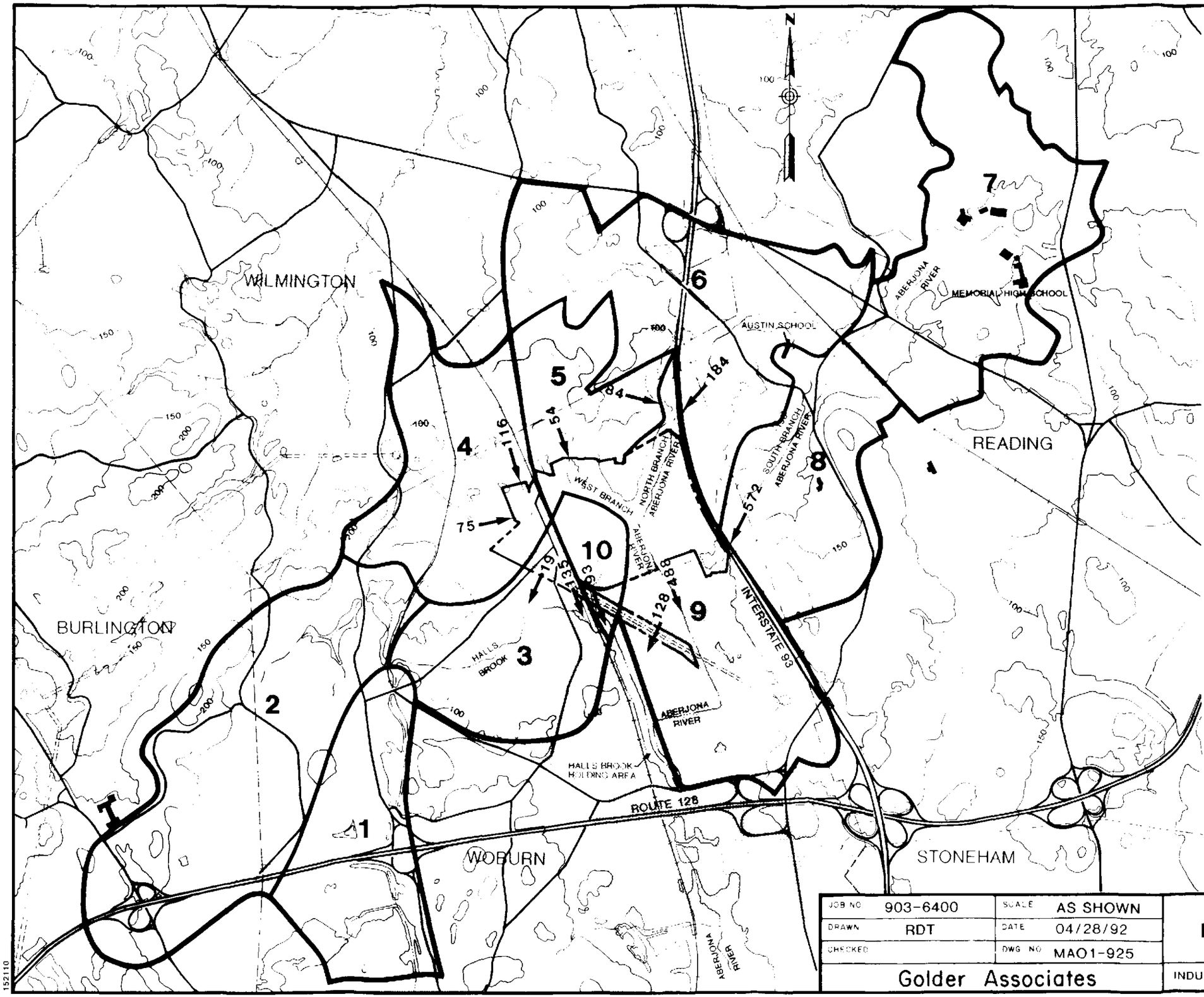
Golder Associates

PEAK DISCHARGES – PROPOSED CONDITIONS – 50 YR. 24 HR. STORM

INDUSTRI-PLEX SITE REMEDIAL TRUST

FIGURE **10-8**

152110



LEGEND

- SITE BOUNDARY
- RESIDENTIAL DEVELOPMENT
- INDUSTRIAL DEVELOPMENT
- WATERBODY
- SWAMP/MARSH
- TOWN CORPORATE LIMITS
- CONTOUR LINE (50' INTERVAL)
- ROAD
- HIGHWAY
- LIMITS OF WATERSHED
- 572 PEAK DISCHARGE (CFS)

NOTES

1) INFORMATION TAKEN FROM USGS MAPS, WILMINGTON, READING AND NORTH BOSTON QUADRANGLES.

2) ADDITIONAL DETAIL SHOWN IN THE VICINITY OF THE SITE PER TOPOGRAPHIC MAPS FROM SAIC ENGINEERING INC., LAKEVILLE, MA. DATED NOVENBER, 1989

2000 0 2000
scale feet

JOB NO	903-6400	SCALE	AS SHOWN
DRAWN	RDT	DATE	04/28/92
CHECKED		DWG NO	MAO1-925
Golder Associates			

PEAK DISCHARGES – PROPOSED CONDITIONS – 100 YR. 24 HR. STORM

INDUSTRI-PLEX SITE REMEDIAL TRUST

FIGURE 10-9

152110

LEGEND

- SITE BOUNDARY
- N 553,500 — GRID LINE
- TRAIL
- SOIL AND WOOD CHIP PILES
- STREAMS AND WATERCOURSES
- RAILROAD TRACKS
- BUSH
- TREE
- SIGN
- UTILITY POLE
- CATCH BASIN
- MANHOLE
- FIRE HYDRANT
- +62.1 — TYPICAL SPOT ELEVATION
- DEPRESSION
- CONSENT DECREE HIDE PILES
- SUBWATERSHED BOUNDARY
- SB2 — SUBWATERSHED DESIGNATION

NOTES

1.) TOPOGRAPHY FROM PHOTOGRAMMETRIC MAP COMPILED BY LIU AERIAL SURVEYS 15 APRIL 90, FOR SAIC ENGINEERING, INC. AT 1 IN. TO 100 FT. AERIAL PHOTOS TAKEN 22 NOVEMBER 90, SCALE 1 IN. TO 800 FT.

2.) SITE AND PROPERTY BOUNDARIES SURVEYED BY SAIC ENGINEERING, INC. APRIL 1, 1990 AND JANUARY 1991.

3.) ELEVATIONS TO NATIONAL GEODETIC VERTICAL DATUM OF 1929 GRID COORDINATES BASED ON MASSACHUSETTS COORDINATE SYSTEM.

4.) DEFINITION OF SUBWATERSHED DESIGNATION PREFIXES
NB = NORTH BRANCH OF THE ABERJONA RIVER
SB = SOUTH BRANCH OF THE ABERJONA RIVER
HP = HIDE PILE
HB = HALLS BROOK
CW = COMMERCE WAY

200 0 200 400
scale feet

APR 25 1992

REV	DATE	DESCRIPTION	DR BY	RVW BY

SCALE: AS SHOWN
PROJECT No. 903-6400

DES BY	VEF	12/09/91
DR BY	ELW	12/09/91
CHK BY		
RVW BY		

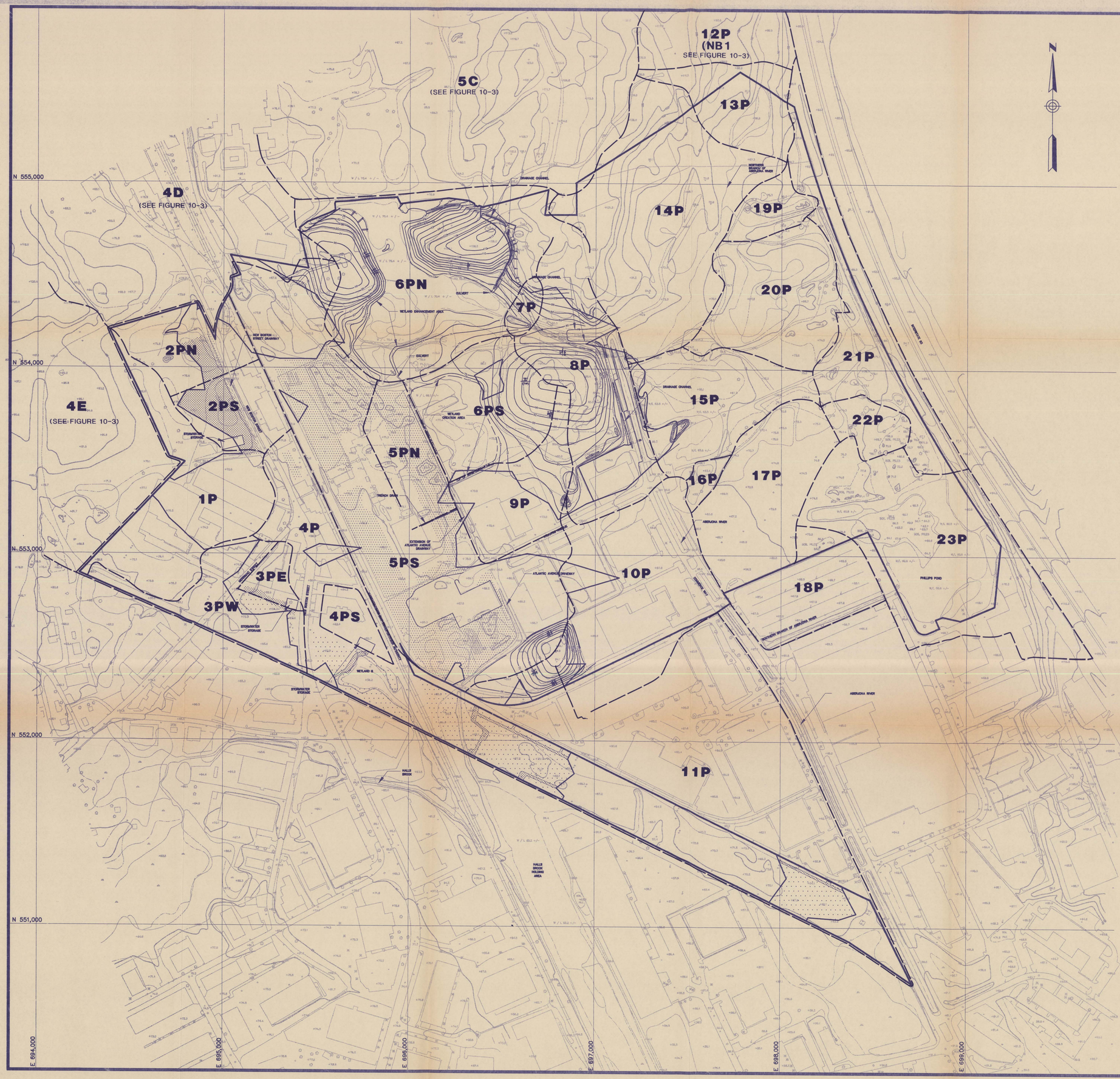
PROJECT: INDUSTRI-PLEX SITE REMEDIAL TRUST WOBURN, MASSACHUSETTS

SHEET TITLE: ON SITE SUBWATERSHED DELINEATION EXISTING CONDITIONS

Golder Associates
Mt. Laurel, New Jersey

SHEET 1 OF 1
DRAWING No. MA01-932

FIGURE 10-10



LEGEND

	SITE BOUNDARY
	EXTENT OF ARSENIC, LEAD OR CHROMIUM AT OR ABOVE ACTION LEVELS AND CONSENT DECREE HIDE PILES
N 552,000	GRID LINE
	TOP OF COVER CONTOUR
	CLEAR AND GRUB, PLACE 6 oz. GEOTEXTILE AND 16 INCH COVER SOIL ON PREPARED GRADE
	CLEAR AND GRUB, PLACE 6 oz. GEOTEXTILE AND 12 OR 16 INCH ASPHALT COVER ON PREPARED GRADE
	CLEAR AND GRUB, PLACE 6 oz. GEOTEXTILE, 13 INCH COVER SOIL AND 3 INCH GRAVEL SURFACE
	LIMITS OF SUBWATERSHED
21P	PROPOSED SUBWATERSHED TITLE

NOTES

1.) TOPOGRAPHIC BASE MAP PREPARED BY SAIC ENGINEERING, INC., OCTOBER 1991, SCALE 1 INCH TO 100 FEET. TOPOGRAPHY BASED ON AERIAL PHOTOGRAPHY CONDUCTED ON NOVEMBER 22, 1989, SCALE 1 INCH TO 800 FEET. TOPOGRAPHY SCALE AND DETAIL IS FOR CONCEPTUAL DESIGN PURPOSES ONLY AND NOT FOR ACCURATE ESTIMATING OF CONSTRUCTION QUANTITIES.

2.) SITE BOUNDARY SURVEY BY SAIC ENGINEERING, INC., APRIL 1990 AND JANUARY 1991.

3.) ELEVATIONS BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929, AND COORDINATES BASED ON MASSACHUSETTS COORDINATE SYSTEM.

200 0 200 400
scale feet

APR 20 1992

REV	DATE	DESCRIPTION	DR BY	RVW BY

SCALE: AS SHOWN

PROJECT No. 903-6400

DES BY	VEEF	12/20/91
DR BY	RK	12/20/91
CHK BY	[illegible]	12/21/91
RVW BY	[illegible]	12/21/91

PROJECT: INDUSTRI-PLEX SITE REMEDIAL TRUST
WOBURN, MASSACHUSETTS

SHEET TITLE: ON-SITE SUBWATERSHED DELINEATION PROPOSED CONDITIONS

Golder Associates
Mt. Laurel, New Jersey

1 OF 1

FILE No. MAC1-960

FIGURE 10-11

APPENDIX 10-A

Analysis of Watershed 4

Subwatershed Areas

Golder Associates

SUBJECT AREA FOR SUB-WATERSHED 4		
Job No. 903-6400.310 Ref. ISRT	Made by MJC Checked MRT Reviewed JEEZ	Date 3-4-91 Sheet 1 of 1

PURPOSE: DETERMINE AREA OF THE SUBWATERSHEDS WITHIN SUBWATERSHED # 4 ON ATTACHED USGS PLAN.

METHOD: DIGITAL PLANIMETER USED TO DETERMINE WATERSHED AREAS.

REFERENCES: USGS MAP OF WOBURN, MASS (SCALE 1" = 2083')

AREAS:

SUB-SUBWATERSHED #	AREA (ft^2)	AVG. AREA (ft^2) (Ac)
4A	874,286 941,539	907,913 20.84 Ac
4B	1,815,825 2,017,583	1,916,704 44.00
4C	3,093,628 3,026,375	3,060,002 70.25
4D	1,277,803 1,345,056	1,311,430 30.11
4E	8,541,103 8,070,334	8,305,719 190.67

Curve Numbers

Golder Associates	SUBJECT CN calcs - Exist Cond. - Entire Drainage Area		
	Job No. 903-6400 Ref. 1SRT	Made by V.E.E. Checked CR Reviewed	Date 12-14-90 Sh 1 of 2

Objective: To calculate the weighted CN number for each of subwatershed 4.

Method: For each subwatershed, determine the percentage of each hydrologic soil type (A, B, C, D) that exists. Within each soil type, determine the percentage and accompanying CN for each land use. Calculate the weighted CN for each soil type by summing the multiplication of the land use CN by the percentage of land use and divide by 100 $\left[CN_f = \frac{\Sigma(CN_{LU} \times \%LU)}{100}\right]$.

Calculate the subwatershed weighted CN by summing the multiplication of the percentage by the CN_f for each soil type and divide by 100 $\left[\text{weighted } CN = \frac{\Sigma(CN_f \times \%Area)}{100}\right]$.

Golder Associates	SUBJECT CN Calcs – Exist. Cond.		
	Job No. 903-6400 Ref. 1SRT	Made by V.E.E. Checked CRM Reviewed [illegible]	Date 12-13-90 Sheet 2 of 2

For Subwatershed 4

Soil Type	% Area	Use	CN#/use	CNf	%Area x CNf
A	10	Residential (R-1) (50%) Open Spc, fair cdn (50%)	46 49	48	480
B	20	Residential (R-1) (100%)	65	65	1300
C	30	Residential (R-1) (10%) Industrial (30%) Open Spc, fair cdn (60%)	77 91 79	83	2490
D	40	Residential (R-1) (50%) Open Spc, fair cdn (50%)	82 84	83	3320
TOTAL	100	—	—	—	7590

$$\text{Weighted CN} = \frac{7590}{100} \approx 76$$

Times of Concentration

Golder Associates	SUBJECT T_c FOR SUBWATERSHED 4		
	Job No. 903-6400.310 Ref. 1SRT	Made by MJC Checked MRT Reviewed VEEZ	Date 3-4-91 Sheet 1 of 8

OBJECTIVE: TO DETERMINE THE LAG TIME OF EACH OF THE SUBWATERSHEDS IN SUBWATERSHED 4, FOR USE IN HEC-1 MODELING

METHODS: USING THE METHODS AND FORMULAS OUTLINED IN CHAPTER 3 OF the USDA, SCS, TR-55 MANUAL, DETERMINE THE T_c (time of concentration) FOR EACH SUBWATERSHED. MULTIPLY T_c BY 0.6 TO OBTAIN THE T_{LAG} (lag time) Per N.E.H. Chapter 4.

Summary

Subwatershed name	T_c	T_L
4A	0.49	0.29
4B	0.49	0.29
4C	0.90	0.54
4D	0.50	0.30
4E	0.42	0.25

Golder Associates	SUBJECT T_c FOR SUBWATERSHED 4		
	Job No. 903-6400.310 Ref. 1SRT	Made by MJC Checked MRT Reviewed UEE7	Date 3-4-91 Sheet 2 of 8

FOR SUB-SUBWATERSHED 4A:

A) SHEET FLOW

$L = 300$ Ft.
$\Delta h = 120 - 100 = 20$ ft.
$n = 0.15$ (short grass)

$$s = \frac{\Delta h}{L} = \frac{20 \text{ ft}}{300 \text{ ft}} = 0.067$$

$$T_{tsf} = \frac{(0.007)(nL)^{0.8}}{(P_2)^{0.5}\, s^{0.4}}$$ where $P_2 = 3.2$ inches

$$T_{tsf} = \frac{(0.007)\left[(0.15)(300)\right]^{0.8}}{(3.2)^{0.5}(0.067)^{0.4}}$$

$T_{tsf} = 0.24$ HR.

B) SHALLOW CONCENTRATED FLOW

$L = 1{,}458$ ft
$\Delta h = 100 \text{ ft} - 80 \text{ ft} = 20$ ft

$$s = \frac{\Delta h}{L} = \frac{20 \text{ ft.}}{1{,}458 \text{ ft}} = 0.014$$

FROM FIG. 3-1, FOR UNPAVED, $V = 1.9$ ft/sec

$$T_{tscf} = \frac{L}{3600\, V} = \frac{1458}{3600\,(1.9 \text{ ft/sec})}$$

$T_{tscf} = 0.21$ HRS.

Golder Associates	SUBJECT T_c FOR SUBWATERSHED 4		
	Job No. 903-6400.310 Ref. 1SRT	Made by MJC Checked MRT Reviewed UEEF	Date 3-4-91 Sheet 3 of 8

SUB-SUBWATERSHED 4A CON'T.

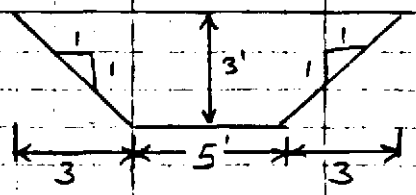
c) OPEN CHANNEL FLOW:

$L = 1{,}042$ FT

$\Delta h = 80\text{ ft} - 72\text{ ft} = 8\text{ ft}$

$$S = \frac{\Delta h}{L} = \frac{8\text{ ft}}{1{,}042\text{ ft}} = 0.008$$

$$A = \left(\frac{b+t}{2}\right)d = \left(\frac{5+11}{2}\right)3$$



$A = 24\text{ ft}^2$

$P = b + 2\sqrt{2}\,d = 5 + 2\sqrt{2}(3)$

$P = 13.5$ ft.

$$R_h = \frac{A}{P} = \frac{24\text{ ft}^2}{13.5\text{ ft}} = 1.78\text{ ft}$$

$n = 0.03$ (natural streambed)

$$V = \frac{1.49}{n} R_h^{2/3} S^{1/2} = \frac{1.49}{0.03}(1.78)^{2/3}(0.008)^{1/2}$$

$V = 6.52$ ft/s

$$T_{t_c} = \frac{L}{3600\,V} = \frac{1{,}042\text{ ft}}{3600(6.52\text{ ft/s})} = 0.044\text{ HRS}$$

$T_c = T_{t_{sf}} + T_{t_{scf}} + T_{t_c}$

$T_c = (0.24\text{ HR} + 0.21 + 0.04)$ HRS.

$\boxed{T_c = 0.49\text{ HRS}}$

$T_{LAG} = (0.49\text{ HRS})(0.6)$

$\boxed{T_{LAG} = 0.294\text{ HRS}}$

Golder Associates	SUBJECT T_c FOR SUBWATERSHED 4		
	Job No. 903-6400.310 Ref. ISRT	Made by MJC Checked MRT Reviewed [illegible]	Date 3-4-91 Sheet 4 of 8

FOR SUB-SUBWATERSHED 4B:

A) SHEET FLOW

$L = 300$ FT.
$\Delta h = 90$ ft $- 85$ ft $= 5$ ft
$n = 0.15$ (short grass)

$$S = \frac{\Delta h}{L} = \frac{5 \text{ ft}}{300 \text{ ft}} = 0.0167$$

$$T_{t_{sf}} = \frac{(0.007)(nL)^{0.8}}{(P_2)^{0.5}\, S^{0.4}}$$ where $P_2 = 3.2$ inches.

$$T_{tsf} = \frac{(0.007)[(0.15)(300)]^{0.8}}{(3.2)^{0.5}(0.0167)^{0.4}}$$

$T_{tsf} = 0.42$ HRS

B) SHALLOW CONCENTRATED FLOW

$L = 416$ ft.
$\Delta h = 85 - 80 = 5$ ft.

$$S = \frac{\Delta h}{L} = \frac{5 \text{ ft}}{416 \text{ ft}} = 0.012$$

FROM FIG. 3-1, FOR UNPAVED, $V = 1.75$ ft/sec.

$$T_{t_{scf}} = \frac{L}{3600 V} = \frac{416}{3600(1.75)}$$

$T_{tscf} = 0.066$ HRS.

$T_c = T_{t_{sf}} + T_{tscf}$

$T_c = (0.42 + 0.07)$ HRS.

$\boxed{T_c = 0.49 \text{ HRS.}}$ $T_{LAG} = 0.49$ HRS $\times 0.6 = \boxed{0.294 \text{ HRS}}$

Golder Associates	SUBJECT T_c FOR SUBWATERSHED 4		
	Job No. 903-6400.310 Ref. 1SRT	Made by MJC Checked MRT Reviewed DGE7	Date 3-4-91 Sheet 5 of 8

FOR SUB-SUBWATERSHED 4D:

A) SHEET FLOW

$L = 300$ FT.
$\Delta h = 150$ FT $- 100$ FT $= 50$ FT.
$n = 0.15$ (SHORT GRASS)

$$s = \frac{\Delta h}{L} = \frac{50 \text{ FT}}{300 \text{ FT}} = 0.167$$

$$T_{tsf} = \frac{(0.007)(nL)^{0.8}}{(P_2)^{0.5}\, s^{0.4}}$$ where $P_2 = 3.2$ inches

$$T_{tsf} = \frac{(0.007)\left[(0.15)(300)\right]^{0.8}}{(3.2)^{0.5}\,(0.167)^{0.4}}$$

$T_{tsf} = 0.17$ HRS.

B) SHALLOW CONCENTRATED FLOW

$L = 2083$ ft.
$\Delta h = 100$ ft $- 76$ ft $= 24$ ft.
$n = 0.15$ (short grass)

$$s = \frac{\Delta h}{L} = \frac{24 \text{ ft}}{2083 \text{ ft}} = 0.012$$

FROM FIG. 3-1, FOR UNPAVED, $V = 1.75$ ft/sec

$$T_{tscf} = \frac{L}{3600\,V} = \frac{2083 \text{ ft}}{3600\,(1.75 \text{ ft/sec})}$$

$T_{tscf} = 0.33$ HRS

$T_c = T_{tsf} + T_{tscf}$

$T_c = (0.17 + 0.33)$ HRS.

$\boxed{T_c = 0.50 \text{ HRS.}}$ $T_{lag} = 0.5 \times 0.6 = \boxed{0.3 \text{ HRS}}$

Golder Associates	SUBJECT T_c FOR SUBWATERSHED 4		
	Job No. 903-6400.310 Ref. ISRT	Made by MJC Checked MRT Reviewed UEEF	Date 3-4-91 Sheet 6 of 8

FOR SUB-SUBWATERSHED 4C:

A) SHEET FLOW

$L = 300$ FT.
$\Delta h = 100\text{ ft} - 90\text{ ft} = 10$ ft.
$n = 0.15$ (short grass)

$$S = \frac{\Delta h}{L} = \frac{10\text{ ft.}}{300\text{ ft}} = 0.033$$

$$T_{tsf} = \frac{(0.007)(nL)^{0.8}}{(P_2)^{0.5}\, S^{0.4}}$$ where $P_2 = 3.2$ inches

$$T_{tsf} = \frac{(0.007)[(0.15)(300)]^{0.8}}{(3.2)^{0.5}(0.033)^{0.4}}$$

$T_{tsf} = 0.32$ HRS.

B) SHALLOW CONCENTRATED FLOW

$L = 2{,}291$
$\Delta h = 90\text{ ft} - 80\text{ ft} = 10$ ft.

$$S = \frac{\Delta h}{L} = \frac{10\text{ ft.}}{2{,}291\text{ ft}} = 0.0044$$

FROM FIG. 3-1, FOR UNPAVED, $V = 1.1$ ft/sec

$$T_{tscf} = \frac{L}{3600V} = \frac{2{,}291}{3600(1.1\text{ ft/sec})}$$

$T_{tscf} = 0.58$ HRS.

$T_c = T_{tsf} + T_{tscf}$

$T_c = (0.32 + 0.58)$ HRS.

$\boxed{T_c = 0.90 \text{ HRS.}}$ $T_{LAG} = 0.90 \times 0.6 = \boxed{0.54 \text{ HRS}}$

Golder Associates	SUBJECT T_c FOR SUBWATERSHED 4		
	Job No. 903-6400.310 Ref. ISRT	Made by MJC Checked MRT Reviewed UEEF	Date 3-4-91 Sheet 7 of 8

FOR SUB-SUBWATERSHED 4E:

A) SHEET FLOW

$L = 300$ FT.

$\Delta h = 220\text{ ft} - 130\text{ ft} = 90\text{ ft}$

$n = 0.15$ (SHORT GRASS) TABLE 3-1

$$S = \frac{\Delta h}{L} = \frac{90\text{ ft}}{300\text{ ft}} = 0.30\text{ ft/ft}$$

$$T_{t_{sf}} = \frac{(0.007)(nL)^{0.8}}{(P_2)^{0.5}\, S^{0.4}}$$

where $P_2 = 3.2$ inches

$$T_{t_{sf}} = \frac{(0.007)\left[(0.15)(300)\right]^{0.8}}{(3.2)^{0.5}\,(0.30)^{0.4}}$$

$T_{t_{sf}} = 0.133$ HR

B) SHALLOW CONCENTRATED FLOW

$L = 1979$ ft.

$\Delta h = 130\text{ ft} - 80\text{ ft} = 50\text{ ft}$

$$S = \frac{\Delta h}{L} = \frac{50\text{ ft}}{1979\text{ ft}} = 0.025$$

FROM FIG. 3-1, FOR UNPAVED, $V = 2.5$ ft/sec

$$T_{t_{scf}} = \frac{L}{3600\,V} = \frac{1979\text{ ft}}{3600\,(2.5\text{ ft/sec})}$$

$T_{t_{scf}} = 0.22$ HRS

Golder Associates	SUBJECT T_c FOR SUBWATERSHED 4		
	Job No. 9036400.310	Made by MJC	Date 3-4-91
	Ref. ISRT	Checked MRT	Sheet 8 of 8
		Reviewed UEE7	

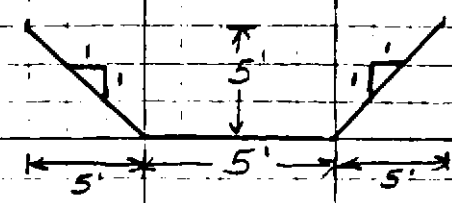
SUB-SUBWATERSHED 4E CON'T

c) FOR OPEN CHANNEL FLOW:

$L = 1666$ ft

$\Delta h = 80$ ft $- 70$ ft $= 10$ ft

$S = \frac{\Delta h}{L} = \frac{10 \text{ ft.}}{1666 \text{ ft}} = 0.006$



$A = \left(\frac{b+t}{2}\right) d = \left(\frac{5+15}{2}\right) 5'$

$A = 50 \text{ ft}^2$

$P = b + 2\sqrt{2}\, d = 5 + 2\sqrt{2}\,(5')$

$P = 19.14$ ft.

$R_h = \frac{A}{P} = \frac{50 \text{ ft}^2}{19.14 \text{ ft}} = 2.61$ ft.

$n = 0.03$ (natural streambed)

$V = \frac{1.49}{n} R_h^{2/3} S^{1/2} = \frac{1.49}{0.03} (2.61)^{2/3} (0.006)^{1/2}$

$V = 7.29$ fps

$T_{tc} = \frac{L}{3600\, V} = \frac{1666 \text{ ft.}}{(3600)(7.29)} = 0.064$

$T_{tc} = 0.064$ HRS.

$T_c = T_{tsf} + T_{tscf} + T_{tc}$

$T_c = (0.133 + 0.22 + 0.064)$ HR

$\boxed{T_c = 0.42 \text{ HR.}}$

$T_{LAG} = 0.42 \text{ HRS} \times 0.6$

$\boxed{T_{LAG} = 0.25 \text{ HRS}}$

Storage vs Elevation Relationships

Golder Associates	SUBJECT ISRT; STORAGE CAPACITY OF SWAMP AREAS FOR SUBWATERSHED 4		
	Job No. 903-6400.310 Ref. ISRT	Made by MJC Checked MRT Reviewed VEEF	Date 3-4-91 Sheet 1 of 3

OBJECTIVE: TO DETERMINE THE RUNOFF STORAGE CAPACITY OF SWAMP AREAS IN SUB-SUBWATERSHED AREAS 4B AND 4C.

METHOD: USING A DIGITAL PLANIMETER DETERMINE THE VOLUME OF SWAMP AREAS BETWEEN CONTOUR LINES BY TAKING THE AVERAGE AREA MULTIPLIED BY THE CHANGE IN ELEVATION. $V = \frac{A_1 + A_2}{2} \cdot \text{depth}$

CONTINUE THIS PROCESS BELOW THE PLAN'S WATER-LINE BY DRAWING AN ESTIMATED CONTOUR BELOW THE WATER LINE.

REFERENCE: USGS MAP; WOBURN, MASS. (SCALE 1" = 2083')

Golder Associates	SUBJECT STORAGE CAPACITY OF SWAMP AREAS		
	Job No. 903-6400.316	Made by MJC	Date 7-22-91
	Ref. ISRT/95%	Copied by SMM	Sheet 2 of 3
		Checked UEE7	
		Reviewed CNN	

SWAMP AREA IN SUB-SUBWATERSHED 4B

ELEV.	PLANIMETERED AREA (ft²)	AVG. AREA	DEPTH (ft)	Volume ft³	Cumulative Volume ft³
76	1) 538,022				
	2) 538,022				
AVG	538,022	689,341	4	2,757,364	2,757,364 (63.3 AC-FT)
80	1) 874,286				
	2) 807,033				
AVG	840,660				

Maximum Storage Elevation = 80

Minimum Storage Elevation = 76

Total Storage Volume = $\boxed{2,757,364 \text{ cf.}}$

SWAMP AREA IN SUB-SUBWATERSHED 4C

ELEV.	AREA Ft²	AVG AREA	DEPTH FT	Volume Ft³	Cumulative Volume ft³
76	1) 201,758				
	2) 201,758				
AVG	201,758	302,638	4	1,210,550	1,210,550 (27.8 AC-FT)
80	1) 403,517				
	2) 403,517				
	403,517				

MAXIMUM STORAGE ELEVATION = 80

MINIMUM STORAGE ELEVATION = 76

TOTAL STORAGE VOLUME = $\boxed{1,210,550 \text{ cf.}}$

Golder Associates	SUBJECT Storage vs Elevation - Offsite		
	Job No. 903-6400-30	Made by DP	Date 7/27/91
	Ref. ISRT - 954	Checked JEEF	Sheet 3 of 3
		Reviewed CAM	

Subwatershed 4E : 4ECHL

Elev	Area (sf)	Avg Area (sf)	Depth ft	Volume cf
65	8330 (0.191ae)			
		16,660	5	83,300
70	24990 (0.574ae)			

HEC-1

25 Year, 24 Hour Storm

1

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FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985

U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616

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THIS HEC-1 VERSION CONTAINS ALL OPTIONS EXCEPT ECONOMICS, AND THE NUMBER OF PLANS ARE REDUCED TO 3

1 HEC-1 INPUT PAGE 1

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

  1           ID        ISRT/WOBURN/MASS. 903-6400.310
  2           ID        SUBWATERSHED #4 (OFF SITE)
  3           ID        SWAMP AREAS NORTH & SOUTH OF WILMINGTON/WOBURN BORDER
  4           ID        DETAILED STORAGE AND STREAM NETWORK
  5           ID        EXISTING CONDITIONS - 25 YR, 24 HR STORM
              *DIAGRAM
  6           IT      15 28FEB91     100      97
  7           IO       5

  8           KK   SUB4C
  9           KO       4
 10           KM        SCS RUNOFF CALCULATION
 11           BA   0.110
 12           PH              0     0.5     1.1     2.1     2.7     3.0     3.6     4.5     5.2
 13           LS             76
 14           UD    0.54

 15           KK   4CSWP
 16           KO       1
 17           KM        STORAGE ROUTING THROUGH SUBWATERSHED 4C SWAMP
 18           RS       1    ELEV      76
 19           SA    4.63    9.26
 20           SE      76      80
 21           SL      76    3.14     0.6     0.5
 22           SS      80       0     3.0     1.5

 23           KK   SUB4B
 24           KO       4
 25           KM        SCS RUNOFF CALCULATION
 26           BA   0.069
 27           PH              0     0.5     1.1     2.1     2.7     3.0     3.6     4.5     5.2
 28           LS             76
 29           UD    0.29

 30           KK     4BC
 31           KM        COMBINE HYDROGRAPHS FOR  SUB4B & 4CSWP
 32           HC       2

 33           KK   4BSWP
 34           KO       1
 35           KM        STORAGE ROUTING THROUGH SUB4B SWAMP
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 36          RS       1    ELEV      76
 37          SA   12.35   19.30
 38          SE      76      80
 39          SS      76       5     3.0     1.5

 40          KK  CHAN4B
 41          KO       1
 42          KM        ROUTING THROUGH N-S CHANNEL WEST OF R.R. TRACKS
 43          RS       1    STOR       0
 44          RC    0.08    0.03    0.08    1354   0.004      75
 45          RX       0      10      20      24      29      32      62      65
 46          RY      74      75      75      71      71      74      74      71
1                                          HEC-1 INPUT                                                    PAGE  2

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


 47          KK   SUB4A
 48          KO       4
 49          KM        SCS RUNOFF CALCULATION
 50          BA   0.033
 51          PH              0     0.5     1.1     2.1     2.7     3.0     3.6     4.5     5.2
 52          LS             76
 53          UD    0.29

 54          KK  CHAN4A
 55          KO       1
 56          KM        ROUTING THROUGH N-S CHANNEL EAST OF R.R. TRACKS
 57          RS       1    STOR       0
 58          RC    0.08    0.03    0.08    1354   0.007      75
 59          RX       0       3      33      36      41      45      55      65
 60          RY      71      74      74      71      71      75      75      74

 61          KK   SUB4D
 62          KO       4
 63          KM        SCS RUNOFF CALCULATION
 64          BA   0.047
 65          PH              0     0.5     1.1     2.1     2.7     3.0     3.6     4.5     5.2
 66          LS             76
 67          UD    0.30

 68          KK  4DCHAB
 69          KO       1
 70          KM        COMBINE HYDROGRAPHS FOR SUB4D & CHANNELS 4A & 4B
 71          HC       3

 72          KK   SUB4E
 73          KO       4
 74          KM        SCS RUNOFF CALCULATION
 75          BA   0.298
 76          PH              0     0.5     1.1     2.1     2.7     3.0     3.6     4.5     5.2
 77          LS             76
 78          UD    0.25

 79          KK  CHAN4E
 80          KO       1
 81          KM        ROUTING THROUGH CHANNEL & PIPE
 82          RS       1    ELEV      65
 83          SA    0.19    0.57
 84          SE      65      70
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          85          SL    65.2    7.07     0.6     0.5
          86          SS      74       0     3.0     1.5
          87          ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK
 ...UT
 LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

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

    8       SUB4C
                V
                V
   15       4CSWP
                .
                .
   23           .       SUB4B
                .           .
                .           .
   30         4BC............
                V
                V
   33       4BSWP
                V
                V
   40      CHAN4B
                .
                .
   47           .       SUB4A
                .           V
                .           V
   54           .      CHAN4A
                .           .
                .           .
   61           .           .       SUB4D
                .           .           .
                .           .           .
   68      4DCHAB........................
                .
                .
   72           .       SUB4E
                .           V
                .           V
   79           .      CHAN4E

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1                                                    ****
                    FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985
          U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616
                                                     ****


                    ISRT/WOBURN/MASS. 903-6400.310
                    SUBWATERSHED #4 (OFF SITE)
                    SWAMP AREAS NORTH & SOUTH OF WILMINGTON/WOBURN BORDER
                    DETAILED STORAGE AND STREAM NETWORK
                    EXISTING CONDITIONS - 25 YR, 24 HR STORM
```

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

    IT        HYDROGRAPH TIME DATA
                     NMIN         15  MINUTES IN COMPUTATION INTERVAL
                    IDATE     28FEB91  STARTING DATE
                    ITIME       0100  STARTING TIME
                       NQ         97  NUMBER OF HYDROGRAPH ORDINATES
                   NDDATE      1MAR91  ENDING DATE
                   NDTIME       0100  ENDING TIME

                COMPUTATION INTERVAL     .25 HOURS
                     TOTAL TIME BASE   24.00 HOURS

        ENGLISH UNITS


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


          **************
          *            *
  8 KK    *     SUB4C  *
          *            *
          **************

  9 KO        OUTPUT CONTROL VARIABLES
                    IPRNT          4  PRINT CONTROL
                    IPLOT          0  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE
                             SCS RUNOFF CALCULATION

            SUBBASIN RUNOFF DATA

 11 BA        SUBBASIN CHARACTERISTICS
                    TAREA        .11  SUBBASIN AREA

              PRECIPITATION DATA

 12 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
              ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
              5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                .50    1.10    2.10    2.70    3.00    3.60    4.50    5.20     .00     .00     .00     .00

                                                STORM AREA =     .11

 13 LS        SCS LOSS RATE
                    STRTL        .63  INITIAL ABSTRACTION
                   CRVNBR      76.00  CURVE NUMBER
                    RTIMP        .00  PERCENT IMPERVIOUS AREA

 14 UD        SCS DIMENSIONLESS UNITGRAPH
                     TLAG        .54  LAG

                                                    ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG
```

```
                                                  UNIT HYDROGRAPH
                                              13 END-OF-PERIOD ORDINATES
          22.       70.       78.       54.       27.       15.        8.        4.        2.        1.
           1.        0.        0.

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

          **************
          *            *
 15 KK    *     4CSWP  *
          *            *
          **************

 16 KO        OUTPUT CONTROL VARIABLES
                    IPRNT           1  PRINT CONTROL
                    IPLOT           0  PLOT CONTROL
                    QSCAL          0.  HYDROGRAPH PLOT SCALE
                             STORAGE ROUTING THROUGH SUBWATERSHED 4C SWAMP

            HYDROGRAPH ROUTING DATA

 18 RS        STORAGE ROUTING
                    NSTPS           1  NUMBER OF SUBREACHES
                     ITYP        ELEV  TYPE OF INITIAL CONDITION
                   RSVRIC       76.00  INITIAL CONDITION
                        X         .00 WORKING R AND D COEFFICIENT

 19 SA             AREA         4.6       9.3

 20 SE        ELEVATION       76.00     80.00

 21 SL        LOW-LEVEL OUTLET
                    ELEVL       76.00  ELEVATION AT CENTER OF OUTLET
                    CAREA        3.14  CROSS-SECTIONAL AREA
                     COQL         .60  COEFFICIENT
                     EXPL         .50  EXPONENT OF HEAD

 22 SS        SPILLWAY
                     CREL       80.00  SPILLWAY CREST ELEVATION
                    SPWID         .00  SPILLWAY WIDTH
                     COQW         .00  WEIR COEFFICIENT
                     EXPW        1.50  EXPONENT OF HEAD

                                                        ***

                                          COMPUTED STORAGE-ELEVATION DATA

          STORAGE        .00     27.25
        ELEVATION      76.00     80.00

                                          COMPUTED OUTFLOW-ELEVATION DATA

          OUTFLOW        .00     14.78     15.79     16.94     18.28     19.85     21.71     23.96     26.73     30.22
        ELEVATION      76.00     76.96     77.09     77.26     77.46     77.73     78.06     78.51     79.13     80.00
```

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	4.88	5.65	6.61	7.86	9.50	11.75	14.94	19.69	27.25
OUTFLOW	.00	14.78	15.79	16.94	18.28	19.85	21.71	23.96	26.73	30.22
ELEVATION	76.00	76.96	77.09	77.26	77.46	77.73	78.06	78.51	79.13	80.00

****

HYDROGRAPH AT STATION 4CSWP

****

DA MON HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA MON HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA MON HRMN	ORD	OUTFLOW	STORAGE	STAGE
28 FEB 0100	1	0.	.0	76.0	28 FEB 0915	34	0.	.0	76.0	28 FEB 1730	67	17.	6.7	77.3
28 FEB 0115	2	0.	.0	76.0	28 FEB 0930	35	0.	.0	76.0	28 FEB 1745	68	17.	6.5	77.2
28 FEB 0130	3	0.	.0	76.0	28 FEB 0945	36	0.	.0	76.0	28 FEB 1800	69	17.	6.3	77.2
28 FEB 0145	4	0.	.0	76.0	28 FEB 1000	37	0.	.0	76.0	28 FEB 1815	70	16.	6.2	77.2
28 FEB 0200	5	0.	.0	76.0	28 FEB 1015	38	0.	.0	76.0	28 FEB 1830	71	16.	6.0	77.2
28 FEB 0215	6	0.	.0	76.0	28 FEB 1030	39	0.	.0	76.0	28 FEB 1845	72	16.	5.9	77.1
28 FEB 0230	7	0.	.0	76.0	28 FEB 1045	40	0.	.1	76.0	28 FEB 1900	73	16.	5.7	77.1
28 FEB 0245	8	0.	.0	76.0	28 FEB 1100	41	0.	.1	76.0	28 FEB 1915	74	16.	5.5	77.1
28 FEB 0300	9	0.	.0	76.0	28 FEB 1115	42	0.	.1	76.0	28 FEB 1930	75	15.	5.3	77.0
28 FEB 0315	10	0.	.0	76.0	28 FEB 1130	43	0.	.1	76.0	28 FEB 1945	76	15.	5.1	77.0
28 FEB 0330	11	0.	.0	76.0	28 FEB 1145	44	1.	.2	76.0	28 FEB 2000	77	15.	4.9	77.0
28 FEB 0345	12	0.	.0	76.0	28 FEB 1200	45	1.	.2	76.0	28 FEB 2015	78	14.	4.7	76.9
28 FEB 0400	13	0.	.0	76.0	28 FEB 1215	46	1.	.3	76.1	28 FEB 2030	79	14.	4.5	76.9
28 FEB 0415	14	0.	.0	76.0	28 FEB 1230	47	1.	.4	76.1	28 FEB 2045	80	13.	4.4	7
28 FEB 0430	15	0.	.0	76.0	28 FEB 1245	48	2.	.6	76.1	28 FEB 2100	81	13.	4.2	76
28 FEB 0445	16	0.	.0	76.0	28 FEB 1300	49	3.	.9	76.2	28 FEB 2115	82	12.	4.0	76.8
28 FEB 0500	17	0.	.0	76.0	28 FEB 1315	50	4.	1.5	76.3	28 FEB 2130	83	12.	3.8	76.8
28 FEB 0515	18	0.	.0	76.0	28 FEB 1330	51	8.	2.6	76.5	28 FEB 2145	84	11.	3.7	76.7
28 FEB 0530	19	0.	.0	76.0	28 FEB 1345	52	13.	4.2	76.8	28 FEB 2200	85	11.	3.5	76.7
28 FEB 0545	20	0.	.0	76.0	28 FEB 1400	53	16.	5.6	77.1	28 FEB 2215	86	10.	3.4	76.7
28 FEB 0600	21	0.	.0	76.0	28 FEB 1415	54	17.	6.6	77.3	28 FEB 2230	87	10.	3.2	76.6
28 FEB 0615	22	0.	.0	76.0	28 FEB 1430	55	18.	7.2	77.4	28 FEB 2245	88	9.	3.1	76.6
28 FEB 0630	23	0.	.0	76.0	28 FEB 1445	56	18.	7.5	77.4	28 FEB 2300	89	9.	3.0	76.6
28 FEB 0645	24	0.	.0	76.0	28 FEB 1500	57	18.	7.7	77.4	28 FEB 2315	90	9.	2.9	76.6
28 FEB 0700	25	0.	.0	76.0	28 FEB 1515	58	18.	7.8	77.4	28 FEB 2330	91	8.	2.8	76.5
28 FEB 0715	26	0.	.0	76.0	28 FEB 1530	59	18.	7.7	77.4	28 FEB 2345	92	8.	2.7	76.5
28 FEB 0730	27	0.	.0	76.0	28 FEB 1545	60	18.	7.7	77.4	1 MAR 0000	93	8.	2.6	76.5
28 FEB 0745	28	0.	.0	76.0	28 FEB 1600	61	18.	7.5	77.4	1 MAR 0015	94	7.	2.5	76.5
28 FEB 0800	29	0.	.0	76.0	28 FEB 1615	62	18.	7.4	77.4	1 MAR 0030	95	7.	2.4	76.5
28 FEB 0815	30	0.	.0	76.0	28 FEB 1630	63	18.	7.3	77.4	1 MAR 0045	96	7.	2.3	76.4
28 FEB 0830	31	0.	.0	76.0	28 FEB 1645	64	17.	7.1	77.3	1 MAR 0100	97	7.	2.2	76.4
28 FEB 0845	32	0.	.0	76.0	28 FEB 1700	65	17.	7.0	77.3					
28 FEB 0900	33	0.	.0	76.0	28 FEB 1715	66	17.	6.8	77.3					

****

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 18.	14.25		17.	7.	7.	7.
		(INCHES)	1.432	2.296	2.296	2.296
		(AC-FT)	8.	13.	13.	13.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE

```
                                    6-HR       24-HR       72-HR     24.00-HR
+  (AC-FT)      (HR)
        8.     14.25                  7.          3.          3.           3.

 ~~AK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                    6-HR       24-HR       72-HR     24.00-HR
+  (FEET)      (HR)
     77.45     14.25               77.26       76.48       76.48        76.48

                      CUMULATIVE AREA =     .11 SQ MI



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


            **************
            *            *
  23 KK     *     SUB4B  *
            *            *
            **************

  24 KO          OUTPUT CONTROL VARIABLES
                       IPRNT           4  PRINT CONTROL
                       IPLOT           0  PLOT CONTROL
                       QSCAL          0.  HYDROGRAPH PLOT SCALE
                                SCS RUNOFF CALCULATION

               SUBBASIN RUNOFF DATA

  ~~ BA          SUBBASIN CHARACTERISTICS
                       TAREA         .07  SUBBASIN AREA

                 PRECIPITATION DATA

  27 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                 ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                 5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                   .50    1.10    2.10    2.70    3.00    3.60    4.50    5.20     .00     .00     .00     .00

                                                  STORM AREA =     .07

  28 LS          SCS LOSS RATE
                       STRTL         .63  INITIAL ABSTRACTION
                      CRVNBR       76.00  CURVE NUMBER
                       RTIMP         .00  PERCENT IMPERVIOUS AREA

  29 UD          SCS DIMENSIONLESS UNITGRAPH
                        TLAG         .29  LAG

                                                                  ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                          UNIT HYDROGRAPH
                                                       8 END-OF-PERIOD ORDINATES
               54.       75.       31.       12.        4.        2.        1.        0.
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*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
 33 KK    *     4BSWP  *
          *            *
          **************

 34 KO        OUTPUT CONTROL VARIABLES
                    IPRNT           1  PRINT CONTROL
                    IPLOT           0  PLOT CONTROL
                    QSCAL          0.  HYDROGRAPH PLOT SCALE
                             STORAGE ROUTING THROUGH SUB4B SWAMP

            HYDROGRAPH ROUTING DATA

 36 RS        STORAGE ROUTING
                    NSTPS           1  NUMBER OF SUBREACHES
                     ITYP        ELEV  TYPE OF INITIAL CONDITION
                   RSVRIC       76.00  INITIAL CONDITION
                        X         .00 WORKING R AND D COEFFICIENT

 37 SA            AREA        12.4      19.3

 38 SE        ELEVATION       76.00     80.00

 39 SS        SPILLWAY
                     CREL       76.00  SPILLWAY CREST ELEVATION
                    SPWID        5.00  SPILLWAY WIDTH
                     COQW        3.00  WEIR COEFFICIENT
                     EXPW        1.50  EXPONENT OF HEAD

                                                    ***

                                      COMPUTED STORAGE-ELEVATION DATA

          STORAGE        .00     62.78
        ELEVATION      76.00     80.00

                                      COMPUTED OUTFLOW-ELEVATION DATA

          OUTFLOW        .00       .00       .02       .16       .56      1.32      2.57      4.44      7.06     10.53
        ELEVATION      76.00     76.00     76.01     76.05     76.11     76.20     76.31     76.44     76.60     76.79

          OUTFLOW      15.00     20.58     27.39     35.56     45.21     56.46     69.44     84.28    101.09    120.00
        ELEVATION      77.00     77.23     77.49     77.78     78.09     78.42     78.78     79.16     79.57     80.00

                                     COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE        .00       .15       .61      1.38      2.47      3.89      5.64      7.76     10.25     13.14
          OUTFLOW        .00       .02       .16       .56      1.32      2.57      4.44      7.06     10.53     15.00
        ELEVATION      76.00     76.01     76.05     76.11     76.20     76.31     76.44     76.60     76.79     77.00

          STORAGE      16.45     20.23     24.49     29.27     34.63     40.61     47.25     54.62     62.79
          OUTFLOW      20.58     27.39     35.56     45.21     56.46     69.44     84.28    101.09    120.00
        ELEVATION      77.23     77.49     77.78     78.09     78.42     78.78     79.16     79.57     80.00
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HYDROGRAPH AT STATION 4BSWP

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
28	FEB	0100	1	0.	.0	76.0	28	FEB	0915	34	0.	.0	76.0	28	FEB	1730	67	12.	11.2	76.9
28	FEB	0115	2	0.	.0	76.0	28	FEB	0930	35	0.	.0	76.0	28	FEB	1745	68	12.	11.4	76.9
28	FEB	0130	3	0.	.0	76.0	28	FEB	0945	36	0.	.0	76.0	28	FEB	1800	69	13.	11.6	76.9
28	FEB	0145	4	0.	.0	76.0	28	FEB	1000	37	0.	.0	76.0	28	FEB	1815	70	13.	11.8	76.9
28	FEB	0200	5	0.	.0	76.0	28	FEB	1015	38	0.	.0	76.0	28	FEB	1830	71	13.	12.0	76.9
28	FEB	0215	6	0.	.0	76.0	28	FEB	1030	39	0.	.0	76.0	28	FEB	1845	72	13.	12.1	76.9
28	FEB	0230	7	0.	.0	76.0	28	FEB	1045	40	0.	.1	76.0	28	FEB	1900	73	14.	12.3	76.9
28	FEB	0245	8	0.	.0	76.0	28	FEB	1100	41	0.	.1	76.0	28	FEB	1915	74	14.	12.4	76.9
28	FEB	0300	9	0.	.0	76.0	28	FEB	1115	42	0.	.1	76.0	28	FEB	1930	75	14.	12.5	77.0
28	FEB	0315	10	0.	.0	76.0	28	FEB	1130	43	0.	.2	76.0	28	FEB	1945	76	14.	12.6	77.0
28	FEB	0330	11	0.	.0	76.0	28	FEB	1145	44	0.	.2	76.0	28	FEB	2000	77	14.	12.7	77.0
28	FEB	0345	12	0.	.0	76.0	28	FEB	1200	45	0.	.3	76.0	28	FEB	2015	78	14.	12.8	77.0
28	FEB	0400	13	0.	.0	76.0	28	FEB	1215	46	0.	.4	76.0	28	FEB	2030	79	14.	12.8	77.0
28	FEB	0415	14	0.	.0	76.0	28	FEB	1230	47	0.	.5	76.0	28	FEB	2045	80	15.	12.8	77.0
28	FEB	0430	15	0.	.0	76.0	28	FEB	1245	48	0.	.7	76.1	28	FEB	2100	81	15.	12.8	77.0
28	FEB	0445	16	0.	.0	76.0	28	FEB	1300	49	0.	1.1	76.1	28	FEB	2115	82	15.	12.8	77.0
28	FEB	0500	17	0.	.0	76.0	28	FEB	1315	50	1.	2.0	76.2	28	FEB	2130	83	15.	12.8	77.0
28	FEB	0515	18	0.	.0	76.0	28	FEB	1330	51	2.	3.5	76.3	28	FEB	2145	84	15.	12.8	77.0
28	FEB	0530	19	0.	.0	76.0	28	FEB	1345	52	4.	4.9	76.4	28	FEB	2200	85	14.	12.8	77.0
28	FEB	0545	20	0.	.0	76.0	28	FEB	1400	53	5.	5.9	76.5	28	FEB	2215	86	14.	12.8	77.0
28	FEB	0600	21	0.	.0	76.0	28	FEB	1415	54	6.	6.7	76.5	28	FEB	2230	87	14.	12.7	77.0
[illegible]	FEB	0615	22	0.	.0	76.0	28	FEB	1430	55	7.	7.3	76.6	28	FEB	2245	88	14.	12.7	77.0
[illegible]	EB	0630	23	0.	.0	76.0	28	FEB	1445	56	7.	7.8	76.6	28	FEB	2300	89	14.	12.6	77.0
28	FEB	0645	24	0.	.0	76.0	28	FEB	1500	57	8.	8.2	76.6	28	FEB	2315	90	14.	12.5	77.0
28	FEB	0700	25	0.	.0	76.0	28	FEB	1515	58	8.	8.6	76.7	28	FEB	2330	91	14.	12.5	77.0
28	FEB	0715	26	0.	.0	76.0	28	FEB	1530	59	9.	9.0	76.7	28	FEB	2345	92	14.	12.4	76.9
28	FEB	0730	27	0.	.0	76.0	28	FEB	1545	60	9.	9.3	76.7	1	MAR	0000	93	14.	12.3	76.9
28	FEB	0745	28	0.	.0	76.0	28	FEB	1600	61	10.	9.6	76.7	1	MAR	0015	94	14.	12.2	76.9
28	FEB	0800	29	0.	.0	76.0	28	FEB	1615	62	10.	9.9	76.8	1	MAR	0030	95	13.	12.1	76.9
28	FEB	0815	30	0.	.0	76.0	28	FEB	1630	63	11.	10.2	76.8	1	MAR	0045	96	13.	12.0	76.9
28	FEB	0830	31	0.	.0	76.0	28	FEB	1645	64	11.	10.5	76.8	1	MAR	0100	97	13.	11.9	76.9
28	FEB	0845	32	0.	.0	76.0	28	FEB	1700	65	11.	10.8	76.8							
28	FEB	0900	33	0.	.0	76.0	28	FEB	1715	66	12.	11.0	76.8							

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 15.	20.25		14.	6.	6.	6.
		(INCHES)	.734	1.196	1.196	1.196
		(AC-FT)	7.	11.	11.	11.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.00-HR
+ (AC-FT)	(HR)				
13.	20.25	13.	5.	5.	5.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.00-HR
+ (FEET)	(HR)				

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  76.98     20.25                 76.96       76.41       76.41       76.41

                    CUMULATIVE AREA =     .18 SQ MI


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          *            *
 40 KK    *    CHAN4B  *
          *            *
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 41 KO         OUTPUT CONTROL VARIABLES
                     IPRNT           1  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                              ROUTING THROUGH N-S CHANNEL WEST OF R.R. TRACKS

             HYDROGRAPH ROUTING DATA

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

 44 RC         NORMAL DEPTH CHANNEL ROUTING
                       ANL        .080  LEFT OVERBANK N-VALUE
                      ANCH        .030  MAIN CHANNEL N-VALUE
                       ANR        .080  RIGHT OVERBANK N-VALUE
                     RLNTH       1354.  REACH LENGTH
                       SEL       .0040  ENERGY SLOPE
                     ELMAX        75.0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                     CROSS-SECTION DATA
                        --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
 46 RY       ELEVATION    74.00     75.00     75.00     71.00     71.00     74.00     74.00     71.00
 45 RX       DISTANCE       .00     10.00     20.00     24.00     29.00     32.00     62.00     65.00

                                                          ***

                                     COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE       .00       .03       .07       .12       .16       .22       .27       .33       .39       .46
          OUTFLOW       .00      1.17      3.72      7.35     11.98     17.57     24.10     31.60     40.07     49.52
        ELEVATION     71.00     71.21     71.42     71.63     71.84     72.05     72.26     72.47     72.68     72.89

          STORAGE       .53       .61       .69       .77       .86      1.11      1.41      1.73      2.07      2.42
          OUTFLOW     59.98     71.47     84.01     97.64    112.37    128.10    152.97    181.59    213.80    249.55
        ELEVATION     73.11     73.32     73.53     73.74     73.95     74.16     74.37     74.58     74.79     75.00


*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN        7. TO      250.
               THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
               THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)
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HYDROGRAPH AT STATION CHAN4B

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
28	FEB	0100	1	0.	.0	71.0	28	FEB	0915	34	0.	.0	71.0	28	FEB	1730	67	12.	.2	71.8
28	FEB	0115	2	0.	.0	71.0	28	FEB	0930	35	0.	.0	71.0	28	FEB	1745	68	12.	.2	71.9
28	FEB	0130	3	0.	.0	71.0	28	FEB	0945	36	0.	.0	71.0	28	FEB	1800	69	13.	.2	71.9
28	FEB	0145	4	0.	.0	71.0	28	FEB	1000	37	0.	.0	71.0	28	FEB	1815	70	13.	.2	71.9
28	FEB	0200	5	0.	.0	71.0	28	FEB	1015	38	0.	.0	71.0	28	FEB	1830	71	13.	.2	71.9
28	FEB	0215	6	0.	.0	71.0	28	FEB	1030	39	0.	.0	71.0	28	FEB	1845	72	13.	.2	71.9
28	FEB	0230	7	0.	.0	71.0	28	FEB	1045	40	0.	.0	71.0	28	FEB	1900	73	14.	.2	71.9
28	FEB	0245	8	0.	.0	71.0	28	FEB	1100	41	0.	.0	71.0	28	FEB	1915	74	14.	.2	71.9
28	FEB	0300	9	0.	.0	71.0	28	FEB	1115	42	0.	.0	71.0	28	FEB	1930	75	14.	.2	71.9
28	FEB	0315	10	0.	.0	71.0	28	FEB	1130	43	0.	.0	71.0	28	FEB	1945	76	14.	.2	71.9
28	FEB	0330	11	0.	.0	71.0	28	FEB	1145	44	0.	.0	71.0	28	FEB	2000	77	14.	.2	71.9
28	FEB	0345	12	0.	.0	71.0	28	FEB	1200	45	0.	.0	71.0	28	FEB	2015	78	14.	.2	71.9
28	FEB	0400	13	0.	.0	71.0	28	FEB	1215	46	0.	.0	71.0	28	FEB	2030	79	14.	.2	71.9
28	FEB	0415	14	0.	.0	71.0	28	FEB	1230	47	0.	.0	71.0	28	FEB	2045	80	14.	.2	71.9
28	FEB	0430	15	0.	.0	71.0	28	FEB	1245	48	0.	.0	71.0	28	FEB	2100	81	15.	.2	71.9
28	FEB	0445	16	0.	.0	71.0	28	FEB	1300	49	0.	.0	71.0	28	FEB	2115	82	15.	.2	71.9
28	FEB	0500	17	0.	.0	71.0	28	FEB	1315	50	0.	.0	71.1	28	FEB	2130	83	15.	.2	71.9
28	FEB	0515	18	0.	.0	71.0	28	FEB	1330	51	1.	.0	71.2	28	FEB	2145	84	15.	.2	71.9
28	FEB	0530	19	0.	.0	71.0	28	FEB	1345	52	3.	.1	71.3	28	FEB	2200	85	14.	.2	71.9
28	FEB	0545	20	0.	.0	71.0	28	FEB	1400	53	4.	.1	71.4	28	FEB	2215	86	14.	.2	71.9
28	FEB	0600	21	0.	.0	71.0	28	FEB	1415	54	5.	.1	71.5	28	FEB	2230	87	14.	.2	71.9
	FEB	0615	22	0.	.0	71.0	28	FEB	1430	55	6.	.1	71.6	28	FEB	2245	88	14.	.2	71.9
	EB	0630	23	0.	.0	71.0	28	FEB	1445	56	7.	.1	71.6	28	FEB	2300	89	14.	.2	71.9
28	FEB	0645	24	0.	.0	71.0	28	FEB	1500	57	7.	.1	71.6	28	FEB	2315	90	14.	.2	71.9
28	FEB	0700	25	0.	.0	71.0	28	FEB	1515	58	8.	.1	71.7	28	FEB	2330	91	14.	.2	71.9
28	FEB	0715	26	0.	.0	71.0	28	FEB	1530	59	9.	.1	71.7	28	FEB	2345	92	14.	.2	71.9
28	FEB	0730	27	0.	.0	71.0	28	FEB	1545	60	9.	.1	71.7	1	MAR	0000	93	14.	.2	71.9
28	FEB	0745	28	0.	.0	71.0	28	FEB	1600	61	9.	.1	71.7	1	MAR	0015	94	14.	.2	71.9
28	FEB	0800	29	0.	.0	71.0	28	FEB	1615	62	10.	.1	71.7	1	MAR	0030	95	13.	.2	71.9
28	FEB	0815	30	0.	.0	71.0	28	FEB	1630	63	10.	.1	71.8	1	MAR	0045	96	13.	.2	71.9
28	FEB	0830	31	0.	.0	71.0	28	FEB	1645	64	11.	.2	71.8	1	MAR	0100	97	13.	.2	71.9
28	FEB	0845	32	0.	.0	71.0	28	FEB	1700	65	11.	.2	71.8							
28	FEB	0900	33	0.	.0	71.0	28	FEB	1715	66	12.	.2	71.8							

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.00-HR
		(CFS)				
15.	20.25		14.	6.	6.	6.
		(INCHES)	.734	1.178	1.178	1.178
		(AC-FT)	7.	11.	11.	11.

PEAK STORAGE (AC-FT)	TIME (HR)	MAXIMUM AVERAGE STORAGE 6-HR	24-HR	72-HR	24.00-HR
0.	19.50	0.	0.	0.	0.

PEAK STAGE (FEET)	TIME (HR)	MAXIMUM AVERAGE STAGE 6-HR	24-HR	72-HR	24.00-HR

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   71.94     20.25                 71.92       71.40       71.40        71.40

                      CUMULATIVE AREA =      .18 SQ MI



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          *            *
 47 KK    *     SU84A  *
          *            *
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 48 KO         OUTPUT CONTROL VARIABLES
                     IPRNT           4  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                              SCS RUNOFF CALCULATION

             SUBBASIN RUNOFF DATA

 50 BA         SUBBASIN CHARACTERISTICS
                     TAREA         .03  SUBBASIN AREA

               PRECIPITATION DATA

 51 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
               ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
               5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                 .50    1.10    2.10    2.70    3.00    3.60    4.50    5.20     .00     .00     .00     .00

                                                  STORM AREA =      .03

 52 LS         SCS LOSS RATE
                     STRTL         .63  INITIAL ABSTRACTION
                    CRVNBR       76.00  CURVE NUMBER
                     RTIMP         .00  PERCENT IMPERVIOUS AREA

 53 UD         SCS DIMENSIONLESS UNITGRAPH
                      TLAG         .29  LAG

                                                          ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                     UNIT HYDROGRAPH
                                                  8 END-OF-PERIOD ORDINATES
              26.       36.       15.        6.        2.        1.        0.        0.



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          *            *
 54 KK    *    CHAN4A  *
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         *          *
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 55 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          1  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE
                               ROUTING THROUGH N-S CHANNEL EAST OF R.R. TRACKS

             HYDROGRAPH ROUTING DATA

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

 58 RC          NORMAL DEPTH CHANNEL ROUTING
                        ANL       .080  LEFT OVERBANK N-VALUE
                       ANCH       .030  MAIN CHANNEL N-VALUE
                        ANR       .080  RIGHT OVERBANK N-VALUE
                      RLNTH      1354.  REACH LENGTH
                        SEL      .0070  ENERGY SLOPE
                      ELMAX       75.0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                      CROSS-SECTION DATA
                        --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
 60 RY        ELEVATION    71.00     74.00     74.00     71.00     71.00     75.00     75.00     74.00
 59 RX        DISTANCE       .00      3.00     33.00     36.00     41.00     45.00     55.00     65.00

                                                          ***

                                      COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE       .00       .03       .07       .12       .16       .22       .27       .33       .39       .46
          OUTFLOW       .00      1.54      4.92      9.72     15.84     23.24     31.89     41.80     53.00     65.51
        ELEVATION     71.00     71.21     71.42     71.63     71.84     72.05     72.26     72.47     72.68     72.89

          STORAGE       .53       .61       .69       .77       .86      1.11      1.41      1.73      2.07      2.42
          OUTFLOW     79.34     94.54    111.14    129.16    148.65    169.46    202.36    240.22    282.83    330.13
        ELEVATION     73.11     73.32     73.53     73.74     73.95     74.16     74.37     74.58     74.79     75.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN        5. TO      330.
               THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
               THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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                                                HYDROGRAPH AT STATION   CHAN4A

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                                                *                                                *
 DA MON HRMN ORD  OUTFLOW  STORAGE   STAGE * DA MON HRMN ORD  OUTFLOW  STORAGE   STAGE * DA MON HRMN ORD  OUTFLOW  STORAGE   STAGE
                                                *                                                *
     EB 0100   1       0.       .0    71.0 * 28 FEB 0915  34       0.       .0    71.0 * 28 FEB 1730  67       3.       .0    71.3
     EB 0115   2       0.       .0    71.0 * 28 FEB 0930  35       0.       .0    71.0 * 28 FEB 1745  68       3.       .0    71.3
 28 FEB 0130   3       0.       .0    71.0 * 28 FEB 0945  36       0.       .0    71.0 * 28 FEB 1800  69       3.       .0    71.3
 28 FEB 0145   4       0.       .0    71.0 * 28 FEB 1000  37       0.       .0    71.0 * 28 FEB 1815  70       2.       .0    71.3
 28 FEB 0200   5       0.       .0    71.0 * 28 FEB 1015  38       0.       .0    71.0 * 28 FEB 1830  71       2.       .0    71.3
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28 FEB 0215	6	0.	.0	71.0	*	28 FEB 1030	39	0.	.0	71.0	*	28 FEB 1845	72	2.	.0	71.3
28 FEB 0230	7	0.	.0	71.0	*	28 FEB 1045	40	0.	.0	71.0	*	28 FEB 1900	73	2.	.0	71.3
28 FEB 0245	8	0.	.0	71.0	*	28 FEB 1100	41	0.	.0	71.1	*	28 FEB 1915	74	2.	.0	71.2
28 FEB 0300	9	0.	.0	71.0	*	28 FEB 1115	42	1.	.0	71.1	*	28 FEB 1930	75	2.	.0	7[illegible]
28 FEB 0315	10	0.	.0	71.0	*	28 FEB 1130	43	1.	.0	71.1	*	28 FEB 1945	76	2.	.0	[illegible]
28 FEB 0330	11	0.	.0	71.0	*	28 FEB 1145	44	1.	.0	71.1	*	28 FEB 2000	77	1.	.0	71.2
28 FEB 0345	12	0.	.0	71.0	*	28 FEB 1200	45	1.	.0	71.2	*	28 FEB 2015	78	1.	.0	71.2
28 FEB 0400	13	0.	.0	71.0	*	28 FEB 1215	46	2.	.0	71.2	*	28 FEB 2030	79	1.	.0	71.2
28 FEB 0415	14	0.	.0	71.0	*	28 FEB 1230	47	3.	.0	71.3	*	28 FEB 2045	80	1.	.0	71.2
28 FEB 0430	15	0.	.0	71.0	*	28 FEB 1245	48	4.	.1	71.4	*	28 FEB 2100	81	1.	.0	71.2
28 FEB 0445	16	0.	.0	71.0	*	28 FEB 1300	49	8.	.1	71.6	*	28 FEB 2115	82	1.	.0	71.2
28 FEB 0500	17	0.	.0	71.0	*	28 FEB 1315	50	22.	.2	72.0	*	28 FEB 2130	83	1.	.0	71.2
28 FEB 0515	18	0.	.0	71.0	*	28 FEB 1330	51	34.	.3	72.3	*	28 FEB 2145	84	1.	.0	71.1
28 FEB 0530	19	0.	.0	71.0	*	28 FEB 1345	52	28.	.2	72.2	*	28 FEB 2200	85	1.	.0	71.1
28 FEB 0545	20	0.	.0	71.0	*	28 FEB 1400	53	17.	.2	71.9	*	28 FEB 2215	86	1.	.0	71.1
28 FEB 0600	21	0.	.0	71.0	*	28 FEB 1415	54	12.	.1	71.7	*	28 FEB 2230	87	1.	.0	71.1
28 FEB 0615	22	0.	.0	71.0	*	28 FEB 1430	55	8.	.1	71.6	*	28 FEB 2245	88	1.	.0	71.1
28 FEB 0630	23	0.	.0	71.0	*	28 FEB 1445	56	6.	.1	71.5	*	28 FEB 2300	89	1.	.0	71.1
28 FEB 0645	24	0.	.0	71.0	*	28 FEB 1500	57	5.	.1	71.4	*	28 FEB 2315	90	1.	.0	71.1
28 FEB 0700	25	0.	.0	71.0	*	28 FEB 1515	58	4.	.1	71.4	*	28 FEB 2330	91	1.	.0	71.1
28 FEB 0715	26	0.	.0	71.0	*	28 FEB 1530	59	4.	.1	71.4	*	28 FEB 2345	92	1.	.0	71.1
28 FEB 0730	27	0.	.0	71.0	*	28 FEB 1545	60	3.	.1	71.3	*	1 MAR 0000	93	1.	.0	71.1
28 FEB 0745	28	0.	.0	71.0	*	28 FEB 1600	61	3.	.1	71.3	*	1 MAR 0015	94	1.	.0	71.1
28 FEB 0800	29	0.	.0	71.0	*	28 FEB 1615	62	3.	.1	71.3	*	1 MAR 0030	95	1.	.0	71.1
28 FEB 0815	30	0.	.0	71.0	*	28 FEB 1630	63	3.	.1	71.3	*	1 MAR 0045	96	1.	.0	71.1
28 FEB 0830	31	0.	.0	71.0	*	28 FEB 1645	64	3.	.1	71.3	*	1 MAR 0100	97	1.	.0	71.1
28 FEB 0845	32	0.	.0	71.0	*	28 FEB 1700	65	3.	.1	71.3	*					
28 FEB 0900	33	0.	.0	71.0	*	28 FEB 1715	66	3.	.1	71.3	*					
					*						*					

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 34.	12.50		8.	2.	2.	2.
		(INCHES)	2.198	2.674	2.674	2.674
		(AC-FT)	4.	5.	5.	5.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.00-HR
+ (AC-FT)	(HR)				
0.	12.50	0.	0.	0.	0.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.00-HR
+ (FEET)	(HR)				
72.31	12.50	71.49	71.18	71.18	71.18

CUMULATIVE AREA = .03 SQ MI

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  61 KK   *    SUB4D    *
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 62 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           4  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                               SCS RUNOFF CALCULATION

             SUBBASIN RUNOFF DATA

 64 BA          SUBBASIN CHARACTERISTICS
                      TAREA         .05  SUBBASIN AREA

                PRECIPITATION DATA

 65 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                  .50    1.10    2.10    2.70    3.00    3.60    4.50    5.20     .00     .00     .00     .00

                                                   STORM AREA =     .05

 66 LS          SCS LOSS RATE
                      STRTL         .63  INITIAL ABSTRACTION
                     CRVNBR       76.00  CURVE NUMBER
                      RTIMP         .00  PERCENT IMPERVIOUS AREA

 67 UD          SCS DIMENSIONLESS UNITGRAPH
                       TLAG         .30  LAG

                                                          ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                     UNIT HYDROGRAPH
                                                 8 END-OF-PERIOD ORDINATES
             34.       51.       22.        9.        3.        1.        1.        0.


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


          **************
          *            *
 68 KK    *   4DCHAB   *
          *            *
          **************

 69 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           1  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                               COMBINE HYDROGRAPHS FOR SUB4D & CHANNELS 4A & 4B

 70 HC          HYDROGRAPH COMBINATION
                      ICOMP           3  NUMBER OF HYDROGRAPHS TO COMBINE

                                                          ***
```

HYDROGRAPH AT STATION 4DCHAB
SUM OF 3 HYDROGRAPHS

DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW
28 FEB 0100	1	0.	28 FEB 0715	26	0.	28 FEB 1330	51	85.	28 FEB 1945	76	18.
28 FEB 0115	2	0.	28 FEB 0730	27	0.	28 FEB 1345	52	63.	28 FEB 2000	77	18.
28 FEB 0130	3	0.	28 FEB 0745	28	0.	28 FEB 1400	53	43.	28 FEB 2015	78	17.
28 FEB 0145	4	0.	28 FEB 0800	29	0.	28 FEB 1415	54	32.	28 FEB 2030	79	17.
28 FEB 0200	5	0.	28 FEB 0815	30	0.	28 FEB 1430	55	25.	28 FEB 2045	80	17.
28 FEB 0215	6	0.	28 FEB 0830	31	0.	28 FEB 1445	56	21.	28 FEB 2100	81	17.
28 FEB 0230	7	0.	28 FEB 0845	32	0.	28 FEB 1500	57	19.	28 FEB 2115	82	17.
28 FEB 0245	8	0.	28 FEB 0900	33	0.	28 FEB 1515	58	18.	28 FEB 2130	83	17.
28 FEB 0300	9	0.	28 FEB 0915	34	0.	28 FEB 1530	59	17.	28 FEB 2145	84	17.
28 FEB 0315	10	0.	28 FEB 0930	35	0.	28 FEB 1545	60	17.	28 FEB 2200	85	17.
28 FEB 0330	11	0.	28 FEB 0945	36	0.	28 FEB 1600	61	17.	28 FEB 2215	86	17.
28 FEB 0345	12	0.	28 FEB 1000	37	0.	28 FEB 1615	62	17.	28 FEB 2230	87	17.
28 FEB 0400	13	0.	28 FEB 1015	38	1.	28 FEB 1630	63	18.	28 FEB 2245	88	17.
28 FEB 0415	14	0.	28 FEB 1030	39	1.	28 FEB 1645	64	18.	28 FEB 2300	89	17.
28 FEB 0430	15	0.	28 FEB 1045	40	1.	28 FEB 1700	65	18.	28 FEB 2315	90	16.
28 FEB 0445	16	0.	28 FEB 1100	41	1.	28 FEB 1715	66	18.	28 FEB 2330	91	16.
28 FEB 0500	17	0.	28 FEB 1115	42	2.	28 FEB 1730	67	19.	28 FEB 2345	92	16.
28 FEB 0515	18	0.	28 FEB 1130	43	2.	28 FEB 1745	68	19.	1 MAR 0000	93	16.
28 FEB 0530	19	0.	28 FEB 1145	44	3.	28 FEB 1800	69	19.	1 MAR 0015	94	16
28 FEB 0545	20	0.	28 FEB 1200	45	3.	28 FEB 1815	70	19.	1 MAR 0030	95	16
28 FEB 0600	21	0.	28 FEB 1215	46	5.	28 FEB 1830	71	19.	1 MAR 0045	96	15.
28 FEB 0615	22	0.	28 FEB 1230	47	7.	28 FEB 1845	72	19.	1 MAR 0100	97	15.
28 FEB 0630	23	0.	28 FEB 1245	48	12.	28 FEB 1900	73	19.			
28 FEB 0645	24	0.	28 FEB 1300	49	24.	28 FEB 1915	74	19.			
28 FEB 0700	25	0.	28 FEB 1315	50	62.	28 FEB 1930	75	18.			

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.00-HR
+ 85.	12.50	(CFS)	27.	11.	11.	11.
		(INCHES)	.961	1.642	1.642	1.642
		(AC-FT)	13.	23.	23.	23.

CUMULATIVE AREA = .26 SQ MI

```
          **************
          *            *
 72 KK    *    SUB4E   *
          *            *
          **************
```

```
73 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           4  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                              SCS RUNOFF CALCULATION

            SUBBASIN RUNOFF DATA

75 BA          SUBBASIN CHARACTERISTICS
                     TAREA         .30  SUBBASIN AREA

               PRECIPITATION DATA

76 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
               ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
               5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                 .50    1.10    2.10    2.70    3.00    3.60    4.50    5.20     .00     .00     .00     .00

                                                STORM AREA =     .30

77 LS          SCS LOSS RATE
                     STRTL         .63  INITIAL ABSTRACTION
                    CRVNBR       76.00  CURVE NUMBER
                     RTIMP         .00  PERCENT IMPERVIOUS AREA

78 UD          SCS DIMENSIONLESS UNITGRAPH
                      TLAG         .25  LAG

                                                          ***

   NG *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                     UNIT HYDROGRAPH
                                                 7 END-OF-PERIOD ORDINATES
            291.      317.      106.       37.       12.        4.        1.


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


          **************
          *            *
79 KK     *    CHAN4E  *
          *            *
          **************

80 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           1  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                              ROUTING THROUGH CHANNEL & PIPE

            HYDROGRAPH ROUTING DATA

   RS          STORAGE ROUTING
                     NSTPS           1  NUMBER OF SUBREACHES
                      ITYP        ELEV  TYPE OF INITIAL CONDITION
                    RSVRIC       65.00  INITIAL CONDITION
                         X         .00 WORKING R AND D COEFFICIENT
```

```
83 SA              AREA          .2        .6

84 SE          ELEVATION       65.00     70.00

85 SL          LOW-LEVEL OUTLET
                    ELEVL       65.20  ELEVATION AT CENTER OF OUTLET
                    CAREA        7.07  CROSS-SECTIONAL AREA
                     COQL         .60  COEFFICIENT
                     EXPL         .50  EXPONENT OF HEAD

86 SS          SPILLWAY
                     CREL       74.00  SPILLWAY CREST ELEVATION
                    SPWID         .00  SPILLWAY WIDTH
                     COQW         .00  WEIR COEFFICIENT
                     EXPW        1.50  EXPONENT OF HEAD
```

***

COMPUTED STORAGE-ELEVATION DATA

STORAGE	.00	1.82
ELEVATION	65.00	70.00

COMPUTED OUTFLOW-ELEVATION DATA

OUTFLOW	.00	.00	41.53	45.35	49.93	55.54	62.58	71.65	83.80	100.92
ELEVATION	65.00	65.20	66.69	66.98	67.35	67.87	68.58	69.64	71.27	74.00

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	.04	.41	.49	.62	.80	1.10	1.61	1.82	2.62
OUTFLOW	.00	.00	41.53	45.35	49.93	55.54	62.58	71.65	74.54	83.80
ELEVATION	65.00	65.20	66.69	66.98	67.35	67.87	68.58	69.64	70.00	71.27

STORAGE	4.95
OUTFLOW	100.92
ELEVATION	74.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 0. TO 42.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

****

HYDROGRAPH AT STATION CHAN4E

****

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
28	FEB	0100	1	0.	.0	65.0	*	28	FEB	0915	34	0.	.0	65.0	*	28	FEB	1730	67	25.	.3	66.1
28	FEB	0115	2	0.	.0	65.0	*	28	FEB	0930	35	0.	.0	65.0	*	28	FEB	1745	68	24.	.2	66 [illegible]
28	FEB	0130	3	0.	.0	65.0	*	28	FEB	0945	36	0.	.0	65.1	*	28	FEB	1800	69	23.	.2	[illegible]
28	FEB	0145	4	0.	.0	65.0	*	28	FEB	1000	37	1.	.0	65.2	*	28	FEB	1815	70	22.	.2	66.[illegible]
28	FEB	0200	5	0.	.0	65.0	*	28	FEB	1015	38	3.	.1	65.3	*	28	FEB	1830	71	21.	.2	66.0
28	FEB	0215	6	0.	.0	65.0	*	28	FEB	1030	39	3.	.1	65.3	*	28	FEB	1845	72	21.	.2	65.9
28	FEB	0230	7	0.	.0	65.0	*	28	FEB	1045	40	4.	.1	65.3	*	28	FEB	1900	73	20.	.2	65.9
28	FEB	0245	8	0.	.0	65.0	*	28	FEB	1100	41	5.	.1	65.4	*	28	FEB	1915	74	18.	.2	65.9

28 FEB 0300	9	0.	.0	65.0	*	28 FEB 1115	42	6.	.1	65.4	*	28 FEB 1930	75	15.	.2	65.7
28 FEB 0315	10	0.	.0	65.0	*	28 FEB 1130	43	8.	.1	65.5	*	28 FEB 1945	76	13.	.2	65.7
28 FEB 0330	11	0.	.0	65.0	*	28 FEB 1145	44	10.	.1	65.6	*	28 FEB 2000	77	12.	.1	65.6
28 FEB 0345	12	0.	.0	65.0	*	28 FEB 1200	45	12.	.1	65.6	*	28 FEB 2015	78	11.	.1	65.6
FEB 0400	13	0.	.0	65.0	*	28 FEB 1215	46	18.	.2	65.8	*	28 FEB 2030	79	11.	.1	65.6
FEB 0415	14	0.	.0	65.0	*	28 FEB 1230	47	27.	.3	66.2	*	28 FEB 2045	80	11.	.1	65.6
28 FEB 0430	15	0.	.0	65.0	*	28 FEB 1245	48	42.	.4	66.8	*	28 FEB 2100	81	10.	.1	65.6
28 FEB 0445	16	0.	.0	65.0	*	28 FEB 1300	49	61.	1.0	68.4	*	28 FEB 2115	82	10.	.1	65.6
28 FEB 0500	17	0.	.0	65.0	*	28 FEB 1315	50	92.	3.7	72.5	*	28 FEB 2130	83	10.	.1	65.6
28 FEB 0515	18	0.	.0	65.0	*	28 FEB 1330	51	122.	7.8	77.3	*	28 FEB 2145	84	10.	.1	65.5
28 FEB 0530	19	0.	.0	65.0	*	28 FEB 1345	52	140.	10.3	80.2	*	28 FEB 2200	85	9.	.1	65.5
28 FEB 0545	20	0.	.0	65.0	*	28 FEB 1400	53	142.	10.6	80.6	*	28 FEB 2215	86	9.	.1	65.5
28 FEB 0600	21	0.	.0	65.0	*	28 FEB 1415	54	137.	9.8	79.7	*	28 FEB 2230	87	9.	.1	65.5
28 FEB 0615	22	0.	.0	65.0	*	28 FEB 1430	55	127.	8.6	78.2	*	28 FEB 2245	88	9.	.1	65.5
28 FEB 0630	23	0.	.0	65.0	*	28 FEB 1445	56	117.	7.1	76.5	*	28 FEB 2300	89	9.	.1	65.5
28 FEB 0645	24	0.	.0	65.0	*	28 FEB 1500	57	106.	5.7	74.9	*	28 FEB 2315	90	9.	.1	65.5
28 FEB 0700	25	0.	.0	65.0	*	28 FEB 1515	58	97.	4.4	73.3	*	28 FEB 2330	91	8.	.1	65.5
28 FEB 0715	26	0.	.0	65.0	*	28 FEB 1530	59	88.	3.1	71.9	*	28 FEB 2345	92	8.	.1	65.5
28 FEB 0730	27	0.	.0	65.0	*	28 FEB 1545	60	77.	2.1	70.4	*	1 MAR 0000	93	8.	.1	65.5
28 FEB 0745	28	0.	.0	65.0	*	28 FEB 1600	61	64.	1.2	68.7	*	1 MAR 0015	94	8.	.1	65.5
28 FEB 0800	29	0.	.0	65.0	*	28 FEB 1615	62	48.	.6	67.2	*	1 MAR 0030	95	8.	.1	65.5
28 FEB 0815	30	0.	.0	65.0	*	28 FEB 1630	63	32.	.3	66.3	*	1 MAR 0045	96	8.	.1	65.5
28 FEB 0830	31	0.	.0	65.0	*	28 FEB 1645	64	27.	.3	66.2	*	1 MAR 0100	97	8.	.1	65.5
28 FEB 0845	32	0.	.0	65.0	*	28 FEB 1700	65	27.	.3	66.2	*					
28 FEB 0900	33	0.	.0	65.0	*	28 FEB 1715	66	26.	.3	66.1	*					
					*						*					

****

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.00-HR
FS)	(HR)					
		(CFS)				
+ 142.	13.00		70.	21.	21.	21.
		(INCHES)	2.197	2.679	2.679	2.679
		(AC-FT)	35.	43.	43.	43.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.00-HR
+ (AC-FT)	(HR)				
11.	13.00	3.	1.	1.	1.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.00-HR
+ (FEET)	(HR)				
80.58	13.00	70.91	66.69	66.69	66.69

CUMULATIVE AREA = .30 SQ MI

1

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
	HYDROGRAPH AT									
+		SUB4C	89.	12.75	26.	8.	8.	.11		

ROUTED TO									
+	4CSWP	18.	14.25	17.	7.	7.	.11		
+								77.45	14.25
HYDROGRAPH AT									
+	SUB4B	73.	12.50	16.	5.	5.	.07		
2 COMBINED AT									
+	4BC	81.	12.50	31.	12.	12.	.18		
ROUTED TO									
+	4BSWP	15.	20.25	14.	6.	6.	.18		
+								76.98	20.25
ROUTED TO									
+	CHAN4B	15.	20.25	14.	6.	6.	.18		
+								71.94	20.25
HYDROGRAPH AT									
+	SUB4A	35.	12.50	8.	2.	2.	.03		
ROUTED TO									
+	CHAN4A	34.	12.50	8.	2.	2.	.03		
+								72.31	12.50
HYDROGRAPH AT									
+	SUB4D	49.	12.50	11.	3.	3.	.05		
3 COMBINED AT									
+	4DCHAB	85.	12.50	27.	11.	11.	.26		
HYDROGRAPH AT									
+	SUB4E	313.	12.50	71.	22.	22.	.30		
ROUTED TO									
+	CHAN4E	142.	13.00	70.	21.	21.	.30		
+								80.58	13.00

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

HEC-1

50 Year, 24 Hour Storm

1 ****

FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985

U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616

****

THIS HEC-1 VERSION CONTAINS ALL OPTIONS EXCEPT ECONOMICS, AND THE NUMBER OF PLANS ARE REDUCED TO 3

1 HEC-1 INPUT PAGE 1

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

  1           ID        ISRT/WOBURN/MASS. 903-6400.310
  2           ID        SUBWATERSHED #4 (OFF SITE)
  3           ID        SWAMP AREAS NORTH & SOUTH OF WILMINGTON/WOBURN BORDER
  4           ID        DETAILED STORAGE AND STREAM NETWORK
  5           ID        EXISTING CONDITIONS - 50 YR, 24 HR STORM
              *DIAGRAM
  6           IT      15 28FEB91     100      97
  7           IO       5

  8           KK   SUB4C
  9           KO       4
 10           KM        SCS RUNOFF CALCULATION
 11           BA   0.110
 12           PH              0     0.6     1.3     2.4     3.0     3.4     4.2     5.2     6.0
 13           LS             76
 14           UD    0.54

 15           KK   4CSWP
 16           KO       1
 17           KM        STORAGE ROUTING THROUGH SUBWATERSHED 4C SWAMP
 18           RS       1    ELEV      76
 19           SA    4.63    9.26
 20           SE      76      80
 21           SL      76    3.14     0.6     0.5
 22           SS      80       0     3.0     1.5

 23           KK   SUB4B
 24           KO       4
 25           KM        SCS RUNOFF CALCULATION
 26           BA   0.069
 27           PH              0     0.6     1.3     2.4     3.0     3.4     4.2     5.2     6.0
 28           LS             76
 29           UD    0.29

 30           KK     4BC
 31           KM        COMBINE HYDROGRAPHS FOR  SUB4B & 4CSWP
 32           HC       2

 33           KK   4BSWP
 34           KO       1
 35           KM        STORAGE ROUTING THROUGH SUB4B SWAMP
```

```
RS      1   ELEV     76
SA  12.35  19.30
SE     76     80
SS     76      5    3.0    1.5

KK  CHAN4B
KO      1
KM       ROUTING THROUGH N-S CHANNEL WEST OF R.R. TRACKS
RS      1   STOR      0
RC   0.08   0.03   0.08   1354  0.004     75
RX      0     10     20     24     29     32     62     65
RY     74     75     75     71     71     74     74     71
```

1 HEC-1 INPUT PAGE 2

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

KK   SUB4A
KO      4
KM       SCS RUNOFF CALCULATION
BA   0.033
PH              0    0.6    1.3    2.4    3.0    3.4    4.2    5.2    6.0
LS             76
UD    0.29

KK  CHAN4A
KO      1
KM       ROUTING THROUGH N-S CHANNEL EAST OF R.R. TRACKS
RS      1   STOR      0
RC   0.08   0.03   0.08   1354  0.007     75
RX      0      3     33     36     41     45     55     65
RY     71     74     74     71     71     75     75     74

KK   SUB4D
KO      4
KM       SCS RUNOFF CALCULATION
BA   0.047
PH              0    0.6    1.3    2.4    3.0    3.4    4.2    5.2    6.0
LS             76
UD    0.30

KK  4DCHAB
KO      1
KM       COMBINE HYDROGRAPHS FOR SUB4D & CHANNELS 4A & 4B
HC      3

KK   SUB4E
KO      4
KM       SCS RUNOFF CALCULATION
BA   0.298
PH              0    0.6    1.3    2.4    3.0    3.4    4.2    5.2    6.0
LS             76
UD    0.25

KK  CHAN4E
KO      1
KM       ROUTING THROUGH CHANNEL & PIPE
RS      1   ELEV     65
SA   0.19   0.57
SE     65     70
```

```
          85          SL    65.2    7.07     0.6     0.5
          86          SS      74       0     3.0     1.5
          87          ZZ
1
              SCHEMATIC DIAGRAM OF STREAM NETWORK
 ...JT
 LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

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

    8       SUB4C
                V
                V
   15       4CSWP
                .
                .
   23           .       SUB4B
                .           .
                .           .
   30         4BC............
                V
                V
   33       4BSWP
                V
                V
   40      CHAN4B
                .
                .
   47           .       SUB4A
                .           V
                .           V
   54           .      CHAN4A
                .           .
                .           .
   61           .           .       SUB4D
                .           .           .
                .           .           .
   68      4DCHAB........................
                .
                .
   72           .       SUB4E
                .           V
                .           V
   79           .      CHAN4E

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1                                                          ****
                    FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985
          U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616
                                                           ****


                    ISRT/WOBURN/MASS. 903-6400.310
                    SUBWATERSHED #4 (OFF SITE)
                    SWAMP AREAS NORTH & SOUTH OF WILMINGTON/WOBURN BORDER
                    DETAILED STORAGE AND STREAM NETWORK
                    EXISTING CONDITIONS - 50 YR, 24 HR STORM
```

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

    IT          HYDROGRAPH TIME DATA
                       NMIN          15  MINUTES IN COMPUTATION INTERVAL
                      IDATE     28FEB91  STARTING DATE
                      ITIME        0100  STARTING TIME
                         NQ          97  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      1MAR91  ENDING DATE
                     NDTIME        0100  ENDING TIME

                 COMPUTATION INTERVAL     .25 HOURS
                      TOTAL TIME BASE   24.00 HOURS

        ENGLISH UNITS


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


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          *            *
  8 KK    *     SUB4C  *
          *            *
          **************

  9 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           4  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                               SCS RUNOFF CALCULATION

             SUBBASIN RUNOFF DATA

 11 BA          SUBBASIN CHARACTERISTICS
                      TAREA         .11  SUBBASIN AREA

                PRECIPITATION DATA

 12 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                  .60    1.30    2.40    3.00    3.40    4.20    5.20    6.00     .00     .00     .00     .00

                                                   STORM AREA =     .11

 13 LS          SCS LOSS RATE
                      STRTL         .63  INITIAL ABSTRACTION
                     CRVNBR       76.00  CURVE NUMBER
                      RTIMP         .00  PERCENT IMPERVIOUS AREA

 14 UD          SCS DIMENSIONLESS UNITGRAPH
                       TLAG         .54  LAG

                                                        ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG
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                                                  UNIT HYDROGRAPH
                                              13 END-OF-PERIOD ORDINATES
          22.       70.       78.       54.       27.       15.        8.        4.        2.        1.
           1.        0.        0.


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


          **************
          *            *
 15 KK    *     4CSWP  *
          *            *
          **************

 16 KO         OUTPUT CONTROL VARIABLES
                     IPRNT           1  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                              STORAGE ROUTING THROUGH SUBWATERSHED 4C SWAMP

             HYDROGRAPH ROUTING DATA

 18 RS         STORAGE ROUTING
                     NSTPS           1  NUMBER OF SUBREACHES
                      ITYP        ELEV  TYPE OF INITIAL CONDITION
                    RSVRIC       76.00  INITIAL CONDITION
                         X         .00 WORKING R AND D COEFFICIENT

 19 SA              AREA         4.6       9.3

 20 SE         ELEVATION       76.00     80.00

 21 SL         LOW-LEVEL OUTLET
                     ELEVL       76.00  ELEVATION AT CENTER OF OUTLET
                     CAREA        3.14  CROSS-SECTIONAL AREA
                      COQL         .60  COEFFICIENT
                      EXPL         .50  EXPONENT OF HEAD

 22 SS         SPILLWAY
                      CREL       80.00  SPILLWAY CREST ELEVATION
                     SPWID         .00  SPILLWAY WIDTH
                      COQW         .00  WEIR COEFFICIENT
                      EXPW        1.50  EXPONENT OF HEAD

                                                          ***

                                          COMPUTED STORAGE-ELEVATION DATA

          STORAGE        .00     27.25
        ELEVATION      76.00     80.00

                                          COMPUTED OUTFLOW-ELEVATION DATA

          OUTFLOW        .00     14.78     15.79     16.94     18.28     19.85     21.71     23.96     26.73     30.22
        ELEVATION      76.00     76.96     77.09     77.26     77.46     77.73     78.06     78.51     79.13     80.00
```

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	4.88	5.65	6.61	7.86	9.50	11.75	14.94	19.69	27.25
OUTFLOW	.00	14.78	15.79	16.94	18.28	19.85	21.71	23.96	26.73	30.22
ELEVATION	76.00	76.96	77.09	77.26	77.46	77.73	78.06	78.51	79.13	80.00

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HYDROGRAPH AT STATION 4CSWP

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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
28	FEB	0100	1	0.	.0	76.0	28	FEB	0915	34	0.	.0	76.0	28	FEB	1730	67	19.	9.1	77.7
28	FEB	0115	2	0.	.0	76.0	28	FEB	0930	35	0.	.0	76.0	28	FEB	1745	68	19.	9.0	77.6
28	FEB	0130	3	0.	.0	76.0	28	FEB	0945	36	0.	.0	76.0	28	FEB	1800	69	19.	8.8	77.6
28	FEB	0145	4	0.	.0	76.0	28	FEB	1000	37	0.	.0	76.0	28	FEB	1815	70	19.	8.6	77.6
28	FEB	0200	5	0.	.0	76.0	28	FEB	1015	38	0.	.1	76.0	28	FEB	1830	71	19.	8.4	77.5
28	FEB	0215	6	0.	.0	76.0	28	FEB	1030	39	0.	.1	76.0	28	FEB	1845	72	19.	8.2	77.5
28	FEB	0230	7	0.	.0	76.0	28	FEB	1045	40	0.	.1	76.0	28	FEB	1900	73	18.	8.0	77.5
28	FEB	0245	8	0.	.0	76.0	28	FEB	1100	41	0.	.2	76.0	28	FEB	1915	74	18.	7.8	77.5
28	FEB	0300	9	0.	.0	76.0	28	FEB	1115	42	1.	.2	76.0	28	FEB	1930	75	18.	7.6	77.4
28	FEB	0315	10	0.	.0	76.0	28	FEB	1130	43	1.	.3	76.1	28	FEB	1945	76	18.	7.4	77.4
28	FEB	0330	11	0.	.0	76.0	28	FEB	1145	44	1.	.4	76.1	28	FEB	2000	77	18.	7.1	77.3
28	FEB	0345	12	0.	.0	76.0	28	FEB	1200	45	1.	.5	76.1	28	FEB	2015	78	17.	6.9	77.3
28	FEB	0400	13	0.	.0	76.0	28	FEB	1215	46	2.	.6	76.1	28	FEB	2030	79	17.	6.6	77.3
28	FEB	0415	14	0.	.0	76.0	28	FEB	1230	47	2.	.7	76.1	28	FEB	2045	80	17.	6.4	77.2
28	FEB	0430	15	0.	.0	76.0	28	FEB	1245	48	3.	1.0	76.2	28	FEB	2100	81	16.	6.2	[illegible]
28	FEB	0445	16	0.	.0	76.0	28	FEB	1300	49	4.	1.3	76.3	28	FEB	2115	82	16.	5.9	[illegible]
28	FEB	0500	17	0.	.0	76.0	28	FEB	1315	50	6.	2.0	76.4	28	FEB	2130	83	16.	5.7	[illegible]
28	FEB	0515	18	0.	.0	76.0	28	FEB	1330	51	11.	3.5	76.7	28	FEB	2145	84	16.	5.5	77.1
28	FEB	0530	19	0.	.0	76.0	28	FEB	1345	52	16.	5.4	77.1	28	FEB	2200	85	15.	5.2	77.0
28	FEB	0545	20	0.	.0	76.0	28	FEB	1400	53	18.	7.2	77.4	28	FEB	2215	86	15.	5.0	77.0
28	FEB	0600	21	0.	.0	76.0	28	FEB	1415	54	19.	8.4	77.5	28	FEB	2230	87	14.	4.8	76.9
28	FEB	0615	22	0.	.0	76.0	28	FEB	1430	55	20.	9.1	77.7	28	FEB	2245	88	14.	4.6	76.9
28	FEB	0630	23	0.	.0	76.0	28	FEB	1445	56	20.	9.6	77.7	28	FEB	2300	89	13.	4.4	76.9
28	FEB	0645	24	0.	.0	76.0	28	FEB	1500	57	20.	9.9	77.8	28	FEB	2315	90	13.	4.2	76.8
28	FEB	0700	25	0.	.0	76.0	28	FEB	1515	58	20.	10.0	77.8	28	FEB	2330	91	12.	4.0	76.8
28	FEB	0715	26	0.	.0	76.0	28	FEB	1530	59	20.	10.0	77.8	28	FEB	2345	92	12.	3.8	76.8
28	FEB	0730	27	0.	.0	76.0	28	FEB	1545	60	20.	10.0	77.8	1	MAR	0000	93	11.	3.7	76.7
28	FEB	0745	28	0.	.0	76.0	28	FEB	1600	61	20.	10.0	77.8	1	MAR	0015	94	11.	3.5	76.7
28	FEB	0800	29	0.	.0	76.0	28	FEB	1615	62	20.	9.9	77.8	1	MAR	0030	95	10.	3.4	76.7
28	FEB	0815	30	0.	.0	76.0	28	FEB	1630	63	20.	9.7	77.8	1	MAR	0045	96	10.	3.2	76.6
28	FEB	0830	31	0.	.0	76.0	28	FEB	1645	64	20.	9.6	77.7	1	MAR	0100	97	9.	3.1	76.6
28	FEB	0845	32	0.	.0	76.0	28	FEB	1700	65	20.	9.5	77.7							
28	FEB	0900	33	0.	.0	76.0	28	FEB	1715	66	20.	9.3	77.7							

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 20.	14.50		19.	8.	8.	8.
		(INCHES)	1.632	2.814	2.814	2.814
		(AC-FT)	10.	17.	17.	17.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE

```
                                    6-HR       24-HR       72-HR     24.00-HR
+  (AC-FT)      (HR)
      10.     14.50                  9.          3.          3.           3.

     STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                    6-HR       24-HR       72-HR     24.00-HR
+   (FEET)      (HR)
     77.81     14.50               77.64       76.65       76.65        76.65

                       CUMULATIVE AREA =     .11 SQ MI


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


           **************
           *            *
  23 KK    *     SUB4B  *
           *            *
           **************

  24 KO          OUTPUT CONTROL VARIABLES
                       IPRNT           4  PRINT CONTROL
                       IPLOT           0  PLOT CONTROL
                       QSCAL          0.  HYDROGRAPH PLOT SCALE
                                SCS RUNOFF CALCULATION

              SUBBASIN RUNOFF DATA

  26 BA          SUBBASIN CHARACTERISTICS
                       TAREA         .07  SUBBASIN AREA

                 PRECIPITATION DATA

  27 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                 ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                 5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                   .60    1.30    2.40    3.00    3.40    4.20    5.20    6.00     .00     .00     .00     .00

                                                  STORM AREA =     .07

  28 LS          SCS LOSS RATE
                       STRTL         .63  INITIAL ABSTRACTION
                      CRVNBR       76.00  CURVE NUMBER
                       RTIMP         .00  PERCENT IMPERVIOUS AREA

  29 UD          SCS DIMENSIONLESS UNITGRAPH
                        TLAG         .29  LAG

                                                          ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                     UNIT HYDROGRAPH
                                                  8 END-OF-PERIOD ORDINATES
                54.       75.       31.       12.        4.        2.        1.        0.
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*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
 33 KK    *    4BSWP   *
          *            *
          **************

 34 KO        OUTPUT CONTROL VARIABLES
                    IPRNT           1  PRINT CONTROL
                    IPLOT           0  PLOT CONTROL
                    QSCAL          0.  HYDROGRAPH PLOT SCALE
                             STORAGE ROUTING THROUGH SUB4B SWAMP

            HYDROGRAPH ROUTING DATA

 36 RS        STORAGE ROUTING
                    NSTPS           1  NUMBER OF SUBREACHES
                     ITYP        ELEV  TYPE OF INITIAL CONDITION
                   RSVRIC       76.00  INITIAL CONDITION
                        X         .00 WORKING R AND D COEFFICIENT

 37 SA            AREA        12.4      19.3

 38 SE        ELEVATION       76.00     80.00

 39 SS        SPILLWAY
                     CREL       76.00  SPILLWAY CREST ELEVATION
                    SPWID        5.00  SPILLWAY WIDTH
                     COQW        3.00  WEIR COEFFICIENT
                     EXPW        1.50  EXPONENT OF HEAD

                                                    ***

                                      COMPUTED STORAGE-ELEVATION DATA

          STORAGE        .00     62.78
        ELEVATION      76.00     80.00

                                      COMPUTED OUTFLOW-ELEVATION DATA

          OUTFLOW        .00       .00       .02       .16       .56      1.32      2.57      4.44      7.06     10.53
        ELEVATION      76.00     76.00     76.01     76.05     76.11     76.20     76.31     76.44     76.60     76.79

          OUTFLOW      15.00     20.58     27.39     35.56     45.21     56.46     69.44     84.28    101.09    120.00
        ELEVATION      77.00     77.23     77.49     77.78     78.09     78.42     78.78     79.16     79.57     80.00

                                     COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE        .00       .15       .61      1.38      2.47      3.89      5.64      7.76     10.25     13.14
          OUTFLOW        .00       .02       .16       .56      1.32      2.57      4.44      7.06     10.53     15.00
        ELEVATION      76.00     76.01     76.05     76.11     76.20     76.31     76.44     76.60     76.79     77.00

          STORAGE      16.45     20.23     24.49     29.27     34.63     40.61     47.25     54.62     62.79
          OUTFLOW      20.58     27.39     35.56     45.21     56.46     69.44     84.28    101.09    120.00
        ELEVATION      77.23     77.49     77.78     78.09     78.42     78.78     79.16     79.57     80.00
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HYDROGRAPH AT STATION 4BSWP

DA MON HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA MON HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA MON HRMN	ORD	OUTFLOW	STORAGE	STAGE
28 FEB 0100	1	0.	.0	76.0	28 FEB 0915	34	0.	.0	76.0	28 FEB 1730	67	15.	13.4	77.0
28 FEB 0115	2	0.	.0	76.0	28 FEB 0930	35	0.	.0	76.0	28 FEB 1745	68	16.	13.6	77.0
28 FEB 0130	3	0.	.0	76.0	28 FEB 0945	36	0.	.0	76.0	28 FEB 1800	69	16.	13.8	77.0
28 FEB 0145	4	0.	.0	76.0	28 FEB 1000	37	0.	.0	76.0	28 FEB 1815	70	16.	14.0	77.1
28 FEB 0200	5	0.	.0	76.0	28 FEB 1015	38	0.	.1	76.0	28 FEB 1830	71	17.	14.1	77.1
28 FEB 0215	6	0.	.0	76.0	28 FEB 1030	39	0.	.1	76.0	28 FEB 1845	72	17.	14.3	77.1
28 FEB 0230	7	0.	.0	76.0	28 FEB 1045	40	0.	.1	76.0	28 FEB 1900	73	17.	14.4	77.1
28 FEB 0245	8	0.	.0	76.0	28 FEB 1100	41	0.	.2	76.0	28 FEB 1915	74	17.	14.6	77.1
28 FEB 0300	9	0.	.0	76.0	28 FEB 1115	42	0.	.3	76.0	28 FEB 1930	75	18.	14.7	77.1
28 FEB 0315	10	0.	.0	76.0	28 FEB 1130	43	0.	.3	76.0	28 FEB 1945	76	18.	14.7	77.1
28 FEB 0330	11	0.	.0	76.0	28 FEB 1145	44	0.	.4	76.0	28 FEB 2000	77	18.	14.8	77.1
28 FEB 0345	12	0.	.0	76.0	28 FEB 1200	45	0.	.6	76.0	28 FEB 2015	78	18.	14.9	77.1
28 FEB 0400	13	0.	.0	76.0	28 FEB 1215	46	0.	.7	76.1	28 FEB 2030	79	18.	14.9	77.1
28 FEB 0415	14	0.	.0	76.0	28 FEB 1230	47	0.	.9	76.1	28 FEB 2045	80	18.	15.0	77.1
28 FEB 0430	15	0.	.0	76.0	28 FEB 1245	48	0.	1.2	76.1	28 FEB 2100	81	18.	15.0	77.1
28 FEB 0445	16	0.	.0	76.0	28 FEB 1300	49	1.	1.7	76.1	28 FEB 2115	82	18.	15.0	77.1
28 FEB 0500	17	0.	.0	76.0	28 FEB 1315	50	2.	2.8	76.2	28 FEB 2130	83	18.	15.0	77.1
28 FEB 0515	18	0.	.0	76.0	28 FEB 1330	51	3.	4.7	76.4	28 FEB 2145	84	18.	15.0	77.1
28 FEB 0530	19	0.	.0	76.0	28 FEB 1345	52	5.	6.4	76.5	28 FEB 2200	85	18.	15.0	77.1
28 FEB 0545	20	0.	.0	76.0	28 FEB 1400	53	7.	7.6	76.6	28 FEB 2215	86	18.	15.0	77.1
28 FEB 0600	21	0.	.0	76.0	28 FEB 1415	54	8.	8.4	76.7	28 FEB 2230	87	18.	15.0	77.1
FEB 0615	22	0.	.0	76.0	28 FEB 1430	55	9.	9.1	76.7	28 FEB 2245	88	18.	15.0	77.1
EB 0630	23	0.	.0	76.0	28 FEB 1445	56	10.	9.7	76.7	28 FEB 2300	89	18.	14.9	77.1
28 FEB 0645	24	0.	.0	76.0	28 FEB 1500	57	10.	10.2	76.8	28 FEB 2315	90	18.	14.9	77.1
28 FEB 0700	25	0.	.0	76.0	28 FEB 1515	58	11.	10.6	76.8	28 FEB 2330	91	18.	14.8	77.1
28 FEB 0715	26	0.	.0	76.0	28 FEB 1530	59	12.	11.0	76.8	28 FEB 2345	92	18.	14.7	77.1
28 FEB 0730	27	0.	.0	76.0	28 FEB 1545	60	12.	11.4	76.9	1 MAR 0000	93	18.	14.6	77.1
28 FEB 0745	28	0.	.0	76.0	28 FEB 1600	61	13.	11.7	76.9	1 MAR 0015	94	17.	14.5	77.1
28 FEB 0800	29	0.	.0	76.0	28 FEB 1615	62	13.	12.1	76.9	1 MAR 0030	95	17.	14.4	77.1
28 FEB 0815	30	0.	.0	76.0	28 FEB 1630	63	14.	12.4	76.9	1 MAR 0045	96	17.	14.3	77.1
28 FEB 0830	31	0.	.0	76.0	28 FEB 1645	64	14.	12.7	77.0	1 MAR 0100	97	17.	14.2	77.1
28 FEB 0845	32	0.	.0	76.0	28 FEB 1700	65	15.	12.9	77.0					
28 FEB 0900	33	0.	.0	76.0	28 FEB 1715	66	15.	13.2	77.0					

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 18.	20.75		18.	7.	7.	7.
		(INCHES)	.924	1.533	1.533	1.533
		(AC-FT)	9.	15.	15.	15.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.00-HR
+ (AC-FT)	(HR)				
15.	20.75	15.	6.	6.	6.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.00-HR
+ (FEET)	(HR)				

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  77.13     20.75                 77.12       76.49       76.49        76.49

                    CUMULATIVE AREA =     .18 SQ MI


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


          **************
          *            *
 40 KK    *    CHAN4B  *
          *            *
          **************

 41 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           1  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                              ROUTING THROUGH N-S CHANNEL WEST OF R.R. TRACKS

             HYDROGRAPH ROUTING DATA

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

 44 RC          NORMAL DEPTH CHANNEL ROUTING
                       ANL        .080  LEFT OVERBANK N-VALUE
                      ANCH        .030  MAIN CHANNEL N-VALUE
                       ANR        .080  RIGHT OVERBANK N-VALUE
                     RLNTH       1354.  REACH LENGTH
                       SEL       .0040  ENERGY SLOPE
                     ELMAX        75.0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                        CROSS-SECTION DATA
                        --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
 46 RY        ELEVATION    74.00     75.00     75.00     71.00     71.00     74.00     74.00     71.00
 45 RX        DISTANCE       .00     10.00     20.00     24.00     29.00     32.00     62.00     65.00

                                                          ***

                                        COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE       .00       .03       .07       .12       .16       .22       .27       .33       .39       .46
          OUTFLOW       .00      1.17      3.72      7.35     11.98     17.57     24.10     31.60     40.07     49.52
        ELEVATION     71.00     71.21     71.42     71.63     71.84     72.05     72.26     72.47     72.68     72.89

          STORAGE       .53       .61       .69       .77       .86      1.11      1.41      1.73      2.07      2.42
          OUTFLOW     59.98     71.47     84.01     97.64    112.37    128.10    152.97    181.59    213.80    249.55
        ELEVATION     73.11     73.32     73.53     73.74     73.95     74.16     74.37     74.58     74.79     75.00


*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN        7. TO      250.
               THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
               THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)
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HYDROGRAPH AT STATION CHAN4B

DA MON HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA MON HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA MON HRMN	ORD	OUTFLOW	STORAGE	STAGE
28 FEB 0100	1	0.	.0	71.0	28 FEB 0915	34	0.	.0	71.0	28 FEB 1730	67	15.	.2	72.0
28 FEB 0115	2	0.	.0	71.0	28 FEB 0930	35	0.	.0	71.0	28 FEB 1745	68	16.	.2	72.0
28 FEB 0130	3	0.	.0	71.0	28 FEB 0945	36	0.	.0	71.0	28 FEB 1800	69	16.	.2	72.0
28 FEB 0145	4	0.	.0	71.0	28 FEB 1000	37	0.	.0	71.0	28 FEB 1815	70	16.	.2	72.0
28 FEB 0200	5	0.	.0	71.0	28 FEB 1015	38	0.	.0	71.0	28 FEB 1830	71	17.	.2	72.0
28 FEB 0215	6	0.	.0	71.0	28 FEB 1030	39	0.	.0	71.0	28 FEB 1845	72	17.	.2	72.0
28 FEB 0230	7	0.	.0	71.0	28 FEB 1045	40	0.	.0	71.0	28 FEB 1900	73	17.	.2	72.0
28 FEB 0245	8	0.	.0	71.0	28 FEB 1100	41	0.	.0	71.0	28 FEB 1915	74	17.	.2	72.0
28 FEB 0300	9	0.	.0	71.0	28 FEB 1115	42	0.	.0	71.0	28 FEB 1930	75	17.	.2	72.1
28 FEB 0315	10	0.	.0	71.0	28 FEB 1130	43	0.	.0	71.0	28 FEB 1945	76	18.	.2	72.1
28 FEB 0330	11	0.	.0	71.0	28 FEB 1145	44	0.	.0	71.0	28 FEB 2000	77	18.	.2	72.1
28 FEB 0345	12	0.	.0	71.0	28 FEB 1200	45	0.	.0	71.0	28 FEB 2015	78	18.	.2	72.1
28 FEB 0400	13	0.	.0	71.0	28 FEB 1215	46	0.	.0	71.0	28 FEB 2030	79	18.	.2	72.1
28 FEB 0415	14	0.	.0	71.0	28 FEB 1230	47	0.	.0	71.0	28 FEB 2045	80	18.	.2	72.1
28 FEB 0430	15	0.	.0	71.0	28 FEB 1245	48	0.	.0	71.1	28 FEB 2100	81	18.	.2	72.1
28 FEB 0445	16	0.	.0	71.0	28 FEB 1300	49	0.	.0	71.1	28 FEB 2115	82	18.	.2	72.1
28 FEB 0500	17	0.	.0	71.0	28 FEB 1315	50	1.	.0	71.2	28 FEB 2130	83	18.	.2	72.1
28 FEB 0515	18	0.	.0	71.0	28 FEB 1330	51	2.	.0	71.3	28 FEB 2145	84	18.	.2	72.1
28 FEB 0530	19	0.	.0	71.0	28 FEB 1345	52	4.	.1	71.4	28 FEB 2200	85	18.	.2	72.1
28 FEB 0545	20	0.	.0	71.0	28 FEB 1400	53	6.	.1	71.6	28 FEB 2215	86	18.	.2	72.1
28 FEB 0600	21	0.	.0	71.0	28 FEB 1415	54	7.	.1	71.6	28 FEB 2230	87	18.	.2	72.1
FEB 0615	22	0.	.0	71.0	28 FEB 1430	55	8.	.1	71.7	28 FEB 2245	88	18.	.2	72.1
EB 0630	23	0.	.0	71.0	28 FEB 1445	56	9.	.1	71.7	28 FEB 2300	89	18.	.2	72.1
FEB 0645	24	0.	.0	71.0	28 FEB 1500	57	10.	.1	71.8	28 FEB 2315	90	18.	.2	72.1
28 FEB 0700	25	0.	.0	71.0	28 FEB 1515	58	11.	.2	71.8	28 FEB 2330	91	18.	.2	72.1
28 FEB 0715	26	0.	.0	71.0	28 FEB 1530	59	11.	.2	71.8	28 FEB 2345	92	18.	.2	72.1
28 FEB 0730	27	0.	.0	71.0	28 FEB 1545	60	12.	.2	71.8	1 MAR 0000	93	18.	.2	72.1
28 FEB 0745	28	0.	.0	71.0	28 FEB 1600	61	13.	.2	71.9	1 MAR 0015	94	17.	.2	72.0
28 FEB 0800	29	0.	.0	71.0	28 FEB 1615	62	13.	.2	71.9	1 MAR 0030	95	17.	.2	72.0
28 FEB 0815	30	0.	.0	71.0	28 FEB 1630	63	14.	.2	71.9	1 MAR 0045	96	17.	.2	72.0
28 FEB 0830	31	0.	.0	71.0	28 FEB 1645	64	14.	.2	71.9	1 MAR 0100	97	17.	.2	72.0
28 FEB 0845	32	0.	.0	71.0	28 FEB 1700	65	14.	.2	71.9					
28 FEB 0900	33	0.	.0	71.0	28 FEB 1715	66	15.	.2	72.0					

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 18.	20.75		18.	7.	7.	7.
		(INCHES)	.924	1.512	1.512	1.512
		(AC-FT)	9.	14.	14.	14.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.00-HR
+ (AC-FT)	(HR)				
0.	20.00	0.	0.	0.	0.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.00-HR
+ (FEET)	(HR)				

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  72.07     20.75                 72.06       71.46       71.46       71.46

                    CUMULATIVE AREA =     .18 SQ MI


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          *            *
 47 KK    *    SUB4A   *
          *            *
          **************

 48 KO         OUTPUT CONTROL VARIABLES
                    IPRNT           4  PRINT CONTROL
                    IPLOT           0  PLOT CONTROL
                    QSCAL          0.  HYDROGRAPH PLOT SCALE
                             SCS RUNOFF CALCULATION

             SUBBASIN RUNOFF DATA

 50 BA         SUBBASIN CHARACTERISTICS
                    TAREA         .03  SUBBASIN AREA

               PRECIPITATION DATA

 51 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
               ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
               5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                 .60    1.30    2.40    3.00    3.40    4.20    5.20    6.00     .00     .00     .00     .00

                                                  STORM AREA =     .03

 52 LS         SCS LOSS RATE
                    STRTL         .63  INITIAL ABSTRACTION
                   CRVNBR       76.00  CURVE NUMBER
                    RTIMP         .00  PERCENT IMPERVIOUS AREA

 53 UD         SCS DIMENSIONLESS UNITGRAPH
                     TLAG         .29  LAG

                                                          ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                     UNIT HYDROGRAPH
                                                  8 END-OF-PERIOD ORDINATES
              26.       36.       15.        6.        2.        1.        0.        0.


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          *            *
 54 KK    *   CHAN4A   *
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          *           *
          **************

 55 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           1  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                               ROUTING THROUGH N-S CHANNEL EAST OF R.R. TRACKS

             HYDROGRAPH ROUTING DATA

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

 58 RC          NORMAL DEPTH CHANNEL ROUTING
                        ANL        .080  LEFT OVERBANK N-VALUE
                       ANCH        .030  MAIN CHANNEL N-VALUE
                        ANR        .080  RIGHT OVERBANK N-VALUE
                      RLNTH       1354.  REACH LENGTH
                        SEL       .0070  ENERGY SLOPE
                      ELMAX        75.0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                      CROSS-SECTION DATA
                        --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
 60 RY        ELEVATION    71.00     74.00     74.00     71.00     71.00     75.00     75.00     74.00
 59 RX        DISTANCE       .00      3.00     33.00     36.00     41.00     45.00     55.00     65.00

                                                          ***

                                      COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE        .00       .03       .07       .12       .16       .22       .27       .33       .39       .46
          OUTFLOW        .00      1.54      4.92      9.72     15.84     23.24     31.89     41.80     53.00     65.51
        ELEVATION      71.00     71.21     71.42     71.63     71.84     72.05     72.26     72.47     72.68     72.89

          STORAGE        .53       .61       .69       .77       .86      1.11      1.41      1.73      2.07      2.42
          OUTFLOW      79.34     94.54    111.14    129.16    148.65    169.46    202.36    240.22    282.83    330.13
        ELEVATION      73.11     73.32     73.53     73.74     73.95     74.16     74.37     74.58     74.79     75.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN        5. TO      330.
               THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
               THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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                                                  HYDROGRAPH AT STATION   CHAN4A

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                                                *                                                *
 DA MON HRMN ORD  OUTFLOW  STORAGE   STAGE * DA MON HRMN ORD  OUTFLOW  STORAGE   STAGE * DA MON HRMN ORD  OUTFLOW  STORAGE   STAGE
                                                *                                                *
    FEB 0100   1       0.       .0    71.0 * 28 FEB 0915  34       0.       .0    71.0 * 28 FEB 1730  67       3.       .1    71.3
 28 FEB 0115   2       0.       .0    71.0 * 28 FEB 0930  35       0.       .0    71.0 * 28 FEB 1745  68       3.       .1    71.3
 28 FEB 0130   3       0.       .0    71.0 * 28 FEB 0945  36       0.       .0    71.0 * 28 FEB 1800  69       3.       .1    71.3
 28 FEB 0145   4       0.       .0    71.0 * 28 FEB 1000  37       0.       .0    71.0 * 28 FEB 1815  70       3.       .1    71.3
 28 FEB 0200   5       0.       .0    71.0 * 28 FEB 1015  38       0.       .0    71.1 * 28 FEB 1830  71       3.       .0    71.3
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28 FEB 0215	6	0.	.0	71.0	*	28 FEB 1030	39	1.	.0	71.1	*	28 FEB 1845	72	3.	.0	71.3
28 FEB 0230	7	0.	.0	71.0	*	28 FEB 1045	40	1.	.0	71.1	*	28 FEB 1900	73	3.	.0	71.3
28 FEB 0245	8	0.	.0	71.0	*	28 FEB 1100	41	1.	.0	71.1	*	28 FEB 1915	74	2.	.0	71.3
28 FEB 0300	9	0.	.0	71.0	*	28 FEB 1115	42	1.	.0	71.2	*	28 FEB 1930	75	2.	.0	7
28 FEB 0315	10	0.	.0	71.0	*	28 FEB 1130	43	1.	.0	71.2	*	28 FEB 1945	76	2.	.0	71.-
28 FEB 0330	11	0.	.0	71.0	*	28 FEB 1145	44	2.	.0	71.2	*	28 FEB 2000	77	2.	.0	71.2
28 FEB 0345	12	0.	.0	71.0	*	28 FEB 1200	45	2.	.0	71.3	*	28 FEB 2015	78	2.	.0	71.2
28 FEB 0400	13	0.	.0	71.0	*	28 FEB 1215	46	3.	.0	71.3	*	28 FEB 2030	79	1.	.0	71.2
28 FEB 0415	14	0.	.0	71.0	*	28 FEB 1230	47	4.	.1	71.3	*	28 FEB 2045	80	1.	.0	71.2
28 FEB 0430	15	0.	.0	71.0	*	28 FEB 1245	48	5.	.1	71.4	*	28 FEB 2100	81	1.	.0	71.2
28 FEB 0445	16	0.	.0	71.0	*	28 FEB 1300	49	10.	.1	71.7	*	28 FEB 2115	82	1.	.0	71.2
28 FEB 0500	17	0.	.0	71.0	*	28 FEB 1315	50	28.	.2	72.2	*	28 FEB 2130	83	1.	.0	71.2
28 FEB 0515	18	0.	.0	71.0	*	28 FEB 1330	51	43.	.3	72.5	*	28 FEB 2145	84	1.	.0	71.2
28 FEB 0530	19	0.	.0	71.0	*	28 FEB 1345	52	34.	.3	72.3	*	28 FEB 2200	85	1.	.0	71.2
28 FEB 0545	20	0.	.0	71.0	*	28 FEB 1400	53	20.	.2	72.0	*	28 FEB 2215	86	1.	.0	71.2
28 FEB 0600	21	0.	.0	71.0	*	28 FEB 1415	54	14.	.1	71.8	*	28 FEB 2230	87	1.	.0	71.2
28 FEB 0615	22	0.	.0	71.0	*	28 FEB 1430	55	10.	.1	71.6	*	28 FEB 2245	88	1.	.0	71.2
28 FEB 0630	23	0.	.0	71.0	*	28 FEB 1445	56	8.	.1	71.6	*	28 FEB 2300	89	1.	.0	71.2
28 FEB 0645	24	0.	.0	71.0	*	28 FEB 1500	57	7.	.1	71.5	*	28 FEB 2315	90	1.	.0	71.2
28 FEB 0700	25	0.	.0	71.0	*	28 FEB 1515	58	6.	.1	71.5	*	28 FEB 2330	91	1.	.0	71.2
28 FEB 0715	26	0.	.0	71.0	*	28 FEB 1530	59	5.	.1	71.4	*	28 FEB 2345	92	1.	.0	71.1
28 FEB 0730	27	0.	.0	71.0	*	28 FEB 1545	60	5.	.1	71.4	*	1 MAR 0000	93	1.	.0	71.1
28 FEB 0745	28	0.	.0	71.0	*	28 FEB 1600	61	4.	.1	71.4	*	1 MAR 0015	94	1.	.0	71.1
28 FEB 0800	29	0.	.0	71.0	*	28 FEB 1615	62	4.	.1	71.4	*	1 MAR 0030	95	1.	.0	71.1
28 FEB 0815	30	0.	.0	71.0	*	28 FEB 1630	63	4.	.1	71.4	*	1 MAR 0045	96	1.	.0	71.1
28 FEB 0830	31	0.	.0	71.0	*	28 FEB 1645	64	4.	.1	71.3	*	1 MAR 0100	97	1.	.0	71.1
28 FEB 0845	32	0.	.0	71.0	*	28 FEB 1700	65	4.	.1	71.3	*					
28 FEB 0900	33	0.	.0	71.0	*	28 FEB 1715	66	3.	.1	71.3	*					
					*						*					

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 43.	12.50		10.	3.	3.	3.
		(INCHES)	2.733	3.348	3.348	3.348
		(AC-FT)	5.	6.	6.	6.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.00-HR
+ (AC-FT)	(HR)				
0.	12.50	0.	0.	0.	0.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.00-HR
+ (FEET)	(HR)				
72.50	12.50	71.56	71.21	71.21	71.21

CUMULATIVE AREA = .03 SQ MI

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          *             *
 61 KK    *    SUB4D    *
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          *            *
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 62 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           4  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                               SCS RUNOFF CALCULATION

             SUBBASIN RUNOFF DATA

 64 BA          SUBBASIN CHARACTERISTICS
                      TAREA         .05  SUBBASIN AREA

                PRECIPITATION DATA

 65 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                  .60    1.30    2.40    3.00    3.40    4.20    5.20    6.00     .00     .00     .00     .00

                                                   STORM AREA =     .05

 66 LS          SCS LOSS RATE
                      STRTL         .63  INITIAL ABSTRACTION
                     CRVNBR       76.00  CURVE NUMBER
                      RTIMP         .00  PERCENT IMPERVIOUS AREA

 67 UD          SCS DIMENSIONLESS UNITGRAPH
                       TLAG         .30  LAG

                                                          ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                     UNIT HYDROGRAPH
                                                 8 END-OF-PERIOD ORDINATES
              34.       51.       22.        9.        3.        1.        1.        0.


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          *            *
 68 KK    *    4DCHAB  *
          *            *
          **************

 69 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           1  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                               COMBINE HYDROGRAPHS FOR SUB4D & CHANNELS 4A & 4B

 70 HC          HYDROGRAPH COMBINATION
                      ICOMP           3  NUMBER OF HYDROGRAPHS TO COMBINE

                                                          ***
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HYDROGRAPH AT STATION 4DCHAB
SUM OF 3 HYDROGRAPHS

DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW
28 FEB 0100	1	0.	28 FEB 0715	26	0.	28 FEB 1330	51	107.	28 FEB 1945	76	22.
28 FEB 0115	2	0.	28 FEB 0730	27	0.	28 FEB 1345	52	78.	28 FEB 2000	77	22.
28 FEB 0130	3	0.	28 FEB 0745	28	0.	28 FEB 1400	53	51.	28 FEB 2015	78	22.
28 FEB 0145	4	0.	28 FEB 0800	29	0.	28 FEB 1415	54	38.	28 FEB 2030	79	21.
28 FEB 0200	5	0.	28 FEB 0815	30	0.	28 FEB 1430	55	31.	28 FEB 2045	80	21.
28 FEB 0215	6	0.	28 FEB 0830	31	0.	28 FEB 1445	56	28.	28 FEB 2100	81	21.
28 FEB 0230	7	0.	28 FEB 0845	32	0.	28 FEB 1500	57	26.	28 FEB 2115	82	21.
28 FEB 0245	8	0.	28 FEB 0900	33	0.	28 FEB 1515	58	24.	28 FEB 2130	83	21.
28 FEB 0300	9	0.	28 FEB 0915	34	0.	28 FEB 1530	59	24.	28 FEB 2145	84	21.
28 FEB 0315	10	0.	28 FEB 0930	35	0.	28 FEB 1545	60	23.	28 FEB 2200	85	21.
28 FEB 0330	11	0.	28 FEB 0945	36	1.	28 FEB 1600	61	23.	28 FEB 2215	86	21.
28 FEB 0345	12	0.	28 FEB 1000	37	1.	28 FEB 1615	62	23.	28 FEB 2230	87	21.
28 FEB 0400	13	0.	28 FEB 1015	38	1.	28 FEB 1630	63	23.	28 FEB 2245	88	21.
28 FEB 0415	14	0.	28 FEB 1030	39	2.	28 FEB 1645	64	23.	28 FEB 2300	89	21.
28 FEB 0430	15	0.	28 FEB 1045	40	2.	28 FEB 1700	65	23.	28 FEB 2315	90	21.
28 FEB 0445	16	0.	28 FEB 1100	41	2.	28 FEB 1715	66	23.	28 FEB 2330	91	20.
28 FEB 0500	17	0.	28 FEB 1115	42	3.	28 FEB 1730	67	23.	28 FEB 2345	92	20.
28 FEB 0515	18	0.	28 FEB 1130	43	4.	28 FEB 1745	68	23.	1 MAR 0000	93	20.
28 FEB 0530	19	0.	28 FEB 1145	44	5.	28 FEB 1800	69	23.	1 MAR 0015	94	20
28 FEB 0545	20	0.	28 FEB 1200	45	6.	28 FEB 1815	70	23.	1 MAR 0030	95	2
28 FEB 0600	21	0.	28 FEB 1215	46	8.	28 FEB 1830	71	23.	1 MAR 0045	96	20.
28 FEB 0615	22	0.	28 FEB 1230	47	10.	28 FEB 1845	72	23.	1 MAR 0100	97	19.
28 FEB 0630	23	0.	28 FEB 1245	48	15.	28 FEB 1900	73	23.			
28 FEB 0645	24	0.	28 FEB 1300	49	30.	28 FEB 1915	74	23.			
28 FEB 0700	25	0.	28 FEB 1315	50	78.	28 FEB 1930	75	22.			

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.00-HR
		(CFS)				
+ 107.	12.50		34.	14.	14.	14.
		(INCHES)	1.214	2.081	2.081	2.081
		(AC-FT)	17.	29.	29.	29.

CUMULATIVE AREA = .26 SQ MI

72 KK SUB4E

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 73 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           4  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                               SCS RUNOFF CALCULATION

            SUBBASIN RUNOFF DATA

 75 BA          SUBBASIN CHARACTERISTICS
                      TAREA         .30  SUBBASIN AREA

                PRECIPITATION DATA

 76 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                  .60    1.30    2.40    3.00    3.40    4.20    5.20    6.00     .00     .00     .00     .00

                                                   STORM AREA =     .30

 77 LS          SCS LOSS RATE
                      STRTL         .63  INITIAL ABSTRACTION
                     CRVNBR       76.00  CURVE NUMBER
                      RTIMP         .00  PERCENT IMPERVIOUS AREA

 78 UD          SCS DIMENSIONLESS UNITGRAPH
                       TLAG         .25  LAG

                                                        ***

_ .ING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                   UNIT HYDROGRAPH
                                              7 END-OF-PERIOD ORDINATES
            291.      317.      106.      37.      12.       4.       1.


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


          **************
          *            *
 79 KK    *    CHAN4E  *
          *            *
          **************

 80 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           1  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                               ROUTING THROUGH CHANNEL & PIPE

            HYDROGRAPH ROUTING DATA

    RS          STORAGE ROUTING
                      NSTPS           1  NUMBER OF SUBREACHES
                       ITYP        ELEV  TYPE OF INITIAL CONDITION
                     RSVRIC       65.00  INITIAL CONDITION
                          X         .00 WORKING R AND D COEFFICIENT
```

```
 83 SA              AREA          .2        .6

 84 SE         ELEVATION       65.00     70.00

 85 SL         LOW-LEVEL OUTLET
                    ELEVL       65.20  ELEVATION AT CENTER OF OUTLET
                    CAREA        7.07  CROSS-SECTIONAL AREA
                     COQL         .60  COEFFICIENT
                     EXPL         .50  EXPONENT OF HEAD

 86 SS         SPILLWAY
                     CREL       74.00  SPILLWAY CREST ELEVATION
                    SPWID         .00  SPILLWAY WIDTH
                     COQW         .00  WEIR COEFFICIENT
                     EXPW        1.50  EXPONENT OF HEAD
```

***

COMPUTED STORAGE-ELEVATION DATA

STORAGE	.00	1.82
ELEVATION	65.00	70.00

COMPUTED OUTFLOW-ELEVATION DATA

OUTFLOW	.00	.00	41.53	45.35	49.93	55.54	62.58	71.65	83.80	100.92
ELEVATION	65.00	65.20	66.69	66.98	67.35	67.87	68.58	69.64	71.27	74.00

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	.04	.41	.49	.62	.80	1.10	1.61	1.82	2.62
OUTFLOW	.00	.00	41.53	45.35	49.93	55.54	62.58	71.65	74.54	83.80
ELEVATION	65.00	65.20	66.69	66.98	67.35	67.87	68.58	69.64	70.00	71.27

STORAGE	4.95
OUTFLOW	100.92
ELEVATION	74.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 0. TO 42.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

****

HYDROGRAPH AT STATION CHAN4E

****

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
28	FEB	0100	1	0.	.0	65.0	*	28	FEB	0915	34	0.	.0	65.1	*	28	FEB	1730	67	29.	.3	66.2
28	FEB	0115	2	0.	.0	65.0	*	28	FEB	0930	35	1.	.0	65.2	*	28	FEB	1745	68	28.	.3	66.2
28	FEB	0130	3	0.	.0	65.0	*	28	FEB	0945	36	3.	.1	65.3	*	28	FEB	1800	69	27.	.3	6
28	FEB	0145	4	0.	.0	65.0	*	28	FEB	1000	37	4.	.1	65.3	*	28	FEB	1815	70	26.	.3	66.
28	FEB	0200	5	0.	.0	65.0	*	28	FEB	1015	38	5.	.1	65.4	*	28	FEB	1830	71	25.	.3	66.1
28	FEB	0215	6	0.	.0	65.0	*	28	FEB	1030	39	6.	.1	65.4	*	28	FEB	1845	72	24.	.3	66.1
28	FEB	0230	7	0.	.0	65.0	*	28	FEB	1045	40	8.	.1	65.5	*	28	FEB	1900	73	23.	.2	66.0
28	FEB	0245	8	0.	.0	65.0	*	28	FEB	1100	41	10.	.1	65.5	*	28	FEB	1915	74	21.	.2	66.0

28 FEB 0300	9	0.	.0	65.0	*	28 FEB 1115	42	12.	.1	65.6	*	28 FEB 1930	75	18.	.2	65.8
28 FEB 0315	10	0.	.0	65.0	*	28 FEB 1130	43	14.	.2	65.7	*	28 FEB 1945	76	15.	.2	65.7
28 FEB 0330	11	0.	.0	65.0	*	28 FEB 1145	44	18.	.2	65.8	*	28 FEB 2000	77	14.	.2	65.7
28 FEB 0345	12	0.	.0	65.0	*	28 FEB 1200	45	22.	.2	66.0	*	28 FEB 2015	78	14.	.2	65.7
FEB 0400	13	0.	.0	65.0	*	28 FEB 1215	46	28.	.3	66.2	*	28 FEB 2030	79	13.	.2	65.7
FEB 0415	14	0.	.0	65.0	*	28 FEB 1230	47	37.	.4	66.5	*	28 FEB 2045	80	13.	.2	65.7
28 FEB 0430	15	0.	.0	65.0	*	28 FEB 1245	48	48.	.6	67.2	*	28 FEB 2100	81	12.	.1	65.6
28 FEB 0445	16	0.	.0	65.0	*	28 FEB 1300	49	69.	1.5	69.3	*	28 FEB 2115	82	12.	.1	65.6
28 FEB 0500	17	0.	.0	65.0	*	28 FEB 1315	50	101.	5.0	74.0	*	28 FEB 2130	83	12.	.1	65.6
28 FEB 0515	18	0.	.0	65.0	*	28 FEB 1330	51	141.	10.4	80.4	*	28 FEB 2145	84	11.	.1	65.6
28 FEB 0530	19	0.	.0	65.0	*	28 FEB 1345	52	164.	13.6	84.1	*	28 FEB 2200	85	11.	.1	65.6
28 FEB 0545	20	0.	.0	65.0	*	28 FEB 1400	53	167.	13.9	84.5	*	28 FEB 2215	86	11.	.1	65.6
28 FEB 0600	21	0.	.0	65.0	*	28 FEB 1415	54	160.	13.0	83.4	*	28 FEB 2230	87	11.	.1	65.6
28 FEB 0615	22	0.	.0	65.0	*	28 FEB 1430	55	150.	11.6	81.8	*	28 FEB 2245	88	11.	.1	65.6
28 FEB 0630	23	0.	.0	65.0	*	28 FEB 1445	56	138.	10.0	79.9	*	28 FEB 2300	89	10.	.1	65.6
28 FEB 0645	24	0.	.0	65.0	*	28 FEB 1500	57	127.	8.5	78.1	*	28 FEB 2315	90	10.	.1	65.6
28 FEB 0700	25	0.	.0	65.0	*	28 FEB 1515	58	116.	7.0	76.4	*	28 FEB 2330	91	10.	.1	65.6
28 FEB 0715	26	0.	.0	65.0	*	28 FEB 1530	59	106.	5.7	74.8	*	28 FEB 2345	92	10.	.1	65.5
28 FEB 0730	27	0.	.0	65.0	*	28 FEB 1545	60	97.	4.4	73.4	*	1 MAR 0000	93	10.	.1	65.5
28 FEB 0745	28	0.	.0	65.0	*	28 FEB 1600	61	89.	3.3	72.1	*	1 MAR 0015	94	9.	.1	65.5
28 FEB 0800	29	0.	.0	65.0	*	28 FEB 1615	62	80.	2.3	70.8	*	1 MAR 0030	95	9.	.1	65.5
28 FEB 0815	30	0.	.0	65.0	*	28 FEB 1630	63	70.	1.5	69.4	*	1 MAR 0045	96	9.	.1	65.5
28 FEB 0830	31	0.	.0	65.0	*	28 FEB 1645	64	57.	.9	68.0	*	1 MAR 0100	97	9.	.1	65.5
28 FEB 0845	32	0.	.0	65.0	*	28 FEB 1700	65	44.	.5	66.9	*					
28 FEB 0900	33	0.	.0	65.0	*	28 FEB 1715	66	31.	.3	66.3	*					
					*						*					

****

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.00-HR
(CFS)	(HR)					
		(CFS)				
+ 167.	13.00		88.	27.	27.	27.
		(INCHES)	2.731	3.354	3.354	3.354
		(AC-FT)	43.	53.	53.	53.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.00-HR
+ (AC-FT)	(HR)				
14.	13.00	5.	1.	1.	1.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.00-HR
+ (FEET)	(HR)				
84.52	13.00	73.01	67.26	67.26	67.26

CUMULATIVE AREA = .30 SQ MI

1

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
	HYDROGRAPH AT									
+		SUB4C	111.	12.75	32.	10.	10.	.11		

```
        ROUTED TO
+                       4CSWP       20.   14.50        19.         8.         8.       .11
+                                                                                      77.81      14.50

        HYDROGRAPH AT
+                       SUB4B       91.   12.50        20.         6.         6.       .07

        2 COMBINED AT
+                         4BC      102.   12.50        37.        15.        15.       .18

        ROUTED TO
+                       4BSWP       18.   20.75        18.         7.         7.       .18
+                                                                                      77.13      20.75

        ROUTED TO
+                      CHAN4B       18.   20.75        18.         7.         7.       .18
+                                                                                      72.07      20.75

        HYDROGRAPH AT
+                       SUB4A       44.   12.50        10.         3.         3.       .03

        ROUTED TO
+                      CHAN4A       43.   12.50        10.         3.         3.       .03
+                                                                                      72.50      12.50

        HYDROGRAPH AT
+                       SUB4D       62.   12.50        14.         4.         4.       .05

        3 COMBINED AT
+                      4DCHAB      107.   12.50        34.        14.        14.       .26

        HYDROGRAPH AT
+                       SUB4E      391.   12.50        88.        27.        27.       .30

        ROUTED TO
+                      CHAN4E      167.   13.00        88.        27.        27.       .30
+                                                                                      84.52      13.00


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

HEC-1

100 Year, 24 Hour Storm

```
1                                                  ****
                    FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985
          U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616
                                                  ****



          THIS HEC-1 VERSION CONTAINS ALL OPTIONS EXCEPT ECONOMICS, AND THE NUMBER OF PLANS ARE REDUCED TO 3


1                                          HEC-1 INPUT                                                  PAGE  1

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

   1          ID        ISRT/WOBURN/MASS. 903-6400.310
   2          ID        SUBWATERSHED #4 (OFF SITE)
   3          ID        SWAMP AREAS NORTH & SOUTH OF WILMINGTON/WOBURN BORDER
   4          ID        DETAILED STORAGE AND STREAM NETWORK
   5          ID        EXISTING CONDITIONS - 100 YR, 24 HR STORM
              *DIAGRAM
   6          IT      15 28FEB91     100      97
   7          IO       5

   8          KK   SUB4C
   9          KO       4
  10          KM        SCS RUNOFF CALCULATION
  11          BA   0.110
  12          PH              0     0.6     1.3     2.5     3.3     3.7     4.6     5.6     6.6
  13          LS             76
  14          UD    0.54

  15          KK   4CSWP
  16          KO       1
  17          KM        STORAGE ROUTING THROUGH SUBWATERSHED 4C SWAMP
  18          RS       1    ELEV      76
  19          SA    4.63    9.26
  20          SE      76      80
  21          SL      76    3.14     0.6     0.5
  22          SS      80       0     3.0     1.5

  23          KK   SUB4B
  24          KO       4
  25          KM        SCS RUNOFF CALCULATION
  26          BA   0.069
  27          PH              0     0.6     1.3     2.5     3.3     3.7     4.6     5.6     6.6
  28          LS             76
  29          UD    0.29

  30          KK     4BC
  31          KM        COMBINE HYDROGRAPHS FOR  SUB4B & 4CSWP
  32          HC       2

  33          KK   4BSWP
  34          KO       1
  35          KM        STORAGE ROUTING THROUGH SUB4B SWAMP
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 36          RS       1    ELEV      76
 37          SA   12.35   19.30
 38          SE      76      80
 39          SS      76       5     3.0     1.5

 40          KK  CHAN4B
 41          KO       1
 42          KM        ROUTING THROUGH N-S CHANNEL WEST OF R.R. TRACKS
 43          RS       1    STOR       0
 44          RC    0.08    0.03    0.08    1354   0.004      75
 45          RX       0      10      20      24      29      32      62      65
 46          RY      74      75      75      71      71      74      74      71
1                                          HEC-1 INPUT                                                    PAGE  2

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


 47          KK   SUB4A
 48          KO       4
 49          KM        SCS RUNOFF CALCULATION
 50          BA   0.033
 51          PH              0     0.6     1.3     2.5     3.3     3.7     4.6     5.6     6.6
 52          LS             76
 53          UD    0.29

 54          KK  CHAN4A
 55          KO       1
 56          KM        ROUTING THROUGH N-S CHANNEL EAST OF R.R. TRACKS
 57          RS       1    STOR       0
 58          RC    0.08    0.03    0.08    1354   0.007      75
 59          RX       0       3      33      36      41      45      55      65
 60          RY      71      74      74      71      71      75      75      74

 61          KK   SUB4D
 62          KO       4
 63          KM        SCS RUNOFF CALCULATION
 64          BA   0.047
 65          PH              0     0.6     1.3     2.5     3.3     3.7     4.6     5.6     6.6
 66          LS             76
 67          UD    0.30

 68          KK  4DCHAB
 69          KO       1
 70          KM        COMBINE HYDROGRAPHS FOR SUB4D & CHANNELS 4A & 4B
 71          HC       3

 72          KK   SUB4E
 73          KO       4
 74          KM        SCS RUNOFF CALCULATION
 75          BA   0.298
 76          PH              0     0.6     1.3     2.5     3.3     3.7     4.6     5.6     6.6
 77          LS             76
 78          UD    0.25

 79          KK  CHAN4E
 80          KO       1
 81          KM        ROUTING THROUGH CHANNEL & PIPE
 82          RS       1    ELEV      65
 83          SA    0.19    0.57
 84          SE      65      70
```

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          85          SL    65.2    7.07     0.6     0.5
          86          SS      74       0     3.0     1.5
          87          ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK
    T
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

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

    8       SUB4C
                V
                V
   15       4CSWP
                .
                .
   23           .       SUB4B
                .           .
                .           .
   30         4BC............
                V
                V
   33       4BSWP
                V
                V
   40      CHAN4B
                .
                .
   47           .       SUB4A
                .           V
                .           V
   54           .      CHAN4A
                .           .
                .           .
   61           .           .       SUB4D
                .           .           .
                .           .           .
   68      4DCHAB........................
                .
                .
   72           .       SUB4E
                .           V
                .           V
   79           .      CHAN4E

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1                                                    ****
                    FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985
          U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616
                                                     ****
```

ISRT/WOBURN/MASS. 903-6400.310
SUBWATERSHED #4 (OFF SITE)
SWAMP AREAS NORTH & SOUTH OF WILMINGTON/WOBURN BORDER
DETAILED STORAGE AND STREAM NETWORK
EXISTING CONDITIONS - 100 YR, 24 HR STORM

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

    IT        HYDROGRAPH TIME DATA
                     NMIN         15  MINUTES IN COMPUTATION INTERVAL
                    IDATE     28FEB91  STARTING DATE
                    ITIME        0100  STARTING TIME
                       NQ         97  NUMBER OF HYDROGRAPH ORDINATES
                   NDDATE      1MAR91  ENDING DATE
                   NDTIME        0100  ENDING TIME

                COMPUTATION INTERVAL     .25 HOURS
                     TOTAL TIME BASE   24.00 HOURS

        ENGLISH UNITS


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


          **************
          *            *
  8 KK    *     SUB4C  *
          *            *
          **************

  9 KO        OUTPUT CONTROL VARIABLES
                    IPRNT          4  PRINT CONTROL
                    IPLOT          0  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE
                             SCS RUNOFF CALCULATION

            SUBBASIN RUNOFF DATA

 11 BA        SUBBASIN CHARACTERISTICS
                    TAREA        .11  SUBBASIN AREA

              PRECIPITATION DATA

 12 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
              ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
              5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                .60    1.30    2.50    3.30    3.70    4.60    5.60    6.60     .00     .00     .00     .00

                                                   STORM AREA =     .11

 13 LS        SCS LOSS RATE
                    STRTL        .63  INITIAL ABSTRACTION
                   CRVNBR      76.00  CURVE NUMBER
                    RTIMP        .00  PERCENT IMPERVIOUS AREA

 14 UD        SCS DIMENSIONLESS UNITGRAPH
                     TLAG        .54  LAG

                                                        ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG
```

```
                                                  UNIT HYDROGRAPH
                                              13 END-OF-PERIOD ORDINATES
          22.       70.       78.       54.       27.       15.        8.        4.        2.        1.
           1.        0.        0.


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


          **************
          *            *
 15 KK    *     4CSWP  *
          *            *
          **************

 16 KO         OUTPUT CONTROL VARIABLES
                     IPRNT           1  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                              STORAGE ROUTING THROUGH SUBWATERSHED 4C SWAMP

            HYDROGRAPH ROUTING DATA

 18 RS         STORAGE ROUTING
                     NSTPS           1  NUMBER OF SUBREACHES
                      ITYP        ELEV  TYPE OF INITIAL CONDITION
                    RSVRIC       76.00  INITIAL CONDITION
                         X         .00 WORKING R AND D COEFFICIENT

 [illegible] SA            AREA        4.6       9.3

 20 SE         ELEVATION       76.00     80.00

 21 SL         LOW-LEVEL OUTLET
                     ELEVL       76.00  ELEVATION AT CENTER OF OUTLET
                     CAREA        3.14  CROSS-SECTIONAL AREA
                      COQL         .60  COEFFICIENT
                      EXPL         .50  EXPONENT OF HEAD

 22 SS         SPILLWAY
                      CREL       80.00  SPILLWAY CREST ELEVATION
                     SPWID         .00  SPILLWAY WIDTH
                      COQW         .00  WEIR COEFFICIENT
                      EXPW        1.50  EXPONENT OF HEAD

                                                          ***

                                          COMPUTED STORAGE-ELEVATION DATA

          STORAGE        .00     27.25
        ELEVATION      76.00     80.00

                                          COMPUTED OUTFLOW-ELEVATION DATA

          OUTFLOW        .00     14.78     15.79     16.94     18.28     19.85     21.71     23.96     26.73     30.22
        ELEVATION      76.00     76.96     77.09     77.26     77.46     77.73     78.06     78.51     79.13     80.00
```

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	4.88	5.65	6.61	7.86	9.50	11.75	14.94	19.69	27.25
OUTFLOW	.00	14.78	15.79	16.94	18.28	19.85	21.71	23.96	26.73	30.22
ELEVATION	76.00	76.96	77.09	77.26	77.46	77.73	78.06	78.51	79.13	80.00

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HYDROGRAPH AT STATION 4CSWP

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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
28	FEB	0100	1	0.	.0	76.0	28	FEB	0915	34	0.	.0	76.0	28	FEB	1730	67	21.	10.9	77.9
28	FEB	0115	2	0.	.0	76.0	28	FEB	0930	35	0.	.0	76.0	28	FEB	1745	68	21.	10.7	77.9
28	FEB	0130	3	0.	.0	76.0	28	FEB	0945	36	0.	.1	76.0	28	FEB	1800	69	21.	10.5	77.9
28	FEB	0145	4	0.	.0	76.0	28	FEB	1000	37	0.	.1	76.0	28	FEB	1815	70	21.	10.3	77.8
28	FEB	0200	5	0.	.0	76.0	28	FEB	1015	38	0.	.1	76.0	28	FEB	1830	71	20.	10.1	77.8
28	FEB	0215	6	0.	.0	76.0	28	FEB	1030	39	0.	.2	76.0	28	FEB	1845	72	20.	9.9	77.8
28	FEB	0230	7	0.	.0	76.0	28	FEB	1045	40	1.	.2	76.0	28	FEB	1900	73	20.	9.6	77.7
28	FEB	0245	8	0.	.0	76.0	28	FEB	1100	41	1.	.3	76.1	28	FEB	1915	74	20.	9.4	77.7
28	FEB	0300	9	0.	.0	76.0	28	FEB	1115	42	1.	.3	76.1	28	FEB	1930	75	20.	9.2	77.7
28	FEB	0315	10	0.	.0	76.0	28	FEB	1130	43	1.	.4	76.1	28	FEB	1945	76	19.	8.9	77.6
28	FEB	0330	11	0.	.0	76.0	28	FEB	1145	44	2.	.5	76.1	28	FEB	2000	77	19.	8.7	77.6
28	FEB	0345	12	0.	.0	76.0	28	FEB	1200	45	2.	.7	76.1	28	FEB	2015	78	19.	8.4	77.6
28	FEB	0400	13	0.	.0	76.0	28	FEB	1215	46	2.	.8	76.2	28	FEB	2030	79	19.	8.2	77.5
28	FEB	0415	14	0.	.0	76.0	28	FEB	1230	47	3.	1.0	76.2	28	FEB	2045	80	18.	7.9	77 [illegible]
28	FEB	0430	15	0.	.0	76.0	28	FEB	1245	48	4.	1.3	76.3	28	FEB	2100	81	18.	7.7	7[illegible]
28	FEB	0445	16	0.	.0	76.0	28	FEB	1300	49	5.	1.7	76.3	28	FEB	2115	82	18.	7.4	77.[illegible]
28	FEB	0500	17	0.	.0	76.0	28	FEB	1315	50	8.	2.6	76.5	28	FEB	2130	83	18.	7.2	77.4
28	FEB	0515	18	0.	.0	76.0	28	FEB	1330	51	13.	4.3	76.8	28	FEB	2145	84	17.	6.9	77.3
28	FEB	0530	19	0.	.0	76.0	28	FEB	1345	52	17.	6.4	77.2	28	FEB	2200	85	17.	6.7	77.3
28	FEB	0545	20	0.	.0	76.0	28	FEB	1400	53	19.	8.3	77.5	28	FEB	2215	86	17.	6.5	77.2
28	FEB	0600	21	0.	.0	76.0	28	FEB	1415	54	20.	9.7	77.8	28	FEB	2230	87	16.	6.2	77.2
28	FEB	0615	22	0.	.0	76.0	28	FEB	1430	55	21.	10.7	77.9	28	FEB	2245	88	16.	6.0	77.2
28	FEB	0630	23	0.	.0	76.0	28	FEB	1445	56	21.	11.2	78.0	28	FEB	2300	89	16.	5.8	77.1
28	FEB	0645	24	0.	.0	76.0	28	FEB	1500	57	22.	11.6	78.0	28	FEB	2315	90	16.	5.5	77.1
28	FEB	0700	25	0.	.0	76.0	28	FEB	1515	58	22.	11.7	78.1	28	FEB	2330	91	15.	5.3	77.0
28	FEB	0715	26	0.	.0	76.0	28	FEB	1530	59	22.	11.8	78.1	28	FEB	2345	92	15.	5.1	77.0
28	FEB	0730	27	0.	.0	76.0	28	FEB	1545	60	22.	11.8	78.1	1	MAR	0000	93	15.	4.9	77.0
28	FEB	0745	28	0.	.0	76.0	28	FEB	1600	61	22.	11.8	78.1	1	MAR	0015	94	14.	4.7	76.9
28	FEB	0800	29	0.	.0	76.0	28	FEB	1615	62	22.	11.7	78.1	1	MAR	0030	95	14.	4.5	76.9
28	FEB	0815	30	0.	.0	76.0	28	FEB	1630	63	22.	11.6	78.0	1	MAR	0045	96	13.	4.3	76.8
28	FEB	0830	31	0.	.0	76.0	28	FEB	1645	64	21.	11.4	78.0	1	MAR	0100	97	13.	4.1	76.8
28	FEB	0845	32	0.	.0	76.0	28	FEB	1700	65	21.	11.3	78.0							
28	FEB	0900	33	0.	.0	76.0	28	FEB	1715	66	21.	11.1	78.0							

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PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.00-HR
		(CFS)				
+ 22.	14.75		21.	9.	9.	9.
		(INCHES)	1.757	3.154	3.154	3.154
		(AC-FT)	10.	19.	19.	19.

PEAK STORAGE TIME MAXIMUM AVERAGE STORAGE

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                                    6-HR       24-HR       72-HR     24.00-HR
+  (AC-FT)      (HR)
      12.     14.75                  11.          4.          4.           4.

    K STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                    6-HR       24-HR       72-HR     24.00-HR
+   (FEET)      (HR)
     78.07     14.75                77.90       76.77       76.77        76.77

                        CUMULATIVE AREA =     .11 SQ MI


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            *            *
  23 KK     *     SUB48  *
            *            *
            **************

  24 KO          OUTPUT CONTROL VARIABLES
                       IPRNT           4  PRINT CONTROL
                       IPLOT           0  PLOT CONTROL
                       QSCAL          0.  HYDROGRAPH PLOT SCALE
                                SCS RUNOFF CALCULATION

              SUBBASIN RUNOFF DATA

  26 BA          SUBBASIN CHARACTERISTICS
                       TAREA         .07  SUBBASIN AREA

                 PRECIPITATION DATA

  27 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                 ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                 5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                   .60    1.30    2.50    3.30    3.70    4.60    5.60    6.60     .00     .00     .00     .00

                                                  STORM AREA =     .07

  28 LS          SCS LOSS RATE
                       STRTL         .63  INITIAL ABSTRACTION
                      CRVNBR       76.00  CURVE NUMBER
                       RTIMP         .00  PERCENT IMPERVIOUS AREA

  29 UD          SCS DIMENSIONLESS UNITGRAPH
                        TLAG         .29  LAG

                                                          ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                     UNIT HYDROGRAPH
                                                  8 END-OF-PERIOD ORDINATES
                54.       75.       31.       12.        4.        2.        1.        0.
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          *            *
 33 KK    *    48SWP   *
          *            *
          **************

 34 KO        OUTPUT CONTROL VARIABLES
                    IPRNT          1  PRINT CONTROL
                    IPLOT          0  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE
                             STORAGE ROUTING THROUGH SUB48 SWAMP

            HYDROGRAPH ROUTING DATA

 36 RS        STORAGE ROUTING
                    NSTPS          1  NUMBER OF SUBREACHES
                     ITYP       ELEV  TYPE OF INITIAL CONDITION
                   RSVRIC      76.00  INITIAL CONDITION
                        X        .00 WORKING R AND D COEFFICIENT

 37 SA            AREA       12.4      19.3

 38 SE        ELEVATION      76.00     80.00

 39 SS        SPILLWAY
                     CREL      76.00  SPILLWAY CREST ELEVATION
                    SPWID       5.00  SPILLWAY WIDTH
                     COQW       3.00  WEIR COEFFICIENT
                     EXPW       1.50  EXPONENT OF HEAD

                                                    ***

                                      COMPUTED STORAGE-ELEVATION DATA

          STORAGE       .00     62.78
        ELEVATION     76.00     80.00

                                      COMPUTED OUTFLOW-ELEVATION DATA

          OUTFLOW       .00       .00       .02       .16       .56      1.32      2.57      4.44      7.06     10.53
        ELEVATION     76.00     76.00     76.01     76.05     76.11     76.20     76.31     76.44     76.60     76.79

          OUTFLOW     15.00     20.58     27.39     35.56     45.21     56.46     69.44     84.28    101.09    120.00
        ELEVATION     77.00     77.23     77.49     77.78     78.09     78.42     78.78     79.16     79.57     80.00

                                     COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE       .00       .15       .61      1.38      2.47      3.89      5.64      7.76     10.25     13.14
          OUTFLOW       .00       .02       .16       .56      1.32      2.57      4.44      7.06     10.53     15.00
        ELEVATION     76.00     76.01     76.05     76.11     76.20     76.31     76.44     76.60     76.79     77.00

          STORAGE     16.45     20.23     24.49     29.27     34.63     40.61     47.25     54.62     62.79
          OUTFLOW     20.58     27.39     35.56     45.21     56.46     69.44     84.28    101.09    120.00
        ELEVATION     77.23     77.49     77.78     78.09     78.42     78.78     79.16     79.57     80.00
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HYDROGRAPH AT STATION 4BSWP

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
28	FEB	0100	1	0.	.0	76.0	28	FEB	0915	34	0.	.0	76.0	28	FEB	1730	67	18.	14.9	77.1
28	FEB	0115	2	0.	.0	76.0	28	FEB	0930	35	0.	.0	76.0	28	FEB	1745	68	18.	15.1	77.1
28	FEB	0130	3	0.	.0	76.0	28	FEB	0945	36	0.	.1	76.0	28	FEB	1800	69	19.	15.2	77.1
28	FEB	0145	4	0.	.0	76.0	28	FEB	1000	37	0.	.1	76.0	28	FEB	1815	70	19.	15.4	77.2
28	FEB	0200	5	0.	.0	76.0	28	FEB	1015	38	0.	.1	76.0	28	FEB	1830	71	19.	15.6	77.2
28	FEB	0215	6	0.	.0	76.0	28	FEB	1030	39	0.	.2	76.0	28	FEB	1845	72	19.	15.7	77.2
28	FEB	0230	7	0.	.0	76.0	28	FEB	1045	40	0.	.2	76.0	28	FEB	1900	73	20.	15.8	77.2
28	FEB	0245	8	0.	.0	76.0	28	FEB	1100	41	0.	.3	76.0	28	FEB	1915	74	20.	15.9	77.2
28	FEB	0300	9	0.	.0	76.0	28	FEB	1115	42	0.	.4	76.0	28	FEB	1930	75	20.	16.0	77.2
28	FEB	0315	10	0.	.0	76.0	28	FEB	1130	43	0.	.5	76.0	28	FEB	1945	76	20.	16.1	77.2
28	FEB	0330	11	0.	.0	76.0	28	FEB	1145	44	0.	.6	76.1	28	FEB	2000	77	20.	16.2	77.2
28	FEB	0345	12	0.	.0	76.0	28	FEB	1200	45	0.	.8	76.1	28	FEB	2015	78	20.	16.2	77.2
28	FEB	0400	13	0.	.0	76.0	28	FEB	1215	46	0.	1.0	76.1	28	FEB	2030	79	20.	16.3	77.2
28	FEB	0415	14	0.	.0	76.0	28	FEB	1230	47	0.	1.3	76.1	28	FEB	2045	80	20.	16.3	77.2
28	FEB	0430	15	0.	.0	76.0	28	FEB	1245	48	1.	1.7	76.1	28	FEB	2100	81	20.	16.4	77.2
28	FEB	0445	16	0.	.0	76.0	28	FEB	1300	49	1.	2.3	76.2	28	FEB	2115	82	20.	16.4	77.2
28	FEB	0500	17	0.	.0	76.0	28	FEB	1315	50	2.	3.6	76.3	28	FEB	2130	83	20.	16.4	77.2
28	FEB	0515	18	0.	.0	76.0	28	FEB	1330	51	4.	5.6	76.4	28	FEB	2145	84	20.	16.4	77.2
28	FEB	0530	19	0.	.0	76.0	28	FEB	1345	52	7.	7.5	76.6	28	FEB	2200	85	20.	16.4	77.2
28	FEB	0545	20	0.	.0	76.0	28	FEB	1400	53	9.	8.8	76.7	28	FEB	2215	86	20.	16.4	77.2
28	FEB	0600	21	0.	.0	76.0	28	FEB	1415	54	10.	9.8	76.8	28	FEB	2230	87	20.	16.4	77.2
	FEB	0615	22	0.	.0	76.0	28	FEB	1430	55	11.	10.5	76.8	28	FEB	2245	88	20.	16.4	77.2
	FEB	0630	23	0.	.0	76.0	28	FEB	1445	56	12.	11.1	76.9	28	FEB	2300	89	20.	16.3	77.2
28	FEB	0645	24	0.	.0	76.0	28	FEB	1500	57	13.	11.6	76.9	28	FEB	2315	90	20.	16.3	77.2
28	FEB	0700	25	0.	.0	76.0	28	FEB	1515	58	13.	12.1	76.9	28	FEB	2330	91	20.	16.3	77.2
28	FEB	0715	26	0.	.0	76.0	28	FEB	1530	59	14.	12.5	77.0	28	FEB	2345	92	20.	16.2	77.2
28	FEB	0730	27	0.	.0	76.0	28	FEB	1545	60	15.	12.9	77.0	1	MAR	0000	93	20.	16.2	77.2
28	FEB	0745	28	0.	.0	76.0	28	FEB	1600	61	15.	13.3	77.0	1	MAR	0015	94	20.	16.1	77.2
28	FEB	0800	29	0.	.0	76.0	28	FEB	1615	62	16.	13.6	77.0	1	MAR	0030	95	20.	16.0	77.2
28	FEB	0815	30	0.	.0	76.0	28	FEB	1630	63	16.	13.9	77.1	1	MAR	0045	96	20.	16.0	77.2
28	FEB	0830	31	0.	.0	76.0	28	FEB	1645	64	17.	14.2	77.1	1	MAR	0100	97	20.	15.9	77.2
28	FEB	0845	32	0.	.0	76.0	28	FEB	1700	65	17.	14.4	77.1							
28	FEB	0900	33	0.	.0	76.0	28	FEB	1715	66	18.	14.6	77.1							

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 20.	20.75		20.	9.	9.	9.
		(INCHES)	1.049	1.770	1.770	1.770
		(AC-FT)	10.	17.	17.	17.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.00-HR
+ (AC-FT)	(HR)				
16.	20.75	16.	7.	7.	7.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.00-HR
+ (FEET)	(HR)				

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  77.23     21.00                 77.22       76.54       76.54        76.54

                    CUMULATIVE AREA =     .18 SQ MI


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          *            *
 40 KK    *    CHAN4B  *
          *            *
          **************

 41 KO         OUTPUT CONTROL VARIABLES
                     IPRNT           1  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                              ROUTING THROUGH N-S CHANNEL WEST OF R.R. TRACKS

             HYDROGRAPH ROUTING DATA

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

 44 RC         NORMAL DEPTH CHANNEL ROUTING
                       ANL        .080  LEFT OVERBANK N-VALUE
                      ANCH        .030  MAIN CHANNEL N-VALUE
                       ANR        .080  RIGHT OVERBANK N-VALUE
                     RLNTH       1354.  REACH LENGTH
                       SEL       .0040  ENERGY SLOPE
                     ELMAX        75.0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                        CROSS-SECTION DATA
                        --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
 46 RY       ELEVATION    74.00     75.00     75.00     71.00     71.00     74.00     74.00     71.00
 45 RX       DISTANCE       .00     10.00     20.00     24.00     29.00     32.00     62.00     65.00

                                                          ***

                                        COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE       .00       .03       .07       .12       .16       .22       .27       .33       .39       .46
          OUTFLOW       .00      1.17      3.72      7.35     11.98     17.57     24.10     31.60     40.07     49.52
        ELEVATION     71.00     71.21     71.42     71.63     71.84     72.05     72.26     72.47     72.68     72.89

          STORAGE       .53       .61       .69       .77       .86      1.11      1.41      1.73      2.07      2.42
          OUTFLOW     59.98     71.47     84.01     97.64    112.37    128.10    152.97    181.59    213.80    249.55
        ELEVATION     73.11     73.32     73.53     73.74     73.95     74.16     74.37     74.58     74.79     75.00


*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN        7. TO      250.
               THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
               THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)
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HYDROGRAPH AT STATION CHAN4B

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
28	FEB	0100	1	0.	.0	71.0	28	FEB	0915	34	0.	.0	71.0	28	FEB	1730	67	18.	.2	72.1
28	FEB	0115	2	0.	.0	71.0	28	FEB	0930	35	0.	.0	71.0	28	FEB	1745	68	18.	.2	72.1
28	FEB	0130	3	0.	.0	71.0	28	FEB	0945	36	0.	.0	71.0	28	FEB	1800	69	18.	.2	72.1
28	FEB	0145	4	0.	.0	71.0	28	FEB	1000	37	0.	.0	71.0	28	FEB	1815	70	19.	.2	72.1
28	FEB	0200	5	0.	.0	71.0	28	FEB	1015	38	0.	.0	71.0	28	FEB	1830	71	19.	.2	72.1
28	FEB	0215	6	0.	.0	71.0	28	FEB	1030	39	0.	.0	71.0	28	FEB	1845	72	19.	.2	72.1
28	FEB	0230	7	0.	.0	71.0	28	FEB	1045	40	0.	.0	71.0	28	FEB	1900	73	19.	.2	72.1
28	FEB	0245	8	0.	.0	71.0	28	FEB	1100	41	0.	.0	71.0	28	FEB	1915	74	20.	.2	72.1
28	FEB	0300	9	0.	.0	71.0	28	FEB	1115	42	0.	.0	71.0	28	FEB	1930	75	20.	.2	72.1
28	FEB	0315	10	0.	.0	71.0	28	FEB	1130	43	0.	.0	71.0	28	FEB	1945	76	20.	.2	72.1
28	FEB	0330	11	0.	.0	71.0	28	FEB	1145	44	0.	.0	71.0	28	FEB	2000	77	20.	.2	72.1
28	FEB	0345	12	0.	.0	71.0	28	FEB	1200	45	0.	.0	71.0	28	FEB	2015	78	20.	.2	72.1
28	FEB	0400	13	0.	.0	71.0	28	FEB	1215	46	0.	.0	71.0	28	FEB	2030	79	20.	.2	72.1
28	FEB	0415	14	0.	.0	71.0	28	FEB	1230	47	0.	.0	71.1	28	FEB	2045	80	20.	.2	72.1
28	FEB	0430	15	0.	.0	71.0	28	FEB	1245	48	0.	.0	71.1	28	FEB	2100	81	20.	.2	72.1
28	FEB	0445	16	0.	.0	71.0	28	FEB	1300	49	1.	.0	71.1	28	FEB	2115	82	20.	.2	72.1
28	FEB	0500	17	0.	.0	71.0	28	FEB	1315	50	1.	.0	71.2	28	FEB	2130	83	20.	.2	72.1
28	FEB	0515	18	0.	.0	71.0	28	FEB	1330	51	3.	.1	71.4	28	FEB	2145	84	20.	.2	72.1
28	FEB	0530	19	0.	.0	71.0	28	FEB	1345	52	5.	.1	71.5	28	FEB	2200	85	20.	.2	72.1
28	FEB	0545	20	0.	.0	71.0	28	FEB	1400	53	7.	.1	71.6	28	FEB	2215	86	20.	.2	72.1
28	FEB	0600	21	0.	.0	71.0	28	FEB	1415	54	9.	.1	71.7	28	FEB	2230	87	20.	.2	72.1
28	FEB	0615	22	0.	.0	71.0	28	FEB	1430	55	10.	.1	71.8	28	FEB	2245	88	20.	.2	72.1
	FEB	0630	23	0.	.0	71.0	28	FEB	1445	56	11.	.2	71.8	28	FEB	2300	89	20.	.2	72.1
	FEB	0645	24	0.	.0	71.0	28	FEB	1500	57	12.	.2	71.9	28	FEB	2315	90	20.	.2	72.1
28	FEB	0700	25	0.	.0	71.0	28	FEB	1515	58	13.	.2	71.9	28	FEB	2330	91	20.	.2	72.1
28	FEB	0715	26	0.	.0	71.0	28	FEB	1530	59	14.	.2	71.9	28	FEB	2345	92	20.	.2	72.1
28	FEB	0730	27	0.	.0	71.0	28	FEB	1545	60	14.	.2	71.9	1	MAR	0000	93	20.	.2	72.1
28	FEB	0745	28	0.	.0	71.0	28	FEB	1600	61	15.	.2	72.0	1	MAR	0015	94	20.	.2	72.1
28	FEB	0800	29	0.	.0	71.0	28	FEB	1615	62	16.	.2	72.0	1	MAR	0030	95	20.	.2	72.1
28	FEB	0815	30	0.	.0	71.0	28	FEB	1630	63	16.	.2	72.0	1	MAR	0045	96	20.	.2	72.1
28	FEB	0830	31	0.	.0	71.0	28	FEB	1645	64	17.	.2	72.0	1	MAR	0100	97	20.	.2	72.1
28	FEB	0845	32	0.	.0	71.0	28	FEB	1700	65	17.	.2	72.0							
28	FEB	0900	33	0.	.0	71.0	28	FEB	1715	66	17.	.2	72.0							

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 20.	21.00		20.	8.	8.	8.
		(INCHES)	1.048	1.746	1.746	1.746
		(AC-FT)	10.	17.	17.	17.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.00-HR
+ (AC-FT)	(HR)				
0.	20.00	0.	0.	0.	0.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.00-HR
+ (FEET)	(HR)				

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   72.15     21.00                 72.14       71.50       71.50       71.50

                    CUMULATIVE AREA =     .18 SQ MI


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


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          *            *
 47 KK    *    SUB4A   *
          *            *
          **************

 48 KO         OUTPUT CONTROL VARIABLES
                    IPRNT           4  PRINT CONTROL
                    IPLOT           0  PLOT CONTROL
                    QSCAL          0.  HYDROGRAPH PLOT SCALE
                            SCS RUNOFF CALCULATION

             SUBBASIN RUNOFF DATA

 50 BA         SUBBASIN CHARACTERISTICS
                    TAREA         .03  SUBBASIN AREA

               PRECIPITATION DATA

 51 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
               ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
               5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                 .60    1.30    2.50    3.30    3.70    4.60    5.60    6.60     .00     .00     .00     .00

                                                  STORM AREA =     .03

 52 LS         SCS LOSS RATE
                    STRTL         .63  INITIAL ABSTRACTION
                   CRVNBR       76.00  CURVE NUMBER
                    RTIMP         .00  PERCENT IMPERVIOUS AREA

 53 UD         SCS DIMENSIONLESS UNITGRAPH
                     TLAG         .29  LAG

                                                        ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                    UNIT HYDROGRAPH
                                                 8 END-OF-PERIOD ORDINATES
              26.       36.       15.        6.        2.        1.        0.        0.


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


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          *            *
 54 KK    *   CHAN4A   *
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        *          *
        **************

 75 KO        OUTPUT CONTROL VARIABLES
                    IPRNT          1  PRINT CONTROL
                    IPLOT          0  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE
                            ROUTING THROUGH N-S CHANNEL EAST OF R.R. TRACKS

            HYDROGRAPH ROUTING DATA

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

 58 RC        NORMAL DEPTH CHANNEL ROUTING
                      ANL       .080  LEFT OVERBANK N-VALUE
                     ANCH       .030  MAIN CHANNEL N-VALUE
                      ANR       .080  RIGHT OVERBANK N-VALUE
                    RLNTH      1354.  REACH LENGTH
                      SEL      .0070  ENERGY SLOPE
                    ELMAX       75.0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                    CROSS-SECTION DATA
                      --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
 60 RY       ELEVATION    71.00     74.00     74.00     71.00     71.00     75.00     75.00     74.00
 59 RX       DISTANCE       .00      3.00     33.00     36.00     41.00     45.00     55.00     65.00

                                                    ***

                                  COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE       .00       .03       .07       .12       .16       .22       .27       .33       .39       .46
          OUTFLOW       .00      1.54      4.92      9.72     15.84     23.24     31.89     41.80     53.00     65.51
        ELEVATION     71.00     71.21     71.42     71.63     71.84     72.05     72.26     72.47     72.68     72.89

          STORAGE       .53       .61       .69       .77       .86      1.11      1.41      1.73      2.07      2.42
          OUTFLOW     79.34     94.54    111.14    129.16    148.65    169.46    202.36    240.22    282.83    330.13
        ELEVATION     73.11     73.32     73.53     73.74     73.95     74.16     74.37     74.58     74.79     75.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN       5. TO      330.
               THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
               THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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

                                              HYDROGRAPH AT STATION   CHAN4A

*****************************************************************************************************************************
                                          *                                                *
 DA MON HRMN ORD  OUTFLOW  STORAGE   STAGE * DA MON HRMN ORD  OUTFLOW  STORAGE   STAGE * DA MON HRMN ORD  OUTFLOW  STORAGE   STAGE
                                          *                                                *
    FEB 0100   1       0.       .0    71.0 * 28 FEB 0915  34       0.       .0    71.0 * 28 FEB 1730  67       3.       .1    71.3
28 FEB 0115   2       0.       .0    71.0 * 28 FEB 0930  35       0.       .0    71.0 * 28 FEB 1745  68       3.       .1    71.3
28 FEB 0130   3       0.       .0    71.0 * 28 FEB 0945  36       0.       .0    71.1 * 28 FEB 1800  69       3.       .1    71.3
28 FEB 0145   4       0.       .0    71.0 * 28 FEB 1000  37       1.       .0    71.1 * 28 FEB 1815  70       3.       .1    71.3
28 FEB 0200   5       0.       .0    71.0 * 28 FEB 1015  38       1.       .0    71.1 * 28 FEB 1830  71       3.       .0    71.3
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28 FEB	0215	6	0.	.0	71.0 *	28 FEB	1030	39	1.	.0	71.1 *	28 FEB	1845	72	3.	.0	71.3
28 FEB	0230	7	0.	.0	71.0 *	28 FEB	1045	40	1.	.0	71.1 *	28 FEB	1900	73	3.	.0	71.3
28 FEB	0245	8	0.	.0	71.0 *	28 FEB	1100	41	1.	.0	71.2 *	28 FEB	1915	74	2.	.0	71.3
28 FEB	0300	9	0.	.0	71.0 *	28 FEB	1115	42	2.	.0	71.2 *	28 FEB	1930	75	2.	.0	71.3
28 FEB	0315	10	0.	.0	71.0 *	28 FEB	1130	43	2.	.0	71.2 *	28 FEB	1945	76	2.	.0	7
28 FEB	0330	11	0.	.0	71.0 *	28 FEB	1145	44	2.	.0	71.3 *	28 FEB	2000	77	2.	.0	71.—
28 FEB	0345	12	0.	.0	71.0 *	28 FEB	1200	45	3.	.0	71.3 *	28 FEB	2015	78	2.	.0	71.2
28 FEB	0400	13	0.	.0	71.0 *	28 FEB	1215	46	4.	.1	71.3 *	28 FEB	2030	79	2.	.0	71.2
28 FEB	0415	14	0.	.0	71.0 *	28 FEB	1230	47	5.	.1	71.4 *	28 FEB	2045	80	2.	.0	71.2
28 FEB	0430	15	0.	.0	71.0 *	28 FEB	1245	48	8.	.1	71.5 *	28 FEB	2100	81	2.	.0	71.2
28 FEB	0445	16	0.	.0	71.0 *	28 FEB	1300	49	13.	.1	71.8 *	28 FEB	2115	82	2.	.0	71.2
28 FEB	0500	17	0.	.0	71.0 *	28 FEB	1315	50	31.	.3	72.3 *	28 FEB	2130	83	2.	.0	71.2
28 FEB	0515	18	0.	.0	71.0 *	28 FEB	1330	51	47.	.4	72.6 *	28 FEB	2145	84	2.	.0	71.2
28 FEB	0530	19	0.	.0	71.0 *	28 FEB	1345	52	37.	.3	72.4 *	28 FEB	2200	85	2.	.0	71.2
28 FEB	0545	20	0.	.0	71.0 *	28 FEB	1400	53	23.	.2	72.0 *	28 FEB	2215	86	2.	.0	71.2
28 FEB	0600	21	0.	.0	71.0 *	28 FEB	1415	54	17.	.2	71.9 *	28 FEB	2230	87	2.	.0	71.2
28 FEB	0615	22	0.	.0	71.0 *	28 FEB	1430	55	12.	.1	71.7 *	28 FEB	2245	88	2.	.0	71.2
28 FEB	0630	23	0.	.0	71.0 *	28 FEB	1445	56	9.	.1	71.6 *	28 FEB	2300	89	1.	.0	71.2
28 FEB	0645	24	0.	.0	71.0 *	28 FEB	1500	57	7.	.1	71.5 *	28 FEB	2315	90	1.	.0	71.2
28 FEB	0700	25	0.	.0	71.0 *	28 FEB	1515	58	7.	.1	71.5 *	28 FEB	2330	91	1.	.0	71.2
28 FEB	0715	26	0.	.0	71.0 *	28 FEB	1530	59	6.	.1	71.5 *	28 FEB	2345	92	1.	.0	71.2
28 FEB	0730	27	0.	.0	71.0 *	28 FEB	1545	60	5.	.1	71.4 *	1 MAR	0000	93	1.	.0	71.2
28 FEB	0745	28	0.	.0	71.0 *	28 FEB	1600	61	5.	.1	71.4 *	1 MAR	0015	94	1.	.0	71.2
28 FEB	0800	29	0.	.0	71.0 *	28 FEB	1615	62	5.	.1	71.4 *	1 MAR	0030	95	1.	.0	71.2
28 FEB	0815	30	0.	.0	71.0 *	28 FEB	1630	63	4.	.1	71.4 *	1 MAR	0045	96	1.	.0	71.2
28 FEB	0830	31	0.	.0	71.0 *	28 FEB	1645	64	4.	.1	71.4 *	1 MAR	0100	97	1.	.0	71.2
28 FEB	0845	32	0.	.0	71.0 *	28 FEB	1700	65	4.	.1	71.3 *						
28 FEB	0900	33	0.	.0	71.0 *	28 FEB	1715	66	3.	.1	71.3 *						
					*						*						

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 47.	12.50		11.	3.	3.	3.
		(INCHES)	3.105	3.862	3.862	3.862
		(AC-FT)	5.	7.	7.	7.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.00-HR
+ (AC-FT)	(HR)				
0.	12.50	0.	0.	0.	0.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.00-HR
+ (FEET)	(HR)				
72.57	12.50	71.61	71.23	71.23	71.23

CUMULATIVE AREA = .03 SQ MI

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          *            *
  61 KK   *    SUB4D   *
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          *           *
          **************

 62 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           4  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                               SCS RUNOFF CALCULATION

            SUBBASIN RUNOFF DATA

 64 BA          SUBBASIN CHARACTERISTICS
                      TAREA         .05  SUBBASIN AREA

                PRECIPITATION DATA

 65 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                  .60    1.30    2.50    3.30    3.70    4.60    5.60    6.60     .00     .00     .00     .00

                                                     STORM AREA =     .05

 66 LS          SCS LOSS RATE
                      STRTL         .63  INITIAL ABSTRACTION
                     CRVNBR       76.00  CURVE NUMBER
                      RTIMP         .00  PERCENT IMPERVIOUS AREA

 67 UD          SCS DIMENSIONLESS UNITGRAPH
                       TLAG         .30  LAG

                                                          ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                   UNIT HYDROGRAPH
                                               8 END-OF-PERIOD ORDINATES
              34.       51.       22.        9.        3.        1.        1.        0.


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          *           *
 68 KK    *   4DCHAB  *
          *           *
          **************

 69 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           1  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                               COMBINE HYDROGRAPHS FOR SUB4D & CHANNELS 4A & 4B

 71 HC          HYDROGRAPH COMBINATION
                      ICOMP           3  NUMBER OF HYDROGRAPHS TO COMBINE

                                                          ***
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HYDROGRAPH AT STATION 4DCHAB
SUM OF 3 HYDROGRAPHS

DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW
28 FEB 0100	1	0.	28 FEB 0715	26	0.	28 FEB 1330	51	116.	28 FEB 1945	76	25.
28 FEB 0115	2	0.	28 FEB 0730	27	0.	28 FEB 1345	52	87.	28 FEB 2000	77	25.
28 FEB 0130	3	0.	28 FEB 0745	28	0.	28 FEB 1400	53	61.	28 FEB 2015	78	25.
28 FEB 0145	4	0.	28 FEB 0800	29	0.	28 FEB 1415	54	47.	28 FEB 2030	79	25.
28 FEB 0200	5	0.	28 FEB 0815	30	0.	28 FEB 1430	55	37.	28 FEB 2045	80	25.
28 FEB 0215	6	0.	28 FEB 0830	31	0.	28 FEB 1445	56	32.	28 FEB 2100	81	25.
28 FEB 0230	7	0.	28 FEB 0845	32	0.	28 FEB 1500	57	30.	28 FEB 2115	82	25.
28 FEB 0245	8	0.	28 FEB 0900	33	0.	28 FEB 1515	58	29.	28 FEB 2130	83	24.
28 FEB 0300	9	0.	28 FEB 0915	34	1.	28 FEB 1530	59	28.	28 FEB 2145	84	24.
28 FEB 0315	10	0.	28 FEB 0930	35	1.	28 FEB 1545	60	27.	28 FEB 2200	85	24.
28 FEB 0330	11	0.	28 FEB 0945	36	1.	28 FEB 1600	61	27.	28 FEB 2215	86	24.
28 FEB 0345	12	0.	28 FEB 1000	37	1.	28 FEB 1615	62	27.	28 FEB 2230	87	24.
28 FEB 0400	13	0.	28 FEB 1015	38	2.	28 FEB 1630	63	26.	28 FEB 2245	88	24.
28 FEB 0415	14	0.	28 FEB 1030	39	2.	28 FEB 1645	64	26.	28 FEB 2300	89	24.
28 FEB 0430	15	0.	28 FEB 1045	40	3.	28 FEB 1700	65	26.	28 FEB 2315	90	24.
28 FEB 0445	16	0.	28 FEB 1100	41	3.	28 FEB 1715	66	26.	28 FEB 2330	91	24.
28 FEB 0500	17	0.	28 FEB 1115	42	4.	28 FEB 1730	67	26.	28 FEB 2345	92	24.
28 FEB 0515	18	0.	28 FEB 1130	43	5.	28 FEB 1745	68	26.	1 MAR 0000	93	23.
28 FEB 0530	19	0.	28 FEB 1145	44	6.	28 FEB 1800	69	26.	1 MAR 0015	94	23.
28 FEB 0545	20	0.	28 FEB 1200	45	7.	28 FEB 1815	70	26.	1 MAR 0030	95	23
28 FEB 0600	21	0.	28 FEB 1215	46	10.	28 FEB 1830	71	26.	1 MAR 0045	96	23
28 FEB 0615	22	0.	28 FEB 1230	47	14.	28 FEB 1845	72	26.	1 MAR 0100	97	23.
28 FEB 0630	23	0.	28 FEB 1245	48	21.	28 FEB 1900	73	26.			
28 FEB 0645	24	0.	28 FEB 1300	49	37.	28 FEB 1915	74	26.			
28 FEB 0700	25	0.	28 FEB 1315	50	88.	28 FEB 1930	75	25.			

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 116.	12.50		39.	17.	17.	17.
		(INCHES)	1.386	2.402	2.402	2.402
		(AC-FT)	19.	33.	33.	33.

CUMULATIVE AREA = .26 SQ MI

72 KK SUB4E

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73 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           4  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                              SCS RUNOFF CALCULATION

            SUBBASIN RUNOFF DATA

75 BA          SUBBASIN CHARACTERISTICS
                     TAREA         .30  SUBBASIN AREA

               PRECIPITATION DATA

76 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
               ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
               5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                 .60    1.30    2.50    3.30    3.70    4.60    5.60    6.60     .00     .00     .00     .00

                                                   STORM AREA =     .30

77 LS          SCS LOSS RATE
                     STRTL         .63  INITIAL ABSTRACTION
                    CRVNBR       76.00  CURVE NUMBER
                     RTIMP         .00  PERCENT IMPERVIOUS AREA

78 UD          SCS DIMENSIONLESS UNITGRAPH
                      TLAG         .25  LAG

                                                          ***

  ING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                     UNIT HYDROGRAPH
                                                 7 END-OF-PERIOD ORDINATES
            291.      317.      106.      37.       12.        4.        1.


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          *            *
79 KK     *    CHAN4E  *
          *            *
          **************

80 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           1  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                              ROUTING THROUGH CHANNEL & PIPE

            HYDROGRAPH ROUTING DATA

   RS          STORAGE ROUTING
                     NSTPS           1  NUMBER OF SUBREACHES
                      ITYP        ELEV  TYPE OF INITIAL CONDITION
                    RSVRIC       65.00  INITIAL CONDITION
                         X         .00 WORKING R AND D COEFFICIENT
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83 SA              AREA          .2        .6

84 SE          ELEVATION       65.00     70.00

85 SL          LOW-LEVEL OUTLET
                    ELEVL       65.20  ELEVATION AT CENTER OF OUTLET
                    CAREA        7.07  CROSS-SECTIONAL AREA
                     COQL         .60  COEFFICIENT
                     EXPL         .50  EXPONENT OF HEAD

86 SS          SPILLWAY
                     CREL       74.00  SPILLWAY CREST ELEVATION
                    SPWID         .00  SPILLWAY WIDTH
                     COQW         .00  WEIR COEFFICIENT
                     EXPW        1.50  EXPONENT OF HEAD
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***

COMPUTED STORAGE-ELEVATION DATA

STORAGE	.00	1.82
ELEVATION	65.00	70.00

COMPUTED OUTFLOW-ELEVATION DATA

OUTFLOW	.00	.00	41.53	45.35	49.93	55.54	62.58	71.65	83.80	100.92
ELEVATION	65.00	65.20	66.69	66.98	67.35	67.87	68.58	69.64	71.27	74.00

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	.04	.41	.49	.62	.80	1.10	1.61	1.82	2.62
OUTFLOW	.00	.00	41.53	45.35	49.93	55.54	62.58	71.65	74.54	83.80
ELEVATION	65.00	65.20	66.69	66.98	67.35	67.87	68.58	69.64	70.00	71.27

STORAGE	4.95
OUTFLOW	100.92
ELEVATION	74.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 0. TO 42.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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HYDROGRAPH AT STATION CHAN4E

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DA MON HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA MON HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA MON HRMN	ORD	OUTFLOW	STORAGE	STAGE
28 FEB 0100	1	0.	.0	65.0	*	28 FEB 0915	34	3.	.1	65.3	*	28 FEB 1730	67	33.	.3	66.4
28 FEB 0115	2	0.	.0	65.0	*	28 FEB 0930	35	3.	.1	65.3	*	28 FEB 1745	68	28.	.3	66.2
28 FEB 0130	3	0.	.0	65.0	*	28 FEB 0945	36	5.	.1	65.4	*	28 FEB 1800	69	27.	.3	66.[illegible]
28 FEB 0145	4	0.	.0	65.0	*	28 FEB 1000	37	6.	.1	65.4	*	28 FEB 1815	70	26.	.3	6[illegible]
28 FEB 0200	5	0.	.0	65.0	*	28 FEB 1015	38	7.	.1	65.5	*	28 FEB 1830	71	25.	.3	66.[illegible]
28 FEB 0215	6	0.	.0	65.0	*	28 FEB 1030	39	9.	.1	65.5	*	28 FEB 1845	72	24.	.3	66.1
28 FEB 0230	7	0.	.0	65.0	*	28 FEB 1045	40	11.	.1	65.6	*	28 FEB 1900	73	24.	.2	66.0
28 FEB 0245	8	0.	.0	65.0	*	28 FEB 1100	41	13.	.2	65.7	*	28 FEB 1915	74	22.	.2	66.0

28 FEB 0300	9	0.	.0	65.0 *	28 FEB 1115	42	16.	.2	65.8 *	28 FEB 1930	75	20.	.2	65.9
28 FEB 0315	10	0.	.0	65.0 *	28 FEB 1130	43	19.	.2	65.9 *	28 FEB 1945	76	18.	.2	65.9
28 FEB 0330	11	0.	.0	65.0 *	28 FEB 1145	44	22.	.2	66.0 *	28 FEB 2000	77	18.	.2	65.8
28 FEB 0345	12	0.	.0	65.0 *	28 FEB 1200	45	26.	.3	66.1 *	28 FEB 2015	78	17.	.2	65.8
FEB 0400	13	0.	.0	65.0 *	28 FEB 1215	46	35.	.3	66.4 *	28 FEB 2030	79	17.	.2	65.8
FEB 0415	14	0.	.0	65.0 *	28 FEB 1230	47	47.	.5	67.1 *	28 FEB 2045	80	16.	.2	65.8
28 FEB 0430	15	0.	.0	65.0 *	28 FEB 1245	48	59.	1.0	68.2 *	28 FEB 2100	81	16.	.2	65.8
28 FEB 0445	16	0.	.0	65.0 *	28 FEB 1300	49	78.	2.1	70.5 *	28 FEB 2115	82	15.	.2	65.7
28 FEB 0500	17	0.	.0	65.0 *	28 FEB 1315	50	110.	6.1	75.4 *	28 FEB 2130	83	15.	.2	65.7
28 FEB 0515	18	0.	.0	65.0 *	28 FEB 1330	51	153.	12.0	82.2 *	28 FEB 2145	84	15.	.2	65.7
28 FEB 0530	19	0.	.0	65.0 *	28 FEB 1345	52	179.	15.5	86.4 *	28 FEB 2200	85	14.	.2	65.7
28 FEB 0545	20	0.	.0	65.0 *	28 FEB 1400	53	183.	16.2	87.2 *	28 FEB 2215	86	14.	.2	65.7
28 FEB 0600	21	0.	.0	65.0 *	28 FEB 1415	54	178.	15.5	86.3 *	28 FEB 2230	87	14.	.2	65.7
28 FEB 0615	22	0.	.0	65.0 *	28 FEB 1430	55	167.	14.0	84.6 *	28 FEB 2245	88	13.	.2	65.7
28 FEB 0630	23	0.	.0	65.0 *	28 FEB 1445	56	154.	12.2	82.5 *	28 FEB 2300	89	13.	.2	65.7
28 FEB 0645	24	0.	.0	65.0 *	28 FEB 1500	57	142.	10.5	80.5 *	28 FEB 2315	90	13.	.2	65.7
28 FEB 0700	25	0.	.0	65.0 *	28 FEB 1515	58	130.	8.9	78.6 *	28 FEB 2330	91	13.	.2	65.7
28 FEB 0715	26	0.	.0	65.0 *	28 FEB 1530	59	119.	7.4	76.9 *	28 FEB 2345	92	12.	.1	65.6
28 FEB 0730	27	0.	.0	65.0 *	28 FEB 1545	60	109.	6.1	75.3 *	1 MAR 0000	93	12.	.1	65.6
28 FEB 0745	28	0.	.0	65.0 *	28 FEB 1600	61	100.	4.8	73.9 *	1 MAR 0015	94	12.	.1	65.6
28 FEB 0800	29	0.	.0	65.0 *	28 FEB 1615	62	92.	3.7	72.5 *	1 MAR 0030	95	12.	.1	65.6
28 FEB 0815	30	0.	.0	65.0 *	28 FEB 1630	63	84.	2.7	71.3 *	1 MAR 0045	96	12.	.1	65.6
28 FEB 0830	31	0.	.0	65.1 *	28 FEB 1645	64	74.	1.8	69.9 *	1 MAR 0100	97	11.	.1	65.6
28 FEB 0845	32	0.	.0	65.2 *	28 FEB 1700	65	61.	1.0	68.4 *					
28 FEB 0900	33	1.	.1	65.2 *	28 FEB 1715	66	48.	.6	67.2 *					
				*					*					

****

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.00-HR
(CFS)	(HR)					
		(CFS)				
+ 183.	13.00		100.	31.	31.	31.
		(INCHES)	3.105	3.871	3.871	3.871
		(AC-FT)	49.	62.	62.	62.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.00-HR
+ (AC-FT)	(HR)				
16.	13.00	6.	2.	2.	2.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.00-HR
+ (FEET)	(HR)				
87.18	13.00	74.59	67.70	67.70	67.70

CUMULATIVE AREA = .30 SQ MI

1

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
	HYDROGRAPH AT									
+		SUB4C	122.	12.75	37.	11.	11.	.11		

```
        ROUTED TO
+                    4CSWP      22.   14.75        21.        9.        9.       .11
+                                                                                  78.07      14.75

        HYDROGRAPH AT
+                    SUB4B      98.   12.50        23.        7.        7.       .07

        2 COMBINED AT
+                      4BC     111.   12.50        41.       17.       17.       .18

        ROUTED TO
+                    4BSWP      20.   20.75        20.        9.        9.       .18
+                                                                                  77.23      21.00

        ROUTED TO
+                   CHAN4B      20.   21.00        20.        8.        8.       .18
+                                                                                  72.15      21.00

        HYDROGRAPH AT
+                    SUB4A      47.   12.50        11.        3.        3.       .03

        ROUTED TO
+                   CHAN4A      47.   12.50        11.        3.        3.       .03
+                                                                                  72.57      12.50

        HYDROGRAPH AT
+                    SUB4D      67.   12.50        16.        5.        5.       .05

        3 COMBINED AT
+                   4DCHAB     116.   12.50        39.       17.       17.       .26

        HYDROGRAPH AT
+                    SUB4E     420.   12.50       100.       31.       31.       .30

        ROUTED TO
+                   CHAN4E     183.   13.00       100.       31.       31.       .30
+                                                                                  87.18      13.00


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

APPENDIX 10-B

Analysis of Watershed 5

Subwatershed Areas

Curve Numbers

Times of Concentration

Storage vs Elevation Relationships

Golder Associates	SUBJECT Subwatershed 5 -		
	Job No. 903-6400.310 Ref. 95%	Made by [illegible] Checked DP Reviewed [illegible]	Date 7-19-91 Sheet 1 of 5

Objective: Obtain T_c, CN, Drainage Area and Storage vs. Elevation for Subwatershed 5.

Method: Since the drainage structures proposed in the GHR Engineering 1982 drainage study for Sheehy Industrial Park have been constructed and no further development has occurred since 1982, the values (for T_c, CN, etc.) presented under "the proposed" conditions in the drainage study will be maintained.

REFERENCE: GHR ENGINEERING CORP. 1982 DRAINAGE STUDY FOR SHEEHY INDUSTRIAL PARK

Golder Associates	SUBJECT Subwatershed 5 - Storage Capacities		
	Job No. 903-6400310 Ref. ISRT	Made by UEE7 Checked DP Reviewed CAM	Date 7-19-91 Sheet 2 of 5

Subwatershed 5C (North Pond)

Elev	Area(sf)	Δ Volume(ft³)	Cum. Vol.(ft³)
70.0	62,500		0
		11,963	
70.1	168,000		11,963
		1,218,722	
76.0	225,700		1,230,000
		228,544	
77.0	231,400		1,458,544

Subwatershed 5D (Upper South Pond)

Elev.	Area(sf)	Δ. Volume (ft³)	Cum. Vol. (ft³)
67.5	0		0
		10,500	
68.0	63,000		10,500
		300,656	
70	260,000		311,156
		530,962	
72	271,000		842,118
		552,964	
74	282,000		1,395,081

Golder Associates	SUBJECT Subwatershed 5 - Areas		
	Job No. 903-6400.310 Ref. ISRT	Made by VEZ Checked DP Reviewed CLM	Date 7-19-91 Sheet 3 of 5

Subwatershed	Area (acres)
5A	12
5B	72
5C	27
5D	56
5E	43

Golder Associates

SUBJECT Subwatershed 5 - CN		
Job No. 903-6400.310 Ref. 1SRT	Made by VEZ Checked DP Reviewed CRM	Date 7-19-91 Sheet 4 of 5

Subwatershed	CN
5A	90
5B	85
5C	90
5D	75
5E	75

Golder Associates	SUBJECT Subwatershed 5 - T_c		
	Job No. 902-6400.310 Ref. ISRT	Made by UEE7 Checked DP Reviewed [illegible]	Date 7-19-91 Sheet 5 of 5

Subwatershed	T_c	$L = 0.6T_c$
5A	0.33	0.20
5B	0.42	0.25
5C	0.18	0.11
5D	0.80	0.48
5E	0.65	0.39

HEC-1

25 Year, 24 Hour Storm

1

****

FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985

U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616

****

THIS HEC-1 VERSION CONTAINS ALL OPTIONS EXCEPT ECONOMICS, AND THE NUMBER OF PLANS ARE REDUCED TO 3

1 HEC-1 INPUT PAGE 1

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

  1           ID        SHEEMY INDUSTRIAL PARK SUBWATERSHEDS
  2           ID        DETAILED STORAGE AND STREAM NETWORK
  3           ID        EXISTING CONDITIONS - 25 YR, 24 HR STORM
              *DIAGRAM
  4           IT      15 28FEB91     100      97
  5           IO       5

  6           KK   SUB5A
  7           KO       4
  8           KM        SCS RUNOFF CALCULATION
  9           BA   0.019
 10           PH              0     0.5     1.1     2.1     2.7     3.0     3.6     4.5     5.2
 11           LS             90
 12           UD    0.20

 13           KK   SUB5B
 14           KO       4
 15           KM        SCS RUNOFF CALCULATION
 16           BA   0.113
 17           PH              0     0.5     1.1     2.1     2.7     3.0     3.6     4.5     5.2
 18           LS             85
 19           UD    0.25

 20           KK   SUB5C
 21           KO       4
 22           KM        SCS RUNOFF CALCULATION
 23           BA   0.042
 24           PH              0     0.5     1.1     2.1     2.7     3.0     3.6     4.5     5.2
 25           LS             90
 26           UD    0.11

 27           KK    5ABC
 28           KM        COMBINE HYDROGRAPHS FOR 5A, 5B & 5C
 29           HC       3

 30           KK   5SWMP
 31           KO       1
 32           KM        STORAGE ROUTING THROUGH NORTH POND
 33           RS       1    ELEV      70
 34           SA    1.43    4.32    5.18    5.31
 35           SE      70    70.1      76      77
 36           SL    69.9    3.14     0.6     0.5
 37           SS      74      25     3.0     1.5

 38           KK   SUB5D
 39           KO       4
 40           KM        SCS RUNOFF CALCULATION
```

```
          41          BA   0.088
          42          PH              0     0.5     1.1     2.1     2.7     3.0     3.6     4.5     5.2
          43          LS             75
          44          UD    0.48
1                                                  HEC-1 INPUT                                          PAGE  2

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


          45          KK     5CD
          46          KM        COMBINE HYDROGRAPHS FOR 5A TO 5D
          47          HC       2

          48          KK   5DSWP
          49          KO       1
          50          KM        STORAGE ROUTING THROUGH SOUTH POND
          51          RS       1    ELEV    67.5
          52          SA       0    1.45    5.97    6.22    6.47
          53          SE    67.5      68      70      72      74
          54          SL    68.5    6.28     0.6     0.5
          55          SS    72.6      25       0     1.5

          56          KK      5E
          57          KO       1
          58          KM        SCS RUNOFF CALCULATION TOWARD Rte 93
          59          BA   0.066
          60          PH              0     0.5     1.1     2.1     2.7     3.0     3.6     4.5     5.2
          61          LS             75
          62          UD    0.39
          63          ZZ
1
              SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

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

     6       SUB5A
                .
                .
    13          .       SUB5B
                .           .
                .           .
    20          .           .       SUB5C
                .           .           .
                .           .           .
    27        5ABC.......................
                V
                V
    30       5SWMP
                .
                .
    38          .       SUB5D
                .           .
                .           .
    45         5CD............
                V
                V
    48       5DSWP
                .
                .
    56          .          5E

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1                                                  ****
                              FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985
```

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U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616
                                                                                                  ****


                                  SHEEHY INDUSTRIAL PARK SUBWATERSHEDS
                                  DETAILED STORAGE AND STREAM NETWORK
                                  EXISTING CONDITIONS - 25 YR, 24 HR STORM

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

    IT          HYDROGRAPH TIME DATA
                       NMIN          15  MINUTES IN COMPUTATION INTERVAL
                      IDATE     28FEB91  STARTING DATE
                      ITIME        0100  STARTING TIME
                         NQ          97  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      1MAR91  ENDING DATE
                     NDTIME        0100  ENDING TIME

                 COMPUTATION INTERVAL     .25 HOURS
                      TOTAL TIME BASE   24.00 HOURS

          ENGLISH UNITS


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


          **************
          *            *
  6 KK    *     SUB5A  *
          *            *
          **************

  7 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           4  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                                  SCS RUNOFF CALCULATION

             SUBBASIN RUNOFF DATA

  9 BA          SUBBASIN CHARACTERISTICS
                      TAREA         .02  SUBBASIN AREA

                PRECIPITATION DATA

 10 PH                                 DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                  .50    1.10    2.10    2.70    3.00    3.60    4.50    5.20     .00     .00     .00     .00

                                                   STORM AREA =     .02

 11 LS          SCS LOSS RATE
                      STRTL         .22  INITIAL ABSTRACTION
                     CRVNBR       90.00  CURVE NUMBER
                      RTIMP         .00  PERCENT IMPERVIOUS AREA

 12 UD          SCS DIMENSIONLESS UNITGRAPH
                       TLAG         .20  LAG
```

```
                                                  ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                  UNIT HYDROGRAPH
                                              6 END-OF-PERIOD ORDINATES
              25.       18.        5.        1.        0.        0.


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


          **************
          *            *
 13 KK    *     SUB5B  *
          *            *
          **************

 14 KO         OUTPUT CONTROL VARIABLES
                     IPRNT           4  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                             SCS RUNOFF CALCULATION

            SUBBASIN RUNOFF DATA

 16 BA         SUBBASIN CHARACTERISTICS
                     TAREA         .11  SUBBASIN AREA

               PRECIPITATION DATA

 17 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
               ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
               5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                 .50    1.10    2.10    2.70    3.00    3.60    4.50    5.20     .00     .00     .00     .00

                                                STORM AREA =     .11

 18 LS         SCS LOSS RATE
                     STRTL         .35  INITIAL ABSTRACTION
                    CRVNBR       85.00  CURVE NUMBER
                     RTIMP         .00  PERCENT IMPERVIOUS AREA

 19 UD         SCS DIMENSIONLESS UNITGRAPH
                      TLAG         .25  LAG

                                                  ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                  UNIT HYDROGRAPH
                                              7 END-OF-PERIOD ORDINATES
            110.      120.       40.       14.        5.        2.        0.


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


          **************
          *            *
 20 KK    *     SUB5C  *
          *            *
          **************
```

```
 21 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           4  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                               SCS RUNOFF CALCULATION

             SUBBASIN RUNOFF DATA

 23 BA          SUBBASIN CHARACTERISTICS
                      TAREA         .04  SUBBASIN AREA

                PRECIPITATION DATA

 24 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                  .50    1.10    2.10    2.70    3.00    3.60    4.50    5.20     .00     .00     .00     .00

                                                   STORM AREA =     .04

 25 LS          SCS LOSS RATE
                      STRTL         .22  INITIAL ABSTRACTION
                     CRVNBR       90.00  CURVE NUMBER
                      RTIMP         .00  PERCENT IMPERVIOUS AREA

 26 UD          SCS DIMENSIONLESS UNITGRAPH
                       TLAG         .11  LAG

                                                          ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                      UNIT HYDROGRAPH
                                                  5 END-OF-PERIOD ORDINATES
              81.       23.        4.        1.        0.


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


          **************
          *            *
 30 KK    *     5SWMP  *
          *            *
          **************

 31 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           1  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                               STORAGE ROUTING THROUGH NORTH POND

             HYDROGRAPH ROUTING DATA

 33 RS          STORAGE ROUTING
                      NSTPS           1  NUMBER OF SUBREACHES
                       ITYP        ELEV  TYPE OF INITIAL CONDITION
                     RSVRIC       70.00  INITIAL CONDITION
                          X         .00 WORKING R AND D COEFFICIENT

 34 SA               AREA         1.4       4.3       5.2       5.3

 35 SE          ELEVATION       70.00     70.10     76.00     77.00
```

```
36 SL          LOW-LEVEL OUTLET
                    ELEVL      69.90  ELEVATION AT CENTER OF OUTLET
                    CAREA       3.14  CROSS-SECTIONAL AREA
                     COQL        .60  COEFFICIENT
                     EXPL        .50  EXPONENT OF HEAD

37 SS          SPILLWAY
                     CREL      74.00  SPILLWAY CREST ELEVATION
                    SPWID      25.00  SPILLWAY WIDTH
                     COQW       3.00  WEIR COEFFICIENT
                     EXPW       1.50  EXPONENT OF HEAD
```

***

COMPUTED STORAGE-ELEVATION DATA

STORAGE	.00	.27	28.26	33.51
ELEVATION	70.00	70.10	76.00	77.00

COMPUTED OUTFLOW-ELEVATION DATA

OUTFLOW	.00	5.27	5.88	6.65	7.65	8.99	10.92	13.90	19.12	30.59
ELEVATION	70.00	70.02	70.05	70.09	70.16	70.25	70.42	70.75	71.50	74.00
OUTFLOW	31.38	35.00	43.67	59.59	84.94	121.92	172.73	239.54	324.56	429.97
ELEVATION	74.04	74.14	74.29	74.51	74.78	75.11	75.49	75.94	76.44	77.00

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	.04	.11	.25	.52	.94	1.68	3.10	6.46	18.20
OUTFLOW	4.78	5.27	5.88	6.65	7.65	8.99	10.92	13.90	19.12	30.59
ELEVATION	70.00	70.02	70.05	70.09	70.16	70.25	70.42	70.75	71.50	74.00
STORAGE	18.40	18.88	19.65	20.70	22.05	23.70	25.66	27.94	28.26	30.55
OUTFLOW	31.38	35.00	43.67	59.59	84.94	121.92	172.73	239.54	249.45	324.56
ELEVATION	74.04	74.14	74.29	74.51	74.78	75.11	75.49	75.94	76.00	76.44
STORAGE	33.51									
OUTFLOW	429.97									
ELEVATION	77.00									

****

HYDROGRAPH AT STATION 5SWMP

****

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
28	FEB	0100	1	5.	.0	70.0	*	28	FEB	0915	34	4.	.0	70.0	*	28	FEB	1730	67	28.	15.9	73.5
28	FEB	0115	2	4.	.0	70.0	*	28	FEB	0930	35	5.	.0	70.0	*	28	FEB	1745	68	28.	15.7	73.5
28	FEB	0130	3	4.	.0	70.0	*	28	FEB	0945	36	5.	.0	70.0	*	28	FEB	1800	69	28.	15.4	73.4
28	FEB	0145	4	4.	.0	70.0	*	28	FEB	1000	37	6.	.1	70.0	*	28	FEB	1815	70	28.	15.2	73.4
28	FEB	0200	5	4.	.0	70.0	*	28	FEB	1015	38	6.	.1	70.1	*	28	FEB	1830	71	27.	14.9	73.3
28	FEB	0215	6	4.	.0	70.0	*	28	FEB	1030	39	6.	.2	70.1	*	28	FEB	1845	72	27.	14.6	73.2
28	FEB	0230	7	4.	.0	70.0	*	28	FEB	1045	40	7.	.2	70.1	*	28	FEB	1900	73	27.	14.3	73.2
28	FEB	0245	8	4.	.0	70.0	*	28	FEB	1100	41	7.	.3	70.1	*	28	FEB	1915	74	27.	14.0	73.1
28	FEB	0300	9	4.	.0	70.0	*	28	FEB	1115	42	7.	.4	70.1	*	28	FEB	1930	75	26.	13.7	73.0
28	FEB	0315	10	4.	.0	70.0	*	28	FEB	1130	43	8.	.5	70.1	*	28	FEB	1945	76	26.	13.3	[illegible]
28	FEB	0330	11	4.	.0	70.0	*	28	FEB	1145	44	8.	.6	70.2	*	28	FEB	2000	77	25.	13.0	[illegible]
28	FEB	0345	12	4.	.0	70.0	*	28	FEB	1200	45	9.	.8	70.2	*	28	FEB	2015	78	25.	12.6	72.[illegible]
28	FEB	0400	13	4.	.0	70.0	*	28	FEB	1215	46	9.	1.1	70.3	*	28	FEB	2030	79	25.	12.2	72.7
28	FEB	0415	14	4.	.0	70.0	*	28	FEB	1230	47	11.	1.6	70.4	*	28	FEB	2045	80	24.	11.9	72.7
28	FEB	0430	15	4.	.0	70.0	*	28	FEB	1245	48	12.	2.3	70.6	*	28	FEB	2100	81	24.	11.5	72.6
28	FEB	0445	16	4.	.0	70.0	*	28	FEB	1300	49	15.	3.8	70.9	*	28	FEB	2115	82	24.	11.2	72.5

28 FEB 0500	17	4.	.0	70.0	28 FEB 1315	50	20.	7.5	71.7	28 FEB 2130	83	23.	10.8	72.4
28 FEB 0515	18	4.	.0	70.0	28 FEB 1330	51	25.	12.2	72.7	28 FEB 2145	84	23.	10.5	72.4
28 FEB 0530	19	4.	.0	70.0	28 FEB 1345	52	28.	15.3	73.4	28 FEB 2200	85	23.	10.1	72.3
28 FEB 0545	20	4.	.0	70.0	28 FEB 1400	53	29.	16.9	73.7	28 FEB 2215	86	22.	9.8	72.2
FEB 0600	21	4.	.0	70.0	28 FEB 1415	54	30.	17.7	73.9	28 FEB 2230	87	22.	9.4	72.1
EB 0615	22	4.	.0	70.0	28 FEB 1430	55	30.	18.0	74.0	28 FEB 2245	88	22.	9.1	72.1
FEB 0630	23	4.	.0	70.0	28 FEB 1445	56	30.	18.1	74.0	28 FEB 2300	89	21.	8.8	72.0
28 FEB 0645	24	4.	.0	70.0	28 FEB 1500	57	30.	18.0	74.0	28 FEB 2315	90	21.	8.5	71.9
28 FEB 0700	25	4.	.0	70.0	28 FEB 1515	58	30.	17.9	73.9	28 FEB 2330	91	21.	8.1	71.9
28 FEB 0715	26	4.	.0	70.0	28 FEB 1530	59	30.	17.7	73.9	28 FEB 2345	92	20.	7.8	71.8
28 FEB 0730	27	4.	.0	70.0	28 FEB 1545	60	30.	17.5	73.9	1 MAR 0000	93	20.	7.5	71.7
28 FEB 0745	28	4.	.0	70.0	28 FEB 1600	61	30.	17.3	73.8	1 MAR 0015	94	20.	7.2	71.7
28 FEB 0800	29	4.	.0	70.0	28 FEB 1615	62	30.	17.1	73.8	1 MAR 0030	95	20.	6.9	71.6
28 FEB 0815	30	4.	.0	70.0	28 FEB 1630	63	29.	16.9	73.7	1 MAR 0045	96	19.	6.6	71.5
28 FEB 0830	31	4.	.0	70.0	28 FEB 1645	64	29.	16.7	73.7	1 MAR 0100	97	19.	6.3	71.5
28 FEB 0845	32	4.	.0	70.0	28 FEB 1700	65	29.	16.4	73.6					
28 FEB 0900	33	4.	.0	70.0	28 FEB 1715	66	29.	16.2	73.6					

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 PEAK FLOW     TIME                            MAXIMUM AVERAGE FLOW
                                     6-HR        24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+       30.    13.75                   29.          15.         15.         15.
                        (INCHES)     1.534        3.287       3.287       3.287
                         (AC-FT)       14.          31.         31.         31.

 PEAK STORAGE   TIME                           MAXIMUM AVERAGE STORAGE
                                     6-HR        24-HR       72-HR     24.00-HR
+  (AC-FT)      (HR)
       18.     13.75                   16.           7.          7.          7.

       STAGE    TIME                           MAXIMUM AVERAGE STAGE
                                     6-HR        24-HR       72-HR     24.00-HR
+   (FEET)      (HR)
     73.97     13.75                 73.59        71.47       71.47       71.47

                        CUMULATIVE AREA =     .17 SQ MI


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           ***************
           *             *
  38 KK    *    SUB5D    *
           *             *
           ***************

  39 KO        OUTPUT CONTROL VARIABLES
                    IPRNT           4  PRINT CONTROL
                    IPLOT           0  PLOT CONTROL
                    QSCAL          0.  HYDROGRAPH PLOT SCALE
                             SCS RUNOFF CALCULATION

             SUBBASIN RUNOFF DATA

  41 BA        SUBBASIN CHARACTERISTICS
                    TAREA         .09  SUBBASIN AREA

               PRECIPITATION DATA

  42 PH                           DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
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                ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                  .50    1.10    2.10    2.70    3.00    3.60    4.50    5.20     .00     .00     .00     .00

                                                STORM AREA =     .09

 43 LS          SCS LOSS RATE
                      STRTL         .67  INITIAL ABSTRACTION
                     CRVNBR       75.00  CURVE NUMBER
                      RTIMP         .00  PERCENT IMPERVIOUS AREA

 44 UD          SCS DIMENSIONLESS UNITGRAPH
                       TLAG         .48  LAG

                                                          ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                     UNIT HYDROGRAPH
                                                 12 END-OF-PERIOD ORDINATES
               23.       67.       64.       36.       18.        9.        5.        2.        1.        1.
                0.        0.


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


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          *            *
 48 KK    *     5DSWP  *
          *            *
          **************

 49 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           1  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                               STORAGE ROUTING THROUGH SOUTH POND

             HYDROGRAPH ROUTING DATA

 51 RS          STORAGE ROUTING
                      NSTPS           1  NUMBER OF SUBREACHES
                       ITYP        ELEV  TYPE OF INITIAL CONDITION
                     RSVRIC       67.50  INITIAL CONDITION
                          X         .00 WORKING R AND D COEFFICIENT

 52 SA               AREA          .0       1.5       6.0       6.2       6.5

 53 SE          ELEVATION       67.50     68.00     70.00     72.00     74.00

 54 SL          LOW-LEVEL OUTLET
                      ELEVL       68.50  ELEVATION AT CENTER OF OUTLET
                      CAREA        6.28  CROSS-SECTIONAL AREA
                       COQL         .60  COEFFICIENT
                       EXPL         .50  EXPONENT OF HEAD

 55 SS          SPILLWAY
                       CREL       72.60  SPILLWAY CREST ELEVATION
                      SPWID       25.00  SPILLWAY WIDTH
                       COQW        3.10  WEIR COEFFICIENT
                       EXPW        1.50  EXPONENT OF HEAD

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COMPUTED STORAGE-ELEVATION DATA

STORAGE	.00	.24	7.15	19.34	32.03
ELEVATION	67.50	68.00	70.00	72.00	74.00

COMPUTED OUTFLOW-ELEVATION DATA

OUTFLOW	.00	.00	35.06	37.33	39.93	42.91	46.37	50.44	55.30	61.19
ELEVATION	67.50	68.50	69.85	70.03	70.25	70.52	70.85	71.29	71.85	72.60
OUTFLOW	61.84	63.66	67.33	73.50	82.83	95.95	113.51	136.15	164.52	199.25
ELEVATION	72.63	72.68	72.76	72.86	72.99	73.14	73.32	73.52	73.75	74.00

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	.24	1.17	6.26	7.15	7.31	8.62	10.25	12.30	14.93
OUTFLOW	.00	.00	.00	35.06	37.01	37.33	39.93	42.91	46.37	50.44
ELEVATION	67.50	68.00	68.50	69.85	70.00	70.03	70.25	70.52	70.85	71.29
STORAGE	18.40	19.34	23.09	23.29	23.62	24.10	24.75	25.55	26.52	27.65
OUTFLOW	55.30	56.54	61.19	61.84	63.66	67.33	73.50	82.83	95.95	113.51
ELEVATION	71.85	72.00	72.60	72.63	72.68	72.76	72.86	72.99	73.14	73.32
STORAGE	28.94	30.40	32.03							
OUTFLOW	136.15	164.52	199.25							
ELEVATION	73.52	73.75	74.00							

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HYDROGRAPH AT STATION 5DSWP

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
28	FEB	0100	1	0.	.0	67.5	28	FEB	0915	34	4.	1.7	68.7	28	FEB	1730	67	40.	8.7	70.3
28	FEB	0115	2	0.	.1	67.7	28	FEB	0930	35	4.	1.8	68.7	28	FEB	1745	68	40.	8.6	70.2
28	FEB	0130	3	0.	.2	67.9	28	FEB	0945	36	4.	1.8	68.7	28	FEB	1800	69	40.	8.5	70.2
28	FEB	0145	4	0.	.3	68.0	28	FEB	1000	37	4.	1.8	68.7	28	FEB	1815	70	40.	8.4	70.2
28	FEB	0200	5	0.	.4	68.1	28	FEB	1015	38	5.	1.8	68.7	28	FEB	1830	71	39.	8.3	70.2
28	FEB	0215	6	0.	.4	68.1	28	FEB	1030	39	5.	1.9	68.7	28	FEB	1845	72	39.	8.2	70.2
28	FEB	0230	7	0.	.5	68.2	28	FEB	1045	40	5.	1.9	68.7	28	FEB	1900	73	39.	8.1	70.2
28	FEB	0245	8	0.	.6	68.2	28	FEB	1100	41	5.	2.0	68.7	28	FEB	1915	74	39.	7.9	70.1
28	FEB	0300	9	0.	.7	68.2	28	FEB	1115	42	6.	2.0	68.7	28	FEB	1930	75	38.	7.8	70.1
28	FEB	0315	10	0.	.8	68.3	28	FEB	1130	43	6.	2.1	68.7	28	FEB	1945	76	38.	7.6	70.1
28	FEB	0330	11	0.	.9	68.3	28	FEB	1145	44	7.	2.1	68.8	28	FEB	2000	77	38.	7.5	70.1
28	FEB	0345	12	0.	1.0	68.4	28	FEB	1200	45	7.	2.2	68.8	28	FEB	2015	78	37.	7.3	70.0
28	FEB	0400	13	0.	1.0	68.4	28	FEB	1215	46	8.	2.3	68.8	28	FEB	2030	79	37.	7.1	70.0
28	FEB	0415	14	0.	1.1	68.5	28	FEB	1230	47	9.	2.5	68.8	28	FEB	2045	80	37.	6.9	70.0
28	FEB	0430	15	0.	1.2	68.5	28	FEB	1245	48	10.	2.7	68.9	28	FEB	2100	81	36.	6.7	69.9
28	FEB	0445	16	1.	1.3	68.5	28	FEB	1300	49	12.	3.0	69.0	28	FEB	2115	82	36.	6.6	69.9
28	FEB	0500	17	1.	1.4	68.5	28	FEB	1315	50	17.	3.6	69.1	28	FEB	2130	83	35.	6.4	69.9
28	FEB	0515	18	2.	1.4	68.6	28	FEB	1330	51	25.	4.8	69.5	28	FEB	2145	84	35.	6.2	69.8
28	FEB	0530	19	2.	1.5	68.6	28	FEB	1345	52	35.	6.2	69.8	28	FEB	2200	85	33.	6.0	69.8
28	FEB	0545	20	2.	1.5	68.6	28	FEB	1400	53	37.	7.3	70.0	28	FEB	2215	86	32.	5.9	69.7
28	FEB	0600	21	3.	1.5	68.6	28	FEB	1415	54	39.	8.1	70.2	28	FEB	2230	87	31.	5.7	69.7
28	FEB	0615	22	3.	1.6	68.6	28	FEB	1430	55	40.	8.6	70.2	28	FEB	2245	88	30.	5.6	69.7
28	FEB	0630	23	3.	1.6	68.6	28	FEB	1445	56	40.	8.9	70.3	28	FEB	2300	89	30.	5.5	69.6
28	FEB	0645	24	3.	1.6	68.6	28	FEB	1500	57	41.	9.1	70.3	28	FEB	2315	90	29.	5.4	69.6
	FEB	0700	25	3.	1.6	68.6	28	FEB	1515	58	41.	9.2	70.3	28	FEB	2330	91	28.	5.3	69.6
	EB	0715	26	3.	1.7	68.6	28	FEB	1530	59	41.	9.2	70.3	28	FEB	2345	92	27.	5.2	69.6
28	FEB	0730	27	3.	1.7	68.6	28	FEB	1545	60	41.	9.2	70.3	1	MAR	0000	93	27.	5.1	69.5
28	FEB	0745	28	4.	1.7	68.6	28	FEB	1600	61	41.	9.2	70.3	1	MAR	0015	94	26.	5.0	69.5
28	FEB	0800	29	4.	1.7	68.6	28	FEB	1615	62	41.	9.1	70.3	1	MAR	0030	95	26.	4.9	69.5
28	FEB	0815	30	4.	1.7	68.6	28	FEB	1630	63	41.	9.0	70.3	1	MAR	0045	96	25.	4.8	69.5

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 28 FEB 0830  31      4.      1.7    68.6 * 28 FEB 1645  64      41.      9.0    70.3 *  1 MAR 0100  97      25.      4.7    69.4
 28 FEB 0845  32      4.      1.7    68.6 * 28 FEB 1700  65      40.      8.9    70.3 *
 28 FEB 0900  33      4.      1.7    68.6 * 28 FEB 1715  66      40.      8.8    70.3 *
                                         *                                            *
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 PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+  (CFS)       (HR)
                          (CFS)
+     41.     14.50                  40.         19.         19.         19.
                       (INCHES)    1.413       2.712       2.712       2.712
                        (AC-FT)      20.         38.         38.         38.

 PEAK STORAGE   TIME                         MAXIMUM AVERAGE STORAGE
                                     6-HR       24-HR       72-HR     24.00-HR
+  (AC-FT)      (HR)
       9.     14.50                   9.          4.          4.          4.

 PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                     6-HR       24-HR       72-HR     24.00-HR
+  (FEET)      (HR)
    70.34     14.50                 70.24       69.24       69.24       69.24

                        CUMULATIVE AREA =     .26 SQ MI


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            **************
            *            *
  56 KK     *       5E   *
            *            *
            **************

  57 KO          OUTPUT CONTROL VARIABLES
                       IPRNT           1  PRINT CONTROL
                       IPLOT           0  PLOT CONTROL
                       QSCAL          0.  HYDROGRAPH PLOT SCALE
                                SCS RUNOFF CALCULATION TOWARD Rte 93

               SUBBASIN RUNOFF DATA

  59 BA          SUBBASIN CHARACTERISTICS
                       TAREA         .07  SUBBASIN AREA

                 PRECIPITATION DATA

  60 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                 ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                 5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                   .50    1.10    2.10    2.70    3.00    3.60    4.50    5.20     .00     .00     .00     .00

                                                  STORM AREA =     .07

  61 LS          SCS LOSS RATE
                       STRTL         .67  INITIAL ABSTRACTION
                      CRVNBR       75.00  CURVE NUMBER
                       RTIMP         .00  PERCENT IMPERVIOUS AREA

  62 UD          SCS DIMENSIONLESS UNITGRAPH
                        TLAG         .39  LAG
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WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

UNIT HYDROGRAPH
10 END-OF-PERIOD ORDINATES

28. 62. 45. 19. 9. 4. 2. 1. 0. 0.

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HYDROGRAPH AT STATION 5E

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DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
28	FEB	0100	1	.00	.00	.00	0.	28	FEB	1315	50	1.10	.42	.68	39.
28	FEB	0115	2	.01	.01	.00	0.	28	FEB	1330	51	.28	.08	.20	61.
28	FEB	0130	3	.01	.01	.00	0.	28	FEB	1345	52	.18	.05	.13	52.
28	FEB	0145	4	.01	.01	.00	0.	28	FEB	1400	53	.14	.04	.10	36.
28	FEB	0200	5	.01	.01	.00	0.	28	FEB	1415	54	.08	.02	.06	25.
28	FEB	0215	6	.01	.01	.00	0.	28	FEB	1430	55	.07	.02	.05	18.
28	FEB	0230	7	.01	.01	.00	0.	28	FEB	1445	56	.06	.02	.05	13.
28	FEB	0245	8	.01	.01	.00	0.	28	FEB	1500	57	.06	.01	.04	10.
28	FEB	0300	9	.01	.01	.00	0.	28	FEB	1515	58	.05	.01	.04	9.
28	FEB	0315	10	.01	.01	.00	0.	28	FEB	1530	59	.05	.01	.04	8.
28	FEB	0330	11	.01	.01	.00	0.	28	FEB	1545	60	.04	.01	.03	7.
28	FEB	0345	12	.01	.01	.00	0.	28	FEB	1600	61	.04	.01	.03	6.
28	FEB	0400	13	.01	.01	.00	0.	28	FEB	1615	62	.05	.01	.04	6.
28	FEB	0415	14	.01	.01	.00	0.	28	FEB	1630	63	.05	.01	.04	6.
28	FEB	0430	15	.01	.01	.00	0.	28	FEB	1645	64	.04	.01	.03	6.
28	FEB	0445	16	.01	.01	.00	0.	28	FEB	1700	65	.04	.01	.03	6.
28	FEB	0500	17	.02	.02	.00	0.	28	FEB	1715	66	.04	.01	.03	6.
28	FEB	0515	18	.02	.02	.00	0.	28	FEB	1730	67	.04	.01	.03	5.
28	FEB	0530	19	.02	.02	.00	0.	28	FEB	1745	68	.04	.01	.03	5.
28	FEB	0545	20	.02	.02	.00	0.	28	FEB	1800	69	.04	.01	.03	5.
28	FEB	0600	21	.02	.02	.00	0.	28	FEB	1815	70	.03	.01	.03	5.
28	FEB	0615	22	.02	.02	.00	0.	28	FEB	1830	71	.03	.01	.03	5.
28	FEB	0630	23	.02	.02	.00	0.	28	FEB	1845	72	.03	.01	.03	5.
28	FEB	0645	24	.02	.02	.00	0.	28	FEB	1900	73	.03	.01	.02	4.
28	FEB	0700	25	.02	.02	.00	0.	28	FEB	1915	74	.02	.00	.02	4.
28	FEB	0715	26	.03	.03	.00	0.	28	FEB	1930	75	.02	.00	.02	3.
28	FEB	0730	27	.03	.03	.00	0.	28	FEB	1945	76	.02	.00	.01	3.
28	FEB	0745	28	.03	.03	.00	0.	28	FEB	2000	77	.02	.00	.01	3.
28	FEB	0800	29	.03	.03	.00	0.	28	FEB	2015	78	.02	.00	.01	3.
28	FEB	0815	30	.03	.03	.00	0.	28	FEB	2030	79	.02	.00	.01	2.
28	FEB	0830	31	.04	.04	.00	0.	28	FEB	2045	80	.02	.00	.01	2.
28	FEB	0845	32	.04	.04	.00	0.	28	FEB	2100	81	.02	.00	.01	2.
28	FEB	0900	33	.04	.04	.00	0.	28	FEB	2115	82	.02	.00	.01	2.
28	FEB	0915	34	.04	.04	.00	0.	28	FEB	2130	83	.02	.00	.01	2.
28	FEB	0930	35	.04	.04	.00	0.	28	FEB	2145	84	.01	.00	.01	2.
28	FEB	0945	36	.04	.04	.00	0.	28	FEB	2200	85	.01	.00	.01	2.
28	FEB	1000	37	.05	.04	.00	0.	28	FEB	2215	86	.01	.00	.01	2.
28	FEB	1015	38	.04	.04	.00	0.	28	FEB	2230	87	.01	.00	.01	2.
28	FEB	1030	39	.04	.04	.00	0.	28	FEB	2245	88	.01	.00	.01	2.
28	FEB	1045	40	.05	.04	.01	1.	28	FEB	2300	89	.01	.00	.01	2.
28	FEB	1100	41	.05	.04	.01	1.	28	FEB	2315	90	.01	.00	.01	2.
28	FEB	1115	42	.05	.05	.01	1.	28	FEB	2330	91	.01	.00	.01	2.
28	FEB	1130	43	.06	.05	.01	1.	28	FEB	2345	92	.01	.00	.01	2.
28	FEB	1145	44	.07	.05	.02	2.	1	MAR	0000	93	.01	.00	.01	2.
28	FEB	1200	45	.08	.06	.02	2.	1	MAR	0015	94	.01	.00	.01	2.
28	FEB	1215	46	.13	.09	.04	3.	1	MAR	0030	95	.01	.00	.01	2.
28	FEB	1230	47	.16	.10	.05	5.	1	MAR	0045	96	.01	.00	.01	2.
28	FEB	1245	48	.23	.14	.09	8.	1	MAR	0100	97	.01	.00	.01	2.
28	FEB	1300	49	.49	.25	.24	16.								

****

TOTAL RAINFALL = 5.20, TOTAL LOSS = 2.59, TOTAL EXCESS = 2.61

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.00-HR
		(CFS)				
61.	12.50		15.	5.	5.	5.
		(INCHES)	2.128	2.591	2.591	2.591
		(AC-FT)	7.	9.	9.	9.

CUMULATIVE AREA = .07 SQ MI

1

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	SUB5A	33.	12.25	6.	2.	2.	.02		
HYDROGRAPH AT	SUB5B	152.	12.50	34.	11.	11.	.11		
HYDROGRAPH AT	SUB5C	91.	12.25	14.	5.	5.	.04		
3 COMBINED AT	5ABC	274.	12.25	55.	17.	17.	.17		
ROUTED TO	5SWMP	30.	13.75	29.	15.	15.	.17		
								73.97	13.75
HYDROGRAPH AT	SUB5D	71.	12.75	20.	6.	6.	.09		
2 COMBINED AT	5CD	99.	12.75	48.	21.	21.	.26		
ROUTED TO	5DSWP	41.	14.50	40.	19.	19.	.26		
								70.34	14.50
HYDROGRAPH AT	5E	61.	12.50	15.	5.	5.	.07		

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

HEC-1

50 Year, 24 Hour Storm

```
1                                                  ****
                    FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985
          U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616
                                                  ****



          THIS HEC-1 VERSION CONTAINS ALL OPTIONS EXCEPT ECONOMICS, AND THE NUMBER OF PLANS ARE REDUCED TO 3


1                                          HEC-1 INPUT                                                  PAGE  1

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

   1          ID        SHEEHY INDUSTRIAL PARK SUBWATERSHEDS
   2          ID        DETAILED STORAGE AND STREAM NETWORK
   3          ID        EXISTING CONDITIONS - 50 YR, 24 HR STORM
              *DIAGRAM
   4          IT      15 28FEB91     100      97
   5          IO       5

   6          KK   SUB5A
   7          KO       4
   8          KM        SCS RUNOFF CALCULATION
   9          BA   0.019
  10          PH              0     0.6     1.3     2.4     3.0     3.4     4.2     5.2     6.0
  11          LS             90
  12          UD    0.20

  13          KK   SUB5B
  14          KO       4
  15          KM        SCS RUNOFF CALCULATION
  16          BA   0.113
  17          PH              0     0.6     1.3     2.4     3.0     3.4     4.2     5.2     6.0
  18          LS             85
  19          UD    0.25

  20          KK   SUB5C
  21          KO       4
  22          KM        SCS RUNOFF CALCULATION
  23          BA   0.042
  24          PH              0     0.6     1.3     2.4     3.0     3.4     4.2     5.2     6.0
  25          LS             90
  26          UD    0.11

  27          KK    5ABC
  28          KM        COMBINE HYDROGRAPHS FOR 5A, 5B & 5C
  29          HC       3

  30          KK   5SWMP
  31          KO       1
  32          KM        STORAGE ROUTING THROUGH NORTH POND
  33          RS       1    ELEV      70
  34          SA    1.43    4.32    5.18    5.31
  35          SE      70    70.1      76      77
  36          SL    69.9    3.14     0.6     0.5
  37          SS      74      25     3.0     1.5

  38          KK   SUB5D
  39          KO       4
  40          KM        SCS RUNOFF CALCULATION
```

```
          41          BA   0.088
          42          PH              0     0.6     1.3     2.4     3.0     3.4     4.2     5.2     6.0
          43          LS             75
          44          UD    0.48
1                                                  HEC-1 INPUT                                                  PAGE  2

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


          45          KK     5CD
          46          KM        COMBINE HYDROGRAPHS FOR 5A TO 5D
          47          HC       2

          48          KK   5DSWP
          49          KO       1
          50          KM        STORAGE ROUTING THROUGH SOUTH POND
          51          RS       1    ELEV    67.5
          52          SA       0    1.45    5.97    6.22    6.47
          53          SE    67.5      68      70      72      74
          54          SL    68.5    6.28     0.6     0.5
          55          SS    72.6      25       0     1.5

          56          KK      5E
          57          KO       1
          58          KM        SCS RUNOFF CALCULATION TOWARD Rte 93
          59          BA   0.066
          60          PH              0     0.6     1.3     2.4     3.0     3.3     4.2     5.2     6.0
          61          LS             75
          62          UD    0.39
          63          ZZ
1
              SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

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

     6       SUB5A
                .
                .
    13          .       SUB5B
                .           .
                .           .
    20          .           .       SUB5C
                .           .           .
                .           .           .
    27        5ABC.......................
                V
                V
    30       5SWMP
                .
                .
    38          .       SUB5D
                .           .
                .           .
    45         5CD............
                V
                V
    48       5DSWP
                .
                .
    56          .          5E

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1                                                                  ****
                                  FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985
```

U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616
****

SHEEHY INDUSTRIAL PARK SUBWATERSHEDS
DETAILED STORAGE AND STREAM NETWORK
EXISTING CONDITIONS - 50 YR, 24 HR STORM

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

    IT        HYDROGRAPH TIME DATA
                     NMIN         15  MINUTES IN COMPUTATION INTERVAL
                    IDATE     28FEB91  STARTING DATE
                    ITIME        0100  STARTING TIME
                       NQ         97  NUMBER OF HYDROGRAPH ORDINATES
                   NDDATE      1MAR91  ENDING DATE
                   NDTIME        0100  ENDING TIME

              COMPUTATION INTERVAL     .25 HOURS
                   TOTAL TIME BASE   24.00 HOURS

        ENGLISH UNITS


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


          **************
          *            *
  6 KK    *     SUB5A  *
          *            *
          **************

  7 KO        OUTPUT CONTROL VARIABLES
                    IPRNT          4  PRINT CONTROL
                    IPLOT          0  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE
                             SCS RUNOFF CALCULATION

            SUBBASIN RUNOFF DATA

  9 BA        SUBBASIN CHARACTERISTICS
                    TAREA        .02  SUBBASIN AREA

              PRECIPITATION DATA

 10 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
              ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
              5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                .60    1.30    2.40    3.00    3.40    4.20    5.20    6.00     .00     .00     .00     .00

                                                   STORM AREA =     .02

 11 LS        SCS LOSS RATE
                    STRTL        .22  INITIAL ABSTRACTION
                   CRVNBR      90.00  CURVE NUMBER
                    RTIMP        .00  PERCENT IMPERVIOUS AREA

 12 UD        SCS DIMENSIONLESS UNITGRAPH
                     TLAG        .20  LAG
```

```
                                                  ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                  UNIT HYDROGRAPH
                                              6 END-OF-PERIOD ORDINATES
              25.       18.       5.       1.       0.       0.


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


          **************
          *            *
  13 KK   *     SUB5B  *
          *            *
          **************

  14 KO         OUTPUT CONTROL VARIABLES
                      IPRNT           4  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                               SCS RUNOFF CALCULATION

             SUBBASIN RUNOFF DATA

  16 BA         SUBBASIN CHARACTERISTICS
                      TAREA         .11  SUBBASIN AREA

                PRECIPITATION DATA

  17 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                  .60    1.30    2.40    3.00    3.40    4.20    5.20    6.00     .00     .00     .00     .00

                                                   STORM AREA =     .11

  18 LS         SCS LOSS RATE
                      STRTL         .35  INITIAL ABSTRACTION
                     CRVNBR       85.00  CURVE NUMBER
                      RTIMP         .00  PERCENT IMPERVIOUS AREA

  19 UD         SCS DIMENSIONLESS UNITGRAPH
                       TLAG         .25  LAG

                                                  ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                  UNIT HYDROGRAPH
                                              7 END-OF-PERIOD ORDINATES
             110.      120.      40.      14.       5.       2.       0.


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


          **************
          *            *
  20 KK   *     SUB5C  *
          *            *
          **************
```

```
 21 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           4  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                               SCS RUNOFF CALCULATION

              SUBBASIN RUNOFF DATA

 23 BA          SUBBASIN CHARACTERISTICS
                      TAREA         .04  SUBBASIN AREA

                PRECIPITATION DATA

 24 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                  .60    1.30    2.40    3.00    3.40    4.20    5.20    6.00     .00     .00     .00     .00

                                                   STORM AREA =     .04

 25 LS          SCS LOSS RATE
                      STRTL         .22  INITIAL ABSTRACTION
                     CRVNBR       90.00  CURVE NUMBER
                      RTIMP         .00  PERCENT IMPERVIOUS AREA

 26 UD          SCS DIMENSIONLESS UNITGRAPH
                       TLAG         .11  LAG

                                                          ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                     UNIT HYDROGRAPH
                                                 5 END-OF-PERIOD ORDINATES
              81.       23.        4.        1.        0.


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


          **************
          *            *
 30 KK    *     5SWMP  *
          *            *
          **************

 31 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           1  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                               STORAGE ROUTING THROUGH NORTH POND

              HYDROGRAPH ROUTING DATA

 33 RS          STORAGE ROUTING
                      NSTPS           1  NUMBER OF SUBREACHES
                       ITYP        ELEV  TYPE OF INITIAL CONDITION
                     RSVRIC       70.00  INITIAL CONDITION
                          X         .00 WORKING R AND D COEFFICIENT

    SA                AREA         1.4       4.3       5.2       5.3

 35 SE          ELEVATION       70.00     70.10     76.00     77.00
```

```
36 SL          LOW-LEVEL OUTLET
                     ELEVL       69.90  ELEVATION AT CENTER OF OUTLET
                     CAREA        3.14  CROSS-SECTIONAL AREA
                      COQL         .60  COEFFICIENT
                      EXPL         .50  EXPONENT OF HEAD

37 SS          SPILLWAY
                      CREL       74.00  SPILLWAY CREST ELEVATION
                     SPWID       25.00  SPILLWAY WIDTH
                      COQW        3.00  WEIR COEFFICIENT
                      EXPW        1.50  EXPONENT OF HEAD
```

***

COMPUTED STORAGE-ELEVATION DATA

STORAGE	.00	.27	28.26	33.51
ELEVATION	70.00	70.10	76.00	77.00

COMPUTED OUTFLOW-ELEVATION DATA

OUTFLOW	.00	5.27	5.88	6.65	7.65	8.99	10.92	13.90	19.12	30.59
ELEVATION	70.00	70.02	70.05	70.09	70.16	70.25	70.42	70.75	71.50	74.00
OUTFLOW	31.38	35.00	43.67	59.59	84.94	121.92	172.73	239.54	324.56	429.97
ELEVATION	74.04	74.14	74.29	74.51	74.78	75.11	75.49	75.94	76.44	77.00

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	.04	.11	.25	.52	.94	1.68	3.10	6.46	18.20
OUTFLOW	4.78	5.27	5.88	6.65	7.65	8.99	10.92	13.90	19.12	30.59
ELEVATION	70.00	70.02	70.05	70.09	70.16	70.25	70.42	70.75	71.50	74.00
STORAGE	18.40	18.88	19.65	20.70	22.05	23.70	25.66	27.94	28.26	30.55
OUTFLOW	31.38	35.00	43.67	59.59	84.94	121.92	172.73	239.54	249.45	324.56
ELEVATION	74.04	74.14	74.29	74.51	74.78	75.11	75.49	75.94	76.00	76.44
STORAGE	33.51									
OUTFLOW	429.97									
ELEVATION	77.00									

****

HYDROGRAPH AT STATION 5SWMP

****

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
28	FEB	0100	1	5.	.0	70.0	*	28	FEB	0915	34	5.	.0	70.0	*	28	FEB	1730	67	30.	17.7	73.9
28	FEB	0115	2	4.	.0	70.0	*	28	FEB	0930	35	6.	.1	70.0	*	28	FEB	1745	68	30.	17.4	73.8
28	FEB	0130	3	4.	.0	70.0	*	28	FEB	0945	36	6.	.1	70.1	*	28	FEB	1800	69	30.	17.2	73.8
28	FEB	0145	4	4.	.0	70.0	*	28	FEB	1000	37	6.	.2	70.1	*	28	FEB	1815	70	29.	16.9	73.7
28	FEB	0200	5	4.	.0	70.0	*	28	FEB	1015	38	7.	.3	70.1	*	28	FEB	1830	71	29.	16.6	73.7
28	FEB	0215	6	4.	.0	70.0	*	28	FEB	1030	39	7.	.4	70.1	*	28	FEB	1845	72	29.	16.3	73.6
28	FEB	0230	7	4.	.0	70.0	*	28	FEB	1045	40	8.	.5	70.2	*	28	FEB	1900	73	29.	16.1	73.5
28	FEB	0245	8	4.	.0	70.0	*	28	FEB	1100	41	8.	.7	70.2	*	28	FEB	1915	74	28.	15.8	73.5
28	FEB	0300	9	4.	.0	70.0	*	28	FEB	1115	42	9.	.8	70.2	*	28	FEB	1930	75	28.	15.4	73.4
28	FEB	0315	10	4.	.0	70.0	*	28	FEB	1130	43	9.	1.0	70.3	*	28	FEB	1945	76	28.	15.0	7[illegible]
28	FEB	0330	11	4.	.0	70.0	*	28	FEB	1145	44	10.	1.3	70.3	*	28	FEB	2000	77	27.	14.7	7[illegible]
28	FEB	0345	12	4.	.0	70.0	*	28	FEB	1200	45	11.	1.6	70.4	*	28	FEB	2015	78	27.	14.3	73.[illegible]
28	FEB	0400	13	4.	.0	70.0	*	28	FEB	1215	46	12.	2.0	70.5	*	28	FEB	2030	79	26.	13.9	73.1
28	FEB	0415	14	4.	.0	70.0	*	28	FEB	1230	47	13.	2.6	70.6	*	28	FEB	2045	80	26.	13.5	73.0
28	FEB	0430	15	4.	.0	70.0	*	28	FEB	1245	48	14.	3.4	70.8	*	28	FEB	2100	81	26.	13.2	72.9
28	FEB	0445	16	4.	.0	70.0	*	28	FEB	1300	49	17.	5.1	71.2	*	28	FEB	2115	82	25.	12.8	72.9

28 FEB 0500	17	4.	.0	70.0 *	28 FEB 1315	50	22.	9.5	72.1 *	28 FEB 2130	83	25.	12.4	72.8
28 FEB 0515	18	4.	.0	70.0 *	28 FEB 1330	51	28.	15.1	73.3 *	28 FEB 2145	84	25.	12.1	72.7
28 FEB 0530	19	4.	.0	70.0 *	28 FEB 1345	52	34.	18.7	74.1 *	28 FEB 2200	85	24.	11.7	72.6
28 FEB 0545	20	4.	.0	70.0 *	28 FEB 1400	53	53.	20.3	74.4 *	28 FEB 2215	86	24.	11.4	72.5
FEB 0600	21	4.	.0	70.0 *	28 FEB 1415	54	59.	20.7	74.5 *	28 FEB 2230	87	24.	11.0	72.5
EB 0615	22	4.	.0	70.0 *	28 FEB 1430	55	58.	20.6	74.5 *	28 FEB 2245	88	23.	10.7	72.4
28 FEB 0630	23	4.	.0	70.0 *	28 FEB 1445	56	54.	20.3	74.4 *	28 FEB 2300	89	23.	10.4	72.3
28 FEB 0645	24	4.	.0	70.0 *	28 FEB 1500	57	50.	20.0	74.4 *	28 FEB 2315	90	23.	10.0	72.3
28 FEB 0700	25	4.	.0	70.0 *	28 FEB 1515	58	45.	19.8	74.3 *	28 FEB 2330	91	22.	9.7	72.2
28 FEB 0715	26	4.	.0	70.0 *	28 FEB 1530	59	42.	19.5	74.3 *	28 FEB 2345	92	22.	9.4	72.1
28 FEB 0730	27	4.	.0	70.0 *	28 FEB 1545	60	39.	19.2	74.2 *	1 MAR 0000	93	22.	9.0	72.0
28 FEB 0745	28	4.	.0	70.0 *	28 FEB 1600	61	36.	19.0	74.2 *	1 MAR 0015	94	21.	8.7	72.0
28 FEB 0800	29	4.	.0	70.0 *	28 FEB 1615	62	34.	18.8	74.1 *	1 MAR 0030	95	21.	8.4	71.9
28 FEB 0815	30	4.	.0	70.0 *	28 FEB 1630	63	32.	18.5	74.1 *	1 MAR 0045	96	21.	8.1	71.8
28 FEB 0830	31	4.	.0	70.0 *	28 FEB 1645	64	31.	18.3	74.0 *	1 MAR 0100	97	20.	7.8	71.8
28 FEB 0845	32	5.	.0	70.0 *	28 FEB 1700	65	31.	18.1	74.0 *					
28 FEB 0900	33	5.	.0	70.0 *	28 FEB 1715	66	30.	17.9	73.9 *					

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

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                       6-HR        24-HR        72-HR      24.00-HR
+   (CFS)       (HR)
                            (CFS)
+      59.     13.25                    37.          18.          18.          18.
                         (INCHES)     1.979        3.869        3.869        3.869
                          (AC-FT)       18.          36.          36.          36.

 PEAK STORAGE   TIME                         MAXIMUM AVERAGE STORAGE
                                       6-HR        24-HR        72-HR      24.00-HR
+  (AC-FT)      (HR)
       21.     13.25                    18.           8.           8.           8.

     . STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                       6-HR        24-HR        72-HR      24.00-HR
+   (FEET)      (HR)
     74.50     13.25                  74.01        71.68        71.68        71.68

                       CUMULATIVE AREA =      .17 SQ MI


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


            ***************
            *             *
  38 KK     *     SUB5D   *
            *             *
            ***************

  39 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           4  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                              SCS RUNOFF CALCULATION

               SUBBASIN RUNOFF DATA

     BA          SUBBASIN CHARACTERISTICS
                      TAREA         .09  SUBBASIN AREA

                 PRECIPITATION DATA

  42 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
```

```
                ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                  .60    1.30    2.40    3.00    3.40    4.20    5.20    6.00     .00     .00     .00     .00

                                                STORM AREA =     .09

 43 LS          SCS LOSS RATE
                      STRTL         .67  INITIAL ABSTRACTION
                     CRVNBR       75.00  CURVE NUMBER
                      RTIMP         .00  PERCENT IMPERVIOUS AREA

 44 UD          SCS DIMENSIONLESS UNITGRAPH
                       TLAG         .48  LAG

                                                          ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                     UNIT HYDROGRAPH
                                                 12 END-OF-PERIOD ORDINATES
              23.       67.       64.       36.       18.        9.        5.        2.        1.        1.
               0.        0.


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


          **************
          *            *
 48 KK    *     5DSWP  *
          *            *
          **************

 49 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           1  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                               STORAGE ROUTING THROUGH SOUTH POND

             HYDROGRAPH ROUTING DATA

 51 RS          STORAGE ROUTING
                      NSTPS           1  NUMBER OF SUBREACHES
                       ITYP        ELEV  TYPE OF INITIAL CONDITION
                     RSVRIC       67.50  INITIAL CONDITION
                          X         .00 WORKING R AND D COEFFICIENT

 52 SA               AREA          .0       1.5       6.0       6.2       6.5

 53 SE          ELEVATION       67.50     68.00     70.00     72.00     74.00

 54 SL          LOW-LEVEL OUTLET
                      ELEVL       68.50  ELEVATION AT CENTER OF OUTLET
                      CAREA        6.28  CROSS-SECTIONAL AREA
                       COQL         .60  COEFFICIENT
                       EXPL         .50  EXPONENT OF HEAD

 55 SS          SPILLWAY
                       CREL       72.60  SPILLWAY CREST ELEVATION
                      SPWID       25.00  SPILLWAY WIDTH
                       COQW        3.10  WEIR COEFFICIENT
                       EXPW        1.50  EXPONENT OF HEAD

                                                          ***
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COMPUTED STORAGE-ELEVATION DATA

STORAGE	.00	.24	7.15	19.34	32.03
ELEVATION	67.50	68.00	70.00	72.00	74.00

COMPUTED OUTFLOW-ELEVATION DATA

OUTFLOW	.00	.00	35.06	37.33	39.93	42.91	46.37	50.44	55.30	61.19
ELEVATION	67.50	68.50	69.85	70.03	70.25	70.52	70.85	71.29	71.85	72.60
OUTFLOW	61.84	63.66	67.33	73.50	82.83	95.95	113.51	136.15	164.52	199.25
ELEVATION	72.63	72.68	72.76	72.86	72.99	73.14	73.32	73.52	73.75	74.00

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	.24	1.17	6.26	7.15	7.31	8.62	10.25	12.30	14.93
OUTFLOW	.00	.00	.00	35.06	37.01	37.33	39.93	42.91	46.37	50.44
ELEVATION	67.50	68.00	68.50	69.85	70.00	70.03	70.25	70.52	70.85	71.29
STORAGE	18.40	19.34	23.09	23.29	23.62	24.10	24.75	25.55	26.52	27.65
OUTFLOW	55.30	56.54	61.19	61.84	63.66	67.33	73.50	82.83	95.95	113.51
ELEVATION	71.85	72.00	72.60	72.63	72.68	72.76	72.86	72.99	73.14	73.32
STORAGE	28.94	30.40	32.03							
OUTFLOW	136.15	164.52	199.25							
ELEVATION	73.52	73.75	74.00							

****

HYDROGRAPH AT STATION 5DSWP

****

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
28	FEB	0100	1	0.	.0	67.5	*	28	FEB	0915	34	4.	1.8	68.7	*	28	FEB	1730	67	48.	13.1	71.0
28	FEB	0115	2	0.	.1	67.7	*	28	FEB	0930	35	4.	1.8	68.7	*	28	FEB	1745	68	47.	12.9	70.9
28	FEB	0130	3	0.	.2	67.9	*	28	FEB	0945	36	5.	1.8	68.7	*	28	FEB	1800	69	47.	12.7	70.9
28	FEB	0145	4	0.	.3	68.0	*	28	FEB	1000	37	5.	1.9	68.7	*	28	FEB	1815	70	47.	12.5	70.9
28	FEB	0200	5	0.	.4	68.1	*	28	FEB	1015	38	5.	1.9	68.7	*	28	FEB	1830	71	46.	12.3	70.9
28	FEB	0215	6	0.	.4	68.1	*	28	FEB	1030	39	6.	2.0	68.7	*	28	FEB	1845	72	46.	12.1	70.8
28	FEB	0230	7	0.	.5	68.2	*	28	FEB	1045	40	6.	2.0	68.7	*	28	FEB	1900	73	46.	11.9	70.8
28	FEB	0245	8	0.	.6	68.2	*	28	FEB	1100	41	7.	2.1	68.8	*	28	FEB	1915	74	45.	11.6	70.7
28	FEB	0300	9	0.	.7	68.2	*	28	FEB	1115	42	7.	2.2	68.8	*	28	FEB	1930	75	45.	11.4	70.7
28	FEB	0315	10	0.	.8	68.3	*	28	FEB	1130	43	8.	2.3	68.8	*	28	FEB	1945	76	44.	11.2	70.7
28	FEB	0330	11	0.	.9	68.3	*	28	FEB	1145	44	8.	2.4	68.8	*	28	FEB	2000	77	44.	10.9	70.6
28	FEB	0345	12	0.	1.0	68.4	*	28	FEB	1200	45	9.	2.5	68.9	*	28	FEB	2015	78	44.	10.7	70.6
28	FEB	0400	13	0.	1.0	68.4	*	28	FEB	1215	46	10.	2.7	68.9	*	28	FEB	2030	79	43.	10.4	70.5
28	FEB	0415	14	0.	1.1	68.5	*	28	FEB	1230	47	12.	2.9	68.9	*	28	FEB	2045	80	43.	10.1	70.5
28	FEB	0430	15	0.	1.2	68.5	*	28	FEB	1245	48	13.	3.1	69.0	*	28	FEB	2100	81	42.	9.9	70.5
28	FEB	0445	16	1.	1.3	68.5	*	28	FEB	1300	49	16.	3.5	69.1	*	28	FEB	2115	82	42.	9.6	70.4
28	FEB	0500	17	1.	1.4	68.5	*	28	FEB	1315	50	21.	4.2	69.3	*	28	FEB	2130	83	41.	9.3	70.4
28	FEB	0515	18	2.	1.4	68.6	*	28	FEB	1330	51	31.	5.7	69.7	*	28	FEB	2145	84	41.	9.1	70.3
28	FEB	0530	19	2.	1.5	68.6	*	28	FEB	1345	52	38.	7.4	70.0	*	28	FEB	2200	85	40.	8.8	70.3
28	FEB	0545	20	2.	1.5	68.6	*	28	FEB	1400	53	41.	9.1	70.3	*	28	FEB	2215	86	40.	8.6	70.2
28	FEB	0600	21	3.	1.5	68.6	*	28	FEB	1415	54	43.	10.5	70.6	*	28	FEB	2230	87	39.	8.3	70.2
28	FEB	0615	22	3.	1.6	68.6	*	28	FEB	1430	55	45.	11.6	70.7	*	28	FEB	2245	88	39.	8.0	70.1
28	FEB	0630	23	3.	1.6	68.6	*	28	FEB	1445	56	47.	12.5	70.9	*	28	FEB	2300	89	38.	7.8	70.1
28	FEB	0645	24	3.	1.6	68.6	*	28	FEB	1500	57	48.	13.0	71.0	*	28	FEB	2315	90	38.	7.5	70.1
[illegible]	FEB	0700	25	3.	1.6	68.6	*	28	FEB	1515	58	48.	13.4	71.0	*	28	FEB	2330	91	37.	7.3	70.0
[illegible]	FEB	0715	26	3.	1.7	68.6	*	28	FEB	1530	59	48.	13.7	71.1	*	28	FEB	2345	92	37.	7.0	70.0
[illegible]	FEB	0730	27	3.	1.7	68.6	*	28	FEB	1545	60	49.	13.8	71.1	*	1	MAR	0000	93	36.	6.8	69.9
28	FEB	0745	28	4.	1.7	68.6	*	28	FEB	1600	61	49.	13.8	71.1	*	1	MAR	0015	94	36.	6.5	69.9
28	FEB	0800	29	4.	1.7	68.6	*	28	FEB	1615	62	49.	13.8	71.1	*	1	MAR	0030	95	35.	6.3	69.9
28	FEB	0815	30	4.	1.7	68.6	*	28	FEB	1630	63	49.	13.7	71.1	*	1	MAR	0045	96	34.	6.1	69.8

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 28 FEB 0830  31       4.      1.7    68.6 * 28 FEB 1645  64      48.     13.6    71.1 *  1 MAR 0100  97      32.      5.9    69.7
 28 FEB 0845  32       4.      1.7    68.6 * 28 FEB 1700  65      48.     13.4    71.0 *
 28 FEB 0900  33       4.      1.7    68.7 * 28 FEB 1715  66      48.     13.2    71.0 *
                                           *                                           *
*****************************************************************************************************************************

 PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+  (CFS)       (HR)
                         (CFS)
+     49.     15.00                  47.         23.         23.          23.
                       (INCHES)    1.661       3.241       3.241        3.241
                        (AC-FT)     23.         45.         45.          45.

 PEAK STORAGE   TIME                         MAXIMUM AVERAGE STORAGE
                                     6-HR       24-HR       72-HR     24.00-HR
+  (AC-FT)      (HR)
      14.     15.00                  13.          6.          6.           6.

 PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                     6-HR       24-HR       72-HR     24.00-HR
+  (FEET)      (HR)
    71.11     15.00                70.91       69.52       69.52        69.52

                       CUMULATIVE AREA =     .26 SQ MI


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


           **************
           *            *
  56 KK    *       5E   *
           *            *
           **************

  57 KO         OUTPUT CONTROL VARIABLES
                      IPRNT           1  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                               SCS RUNOFF CALCULATION TOWARD Rte 93

              SUBBASIN RUNOFF DATA

  59 BA         SUBBASIN CHARACTERISTICS
                      TAREA         .07  SUBBASIN AREA

                PRECIPITATION DATA

  60 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                  .60    1.30    2.40    3.00    3.30    4.20    5.20    6.00     .00     .00     .00     .00

                                                  STORM AREA =     .07

  61 LS         SCS LOSS RATE
                      STRTL         .67  INITIAL ABSTRACTION
                     CRVNBR       75.00  CURVE NUMBER
                      RTIMP         .00  PERCENT IMPERVIOUS AREA

  62 UD         SCS DIMENSIONLESS UNITGRAPH
                       TLAG         .39  LAG
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WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

UNIT HYDROGRAPH
10 END-OF-PERIOD ORDINATES

28. 62. 45. 19. 9. 4. 2. 1. 0. 0.

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HYDROGRAPH AT STATION 5E

****

DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
28 FEB 0100	1	.00	.00	.00	0.	28 FEB 1315	50	1.30	.42	.87	50.
28 FEB 0115	2	.01	.01	.00	0.	28 FEB 1330	51	.31	.08	.23	77.
28 FEB 0130	3	.01	.01	.00	0.	28 FEB 1345	52	.18	.04	.14	65.
28 FEB 0145	4	.01	.01	.00	0.	28 FEB 1400	53	.14	.03	.11	42.
28 FEB 0200	5	.01	.01	.00	0.	28 FEB 1415	54	.08	.02	.07	28.
28 FEB 0215	6	.01	.01	.00	0.	28 FEB 1430	55	.07	.02	.06	19.
28 FEB 0230	7	.01	.01	.00	0.	28 FEB 1445	56	.09	.02	.07	15.
28 FEB 0245	8	.01	.01	.00	0.	28 FEB 1500	57	.08	.02	.07	13.
28 FEB 0300	9	.01	.01	.00	0.	28 FEB 1515	58	.08	.02	.06	12.
28 FEB 0315	10	.01	.01	.00	0.	28 FEB 1530	59	.07	.01	.06	11.
28 FEB 0330	11	.02	.02	.00	0.	28 FEB 1545	60	.07	.01	.05	10.
28 FEB 0345	12	.02	.02	.00	0.	28 FEB 1600	61	.06	.01	.05	10.
28 FEB 0400	13	.02	.02	.00	0.	28 FEB 1615	62	.05	.01	.04	9.
28 FEB 0415	14	.02	.02	.00	0.	28 FEB 1630	63	.05	.01	.04	8.
28 FEB 0430	15	.02	.02	.00	0.	28 FEB 1645	64	.05	.01	.04	8.
28 FEB 0445	16	.02	.02	.00	0.	28 FEB 1700	65	.05	.01	.04	7.
28 FEB 0500	17	.02	.02	.00	0.	28 FEB 1715	66	.04	.01	.04	7.
28 FEB 0515	18	.02	.02	.00	0.	28 FEB 1730	67	.04	.01	.03	6.
28 FEB 0530	19	.02	.02	.00	0.	28 FEB 1745	68	.04	.01	.03	6.
28 FEB 0545	20	.02	.02	.00	0.	28 FEB 1800	69	.04	.01	.03	6.
28 FEB 0600	21	.02	.02	.00	0.	28 FEB 1815	70	.04	.01	.03	6.
28 FEB 0615	22	.02	.02	.00	0.	28 FEB 1830	71	.04	.01	.03	5.
28 FEB 0630	23	.02	.02	.00	0.	28 FEB 1845	72	.04	.01	.03	5.
28 FEB 0645	24	.02	.02	.00	0.	28 FEB 1900	73	.03	.01	.03	5.
28 FEB 0700	25	.02	.02	.00	0.	28 FEB 1915	74	.02	.00	.02	5.
28 FEB 0715	26	.03	.03	.00	0.	28 FEB 1930	75	.02	.00	.02	4.
28 FEB 0730	27	.03	.03	.00	0.	28 FEB 1945	76	.02	.00	.02	3.
28 FEB 0745	28	.04	.04	.00	0.	28 FEB 2000	77	.02	.00	.02	3.
28 FEB 0800	29	.04	.04	.00	0.	28 FEB 2015	78	.02	.00	.02	3.
28 FEB 0815	30	.04	.04	.00	0.	28 FEB 2030	79	.02	.00	.02	3.
28 FEB 0830	31	.04	.04	.00	0.	28 FEB 2045	80	.02	.00	.02	3.
28 FEB 0845	32	.04	.04	.00	0.	28 FEB 2100	81	.02	.00	.02	3.
28 FEB 0900	33	.04	.04	.00	0.	28 FEB 2115	82	.02	.00	.01	3.
28 FEB 0915	34	.04	.04	.00	0.	28 FEB 2130	83	.02	.00	.01	3.
28 FEB 0930	35	.05	.04	.00	0.	28 FEB 2145	84	.02	.00	.01	3.
28 FEB 0945	36	.05	.04	.00	0.	28 FEB 2200	85	.02	.00	.01	2.
28 FEB 1000	37	.05	.05	.01	1.	28 FEB 2215	86	.02	.00	.01	2.
28 FEB 1015	38	.06	.05	.01	1.	28 FEB 2230	87	.02	.00	.01	2.
28 FEB 1030	39	.07	.05	.01	1.	28 FEB 2245	88	.02	.00	.01	2.
28 FEB 1045	40	.07	.06	.01	2.	28 FEB 2300	89	.02	.00	.01	2.
28 FEB 1100	41	.07	.06	.02	2.	28 FEB 2315	90	.01	.00	.01	2.
28 FEB 1115	42	.08	.06	.02	3.	28 FEB 2330	91	.01	.00	.01	2.
28 FEB 1130	43	.09	.06	.03	3.	28 FEB 2345	92	.01	.00	.01	2.
28 FEB 1145	44	.07	.05	.02	4.	1 MAR 0000	93	.01	.00	.01	2.
28 FEB 1200	45	.08	.05	.03	4.	1 MAR 0015	94	.01	.00	.01	2.
28 FEB 1215	46	.13	.08	.05	5.	1 MAR 0030	95	.01	.00	.01	2.
28 FEB 1230	47	.16	.09	.06	7.	1 MAR 0045	96	.01	.00	.01	2.
28 FEB 1245	48	.25	.13	.12	10.	1 MAR 0100	97	.01	.00	.01	2.
28 FEB 1300	49	.54	.25	.29	20.						

****

TOTAL RAINFALL = 6.00, TOTAL LOSS = 2.72, TOTAL EXCESS = 3.28

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.00-HR
		(CFS)				
77.	12.50		19.	6.	6.	6.
		(INCHES)	2.650	3.257	3.257	3.257
		(AC-FT)	9.	11.	11.	11.

CUMULATIVE AREA = .07 SQ MI

1

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	SUB5A	39.	12.25	8.	2.	2.	.02		
HYDROGRAPH AT	SUB5B	183.	12.50	41.	13.	13.	.11		
HYDROGRAPH AT	SUB5C	108.	12.25	17.	5.	5.	.04		
3 COMBINED AT	5ABC	329.	12.25	66.	21.	21.	.17		
ROUTED TO	5SWMP	59.	13.25	37.	18.	18.	.17		
								74.50	13.25
HYDROGRAPH AT	SUB5D	89.	12.50	25.	8.	8.	.09		
2 COMBINED AT	5CD	122.	12.75	61.	26.	26.	.26		
ROUTED TO	5DSWP	49.	15.00	47.	23.	23.	.26		
								71.11	15.00
HYDROGRAPH AT	5E	77.	12.50	19.	6.	6.	.07		

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

HEC-1

100 Year, 24 Hour Storm

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1                                                  ****
                    FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985
          U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616
                                                  ****



          THIS HEC-1 VERSION CONTAINS ALL OPTIONS EXCEPT ECONOMICS, AND THE NUMBER OF PLANS ARE REDUCED TO 3


1                                          HEC-1 INPUT                                                  PAGE  1

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

  1           ID        SHEEHY INDUSTRIAL PARK SUBWATERSHEDS
  2           ID        DETAILED STORAGE AND STREAM NETWORK
  3           ID        EXISTING CONDITIONS - 100 YR, 24 HR STORM
              *DIAGRAM
  4           IT      15 28FEB91     100      97
  5           IO       5

  6           KK   SUB5A
  7           KO       4
  8           KM        SCS RUNOFF CALCULATION
  9           BA   0.019
 10           PH              0     0.6     1.3     2.5     3.3     3.7     4.6     5.6     6.6
 11           LS             90
 12           UD    0.20

 13           KK   SUB5B
 14           KO       4
 15           KM        SCS RUNOFF CALCULATION
 16           BA   0.113
 17           PH              0     0.6     1.3     2.5     3.3     3.7     4.6     5.6     6.6
 18           LS             85
 19           UD    0.25

 20           KK   SUB5C
 21           KO       4
 22           KM        SCS RUNOFF CALCULATION
 23           BA   0.042
 24           PH              0     0.6     1.3     2.5     3.3     3.7     4.6     5.6     6.6
 25           LS             90
 26           UD    0.11

 27           KK    5ABC
 28           KM        COMBINE HYDROGRAPHS FOR 5A, 5B & 5C
 29           HC       3

 30           KK   5SWMP
 31           KO       1
 32           KM        STORAGE ROUTING THROUGH NORTH POND
 33           RS       1    ELEV      70
 34           SA    1.43    4.32    5.18    5.31
 35           SE      70    70.1      76      77
 36           SL    69.9    3.14     0.6     0.5
 37           SS      74      25     3.0     1.5

 38           KK   SUB5D
 39           KO       4
 40           KM        SCS RUNOFF CALCULATION
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          41          BA   0.088
          42          PH              0     0.6     1.3     2.5     3.3     3.7     4.6     5.6     6.6
          43          LS             75
          44          UD    0.48
1                                                  HEC-1 INPUT                                                  PAGE  2

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


          45          KK     5CD
          46          KM        COMBINE HYDROGRAPHS FOR 5A TO 5D
          47          HC       2

          48          KK   5DSWP
          49          KO       1
          50          KM        STORAGE ROUTING THROUGH SOUTH POND
          51          RS       1    ELEV    67.5
          52          SA       0    1.45    5.97    6.22    6.47
          53          SE    67.5      68      70      72      74
          54          SL    68.5    6.28     0.6     0.5
          55          SS    72.6      25       0     1.5

          56          KK      5E
          57          KO       1
          58          KM        SCS RUNOFF CALCULATION TOWARD Rte 93
          59          BA   0.066
          60          PH              0     0.6     1.3     2.5     3.3     3.7     4.6     5.6     6.6
          61          LS             75
          62          UD    0.39
          63          ZZ
1
              SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

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

     6       SUB5A
                .
                .
    13          .       SUB5B
                .           .
                .           .
    20          .           .       SUB5C
                .           .           .
                .           .           .
    27        5ABC.......................
                V
                V
    30       5SWMP
                .
                .
    38          .       SUB5D
                .           .
                .           .
    45         5CD............
                V
                V
    48       5DSWP
                .
                .
    56          .          5E

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1                                                                  ****
                                  FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985
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U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616
****

SHEEHY INDUSTRIAL PARK SUBWATERSHEDS
DETAILED STORAGE AND STREAM NETWORK
EXISTING CONDITIONS - 100 YR, 24 HR STORM

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

    IT        HYDROGRAPH TIME DATA
                     NMIN         15  MINUTES IN COMPUTATION INTERVAL
                    IDATE     28FEB91  STARTING DATE
                    ITIME       0100  STARTING TIME
                       NQ         97  NUMBER OF HYDROGRAPH ORDINATES
                   NDDATE      1MAR91  ENDING DATE
                   NDTIME       0100  ENDING TIME

              COMPUTATION INTERVAL     .25 HOURS
                   TOTAL TIME BASE   24.00 HOURS

        ENGLISH UNITS
```

*** ***

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          **************
          *            *
  6 KK    *     SUB5A  *
          *            *
          **************

  7 KO        OUTPUT CONTROL VARIABLES
                    IPRNT          4  PRINT CONTROL
                    IPLOT          0  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE
                            SCS RUNOFF CALCULATION

            SUBBASIN RUNOFF DATA

  9 BA        SUBBASIN CHARACTERISTICS
                    TAREA        .02  SUBBASIN AREA

              PRECIPITATION DATA

 10 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
              ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
              5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                .60    1.30    2.50    3.30    3.70    4.60    5.60    6.60     .00     .00     .00     .00

                                                   STORM AREA =     .02

 11 LS        SCS LOSS RATE
                    STRTL        .22  INITIAL ABSTRACTION
                   CRVNBR      90.00  CURVE NUMBER
                    RTIMP        .00  PERCENT IMPERVIOUS AREA

 12 UD        SCS DIMENSIONLESS UNITGRAPH
                     TLAG        .20  LAG
```

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                                                  ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                  UNIT HYDROGRAPH
                                              6 END-OF-PERIOD ORDINATES
              25.       18.        5.        1.        0.        0.


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


          **************
          *            *
  13 KK   *    SUB5B   *
          *            *
          **************

  14 KO         OUTPUT CONTROL VARIABLES
                      IPRNT          4  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE
                               SCS RUNOFF CALCULATION

             SUBBASIN RUNOFF DATA

  16 BA         SUBBASIN CHARACTERISTICS
                      TAREA        .11  SUBBASIN AREA

                PRECIPITATION DATA

  17 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                  .60    1.30    2.50    3.30    3.70    4.60    5.60    6.60     .00     .00     .00     .00

                                                STORM AREA =     .11

  18 LS         SCS LOSS RATE
                      STRTL        .35  INITIAL ABSTRACTION
                     CRVNBR      85.00  CURVE NUMBER
                      RTIMP        .00  PERCENT IMPERVIOUS AREA

  19 UD         SCS DIMENSIONLESS UNITGRAPH
                       TLAG        .25  LAG

                                                  ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                  UNIT HYDROGRAPH
                                              7 END-OF-PERIOD ORDINATES
             110.      120.       40.       14.        5.        2.        0.


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


          **************
          *            *
  20 KK   *    SUB5C   *
          *            *
          **************
```

```
 21 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           4  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                               SCS RUNOFF CALCULATION

             SUBBASIN RUNOFF DATA

 23 BA          SUBBASIN CHARACTERISTICS
                      TAREA         .04  SUBBASIN AREA

                PRECIPITATION DATA

 24 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                  .60    1.30    2.50    3.30    3.70    4.60    5.60    6.60     .00     .00     .00     .00

                                                   STORM AREA =     .04

 25 LS          SCS LOSS RATE
                      STRTL         .22  INITIAL ABSTRACTION
                     CRVNBR       90.00  CURVE NUMBER
                      RTIMP         .00  PERCENT IMPERVIOUS AREA

 26 UD          SCS DIMENSIONLESS UNITGRAPH
                       TLAG         .11  LAG

                                                          ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                       UNIT HYDROGRAPH
                                                   5 END-OF-PERIOD ORDINATES
             81.       23.        4.        1.        0.


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


          **************
          *            *
 30 KK    *     5SWMP  *
          *            *
          **************

 31 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           1  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                               STORAGE ROUTING THROUGH NORTH POND

             HYDROGRAPH ROUTING DATA

 33 RS          STORAGE ROUTING
                      NSTPS           1  NUMBER OF SUBREACHES
                       ITYP        ELEV  TYPE OF INITIAL CONDITION
                     RSVRIC       70.00  INITIAL CONDITION
                          X         .00 WORKING R AND D COEFFICIENT

  + SA               AREA         1.4       4.3       5.2       5.3

 35 SE          ELEVATION       70.00     70.10     76.00     77.00
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```
36 SL          LOW-LEVEL OUTLET
                    ELEVL       69.90  ELEVATION AT CENTER OF OUTLET
                    CAREA        3.14  CROSS-SECTIONAL AREA
                     COQL         .60  COEFFICIENT
                     EXPL         .50  EXPONENT OF HEAD

37 SS          SPILLWAY
                     CREL       74.00  SPILLWAY CREST ELEVATION
                    SPWID       25.00  SPILLWAY WIDTH
                     COQW        3.00  WEIR COEFFICIENT
                     EXPW        1.50  EXPONENT OF HEAD
```

***

COMPUTED STORAGE-ELEVATION DATA

STORAGE	.00	.27	28.26	33.51
ELEVATION	70.00	70.10	76.00	77.00

COMPUTED OUTFLOW-ELEVATION DATA

OUTFLOW	.00	5.27	5.88	6.65	7.65	8.99	10.92	13.90	19.12	30.59
ELEVATION	70.00	70.02	70.05	70.09	70.16	70.25	70.42	70.75	71.50	74.00
OUTFLOW	31.38	35.00	43.67	59.59	84.94	121.92	172.73	239.54	324.56	429.97
ELEVATION	74.04	74.14	74.29	74.51	74.78	75.11	75.49	75.94	76.44	77.00

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	.04	.11	.25	.52	.94	1.68	3.10	6.46	18.20
OUTFLOW	4.78	5.27	5.88	6.65	7.65	8.99	10.92	13.90	19.12	30.59
ELEVATION	70.00	70.02	70.05	70.09	70.16	70.25	70.42	70.75	71.50	74.00
STORAGE	18.40	18.88	19.65	20.70	22.05	23.70	25.66	27.94	28.26	30.55
OUTFLOW	31.38	35.00	43.67	59.59	84.94	121.92	172.73	239.54	249.45	324.56
ELEVATION	74.04	74.14	74.29	74.51	74.78	75.11	75.49	75.94	76.00	76.44
STORAGE	33.51									
OUTFLOW	429.97									
ELEVATION	77.00									

****

HYDROGRAPH AT STATION 5SWMP

****

DA MON HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA MON HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA MON HRMN	ORD	OUTFLOW	STORAGE	STAGE
28 FEB 0100	1	5.	.0	70.0	*	28 FEB 0915	34	6.	.1	70.1	*	28 FEB 1730	67	30.	17.9	73.9
28 FEB 0115	2	4.	.0	70.0	*	28 FEB 0930	35	6.	.2	70.1	*	28 FEB 1745	68	30.	17.7	73.9
28 FEB 0130	3	4.	.0	70.0	*	28 FEB 0945	36	7.	.2	70.1	*	28 FEB 1800	69	30.	17.4	73.8
28 FEB 0145	4	4.	.0	70.0	*	28 FEB 1000	37	7.	.3	70.1	*	28 FEB 1815	70	30.	17.2	73.8
28 FEB 0200	5	4.	.0	70.0	*	28 FEB 1015	38	7.	.4	70.1	*	28 FEB 1830	71	29.	16.9	73.7
28 FEB 0215	6	4.	.0	70.0	*	28 FEB 1030	39	8.	.6	70.2	*	28 FEB 1845	72	29.	16.6	73.7
28 FEB 0230	7	4.	.0	70.0	*	28 FEB 1045	40	8.	.7	70.2	*	28 FEB 1900	73	29.	16.3	73.6
28 FEB 0245	8	4.	.0	70.0	*	28 FEB 1100	41	9.	.9	70.2	*	28 FEB 1915	74	28.	16.0	73.5
28 FEB 0300	9	4.	.0	70.0	*	28 FEB 1115	42	10.	1.1	70.3	*	28 FEB 1930	75	28.	15.7	73.5
28 FEB 0315	10	4.	.0	70.0	*	28 FEB 1130	43	10.	1.4	70.4	*	28 FEB 1945	76	28.	15.4	7
28 FEB 0330	11	4.	.0	70.0	*	28 FEB 1145	44	11.	1.7	70.4	*	28 FEB 2000	77	27.	15.0	73
28 FEB 0345	12	4.	.0	70.0	*	28 FEB 1200	45	12.	2.1	70.5	*	28 FEB 2015	78	27.	14.7	73.3
28 FEB 0400	13	4.	.0	70.0	*	28 FEB 1215	46	13.	2.6	70.6	*	28 FEB 2030	79	27.	14.3	73.2
28 FEB 0415	14	4.	.0	70.0	*	28 FEB 1230	47	14.	3.3	70.8	*	28 FEB 2045	80	26.	14.0	73.1
28 FEB 0430	15	4.	.0	70.0	*	28 FEB 1245	48	16.	4.5	71.1	*	28 FEB 2100	81	26.	13.7	73.0
28 FEB 0445	16	4.	.0	70.0	*	28 FEB 1300	49	19.	6.5	71.5	*	28 FEB 2115	82	26.	13.3	73.0

28 FEB 0500	17	4.	.0	70.0	*	28 FEB 1315	50	24.	11.2	72.5	*	28 FEB 2130	83	26.	13.0	72.9
28 FEB 0515	18	4.	.0	70.0	*	28 FEB 1330	51	30.	17.1	73.8	*	28 FEB 2145	84	25.	12.7	72.8
28 FEB 0530	19	4.	.0	70.0	*	28 FEB 1345	52	60.	20.7	74.5	*	28 FEB 2200	85	25.	12.3	72.8
28 FEB 0545	20	4.	.0	70.0	*	28 FEB 1400	53	85.	22.0	74.8	*	28 FEB 2215	86	25.	12.0	72.7
FEB 0600	21	4.	.0	70.0	*	28 FEB 1415	54	87.	22.2	74.8	*	28 FEB 2230	87	24.	11.7	72.6
FEB 0615	22	4.	.0	70.0	*	28 FEB 1430	55	79.	21.7	74.7	*	28 FEB 2245	88	24.	11.4	72.5
28 FEB 0630	23	4.	.0	70.0	*	28 FEB 1445	56	69.	21.2	74.6	*	28 FEB 2300	89	24.	11.1	72.5
28 FEB 0645	24	4.	.0	70.0	*	28 FEB 1500	57	60.	20.7	74.5	*	28 FEB 2315	90	23.	10.7	72.4
28 FEB 0700	25	4.	.0	70.0	*	28 FEB 1515	58	54.	20.3	74.4	*	28 FEB 2330	91	23.	10.4	72.3
28 FEB 0715	26	4.	.0	70.0	*	28 FEB 1530	59	48.	20.0	74.4	*	28 FEB 2345	92	23.	10.1	72.3
28 FEB 0730	27	4.	.0	70.0	*	28 FEB 1545	60	44.	19.7	74.3	*	1 MAR 0000	93	22.	9.8	72.2
28 FEB 0745	28	4.	.0	70.0	*	28 FEB 1600	61	41.	19.4	74.2	*	1 MAR 0015	94	22.	9.5	72.2
28 FEB 0800	29	4.	.0	70.0	*	28 FEB 1615	62	38.	19.1	74.2	*	1 MAR 0030	95	22.	9.2	72.1
28 FEB 0815	30	4.	.0	70.0	*	28 FEB 1630	63	35.	18.9	74.1	*	1 MAR 0045	96	22.	8.9	72.0
28 FEB 0830	31	5.	.0	70.0	*	28 FEB 1645	64	33.	18.6	74.1	*	1 MAR 0100	97	21.	8.6	72.0
28 FEB 0845	32	5.	.0	70.0	*	28 FEB 1700	65	31.	18.4	74.0	*					
28 FEB 0900	33	6.	.1	70.0	*	28 FEB 1715	66	31.	18.2	74.0	*					
					*						*					

****

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 87.	13.25		44.	20.	20.	20.
		(INCHES)	2.358	4.322	4.322	4.322
		(AC-FT)	22.	40.	40.	40.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.00-HR
+ (AC-FT)	(HR)				
22.	13.25	19.	8.	8.	8.

.K STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.00-HR
+ (FEET)	(HR)				
74.80	13.25	74.14	71.77	71.77	71.77

CUMULATIVE AREA = .17 SQ MI

*** ***

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              **************
              *            *
  38 KK       *     SUB5D  *
              *            *
              **************

  39 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          4  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE
                               SCS RUNOFF CALCULATION          ;

               SUBBASIN RUNOFF DATA

     BA        SUBBASIN CHARACTERISTICS
                      TAREA        .09  SUBBASIN AREA

               PRECIPITATION DATA

  42 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
```

```
                ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                  .60    1.30    2.50    3.30    3.70    4.60    5.60    6.60     .00     .00     .00     .00

                                                STORM AREA =     .09

 43 LS          SCS LOSS RATE
                      STRTL         .67  INITIAL ABSTRACTION
                     CRVNBR       75.00  CURVE NUMBER
                      RTIMP         .00  PERCENT IMPERVIOUS AREA

 44 UD          SCS DIMENSIONLESS UNITGRAPH
                       TLAG         .48  LAG

                                                          ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                     UNIT HYDROGRAPH
                                                 12 END-OF-PERIOD ORDINATES
              23.      67.      64.      36.      18.       9.       5.       2.       1.       1.
               0.       0.


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


          **************
          *            *
 48 KK    *     5DSWP  *
          *            *
          **************

 49 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           1  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                               STORAGE ROUTING THROUGH SOUTH POND

             HYDROGRAPH ROUTING DATA

 51 RS          STORAGE ROUTING
                      NSTPS           1  NUMBER OF SUBREACHES
                       ITYP        ELEV  TYPE OF INITIAL CONDITION
                     RSVRIC       67.50  INITIAL CONDITION
                          X         .00 WORKING R AND D COEFFICIENT

 52 SA                AREA          .0       1.5       6.0       6.2       6.5

 53 SE          ELEVATION       67.50     68.00     70.00     72.00     74.00

 54 SL          LOW-LEVEL OUTLET
                      ELEVL       68.50  ELEVATION AT CENTER OF OUTLET
                      CAREA        6.28  CROSS-SECTIONAL AREA
                       COQL         .60  COEFFICIENT
                       EXPL         .50  EXPONENT OF HEAD

 55 SS          SPILLWAY
                       CREL       72.60  SPILLWAY CREST ELEVATION
                      SPWID       25.00  SPILLWAY WIDTH
                       COQW        3.10  WEIR COEFFICIENT
                       EXPW        1.50  EXPONENT OF HEAD

                                                          ***
```

COMPUTED STORAGE-ELEVATION DATA

STORAGE	.00	.24	7.15	19.34	32.03
ELEVATION	67.50	68.00	70.00	72.00	74.00

COMPUTED OUTFLOW-ELEVATION DATA

OUTFLOW	.00	.00	35.06	37.33	39.93	42.91	46.37	50.44	55.30	61.19
ELEVATION	67.50	68.50	69.85	70.03	70.25	70.52	70.85	71.29	71.85	72.60
OUTFLOW	61.84	63.66	67.33	73.50	82.83	95.95	113.51	136.15	164.52	199.25
ELEVATION	72.63	72.68	72.76	72.86	72.99	73.14	73.32	73.52	73.75	74.00

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	.24	1.17	6.26	7.15	7.31	8.62	10.25	12.30	14.93
OUTFLOW	.00	.00	.00	35.06	37.01	37.33	39.93	42.91	46.37	50.44
ELEVATION	67.50	68.00	68.50	69.85	70.00	70.03	70.25	70.52	70.85	71.29
STORAGE	18.40	19.34	23.09	23.29	23.62	24.10	24.75	25.55	26.52	27.65
OUTFLOW	55.30	56.54	61.19	61.84	63.66	67.33	73.50	82.83	95.95	113.51
ELEVATION	71.85	72.00	72.60	72.63	72.68	72.76	72.86	72.99	73.14	73.32
STORAGE	28.94	30.40	32.03							
OUTFLOW	136.15	164.52	199.25							
ELEVATION	73.52	73.75	74.00							

****

HYDROGRAPH AT STATION 5DSWP

****

MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
28	FEB	0100	1	0.	.0	67.5	*	28	FEB	0915	34	4.	1.8	68.7	*	28	FEB	1730	67	53.	16.7	71.6
28	FEB	0115	2	0.	.1	67.7	*	28	FEB	0930	35	5.	1.9	68.7	*	28	FEB	1745	68	53.	16.4	71.5
28	FEB	0130	3	0.	.2	67.9	*	28	FEB	0945	36	5.	1.9	68.7	*	28	FEB	1800	69	52.	16.1	71.5
28	FEB	0145	4	0.	.3	68.0	*	28	FEB	1000	37	5.	2.0	68.7	*	28	FEB	1815	70	52.	15.8	71.4
28	FEB	0200	5	0.	.4	68.1	*	28	FEB	1015	38	6.	2.0	68.7	*	28	FEB	1830	71	51.	15.5	71.4
28	FEB	0215	6	0.	.4	68.1	*	28	FEB	1030	39	6.	2.1	68.7	*	28	FEB	1845	72	51.	15.2	71.3
28	FEB	0230	7	0.	.5	68.2	*	28	FEB	1045	40	7.	2.2	68.8	*	28	FEB	1900	73	50.	14.9	71.3
28	FEB	0245	8	0.	.6	68.2	*	28	FEB	1100	41	7.	2.3	68.8	*	28	FEB	1915	74	50.	14.6	71.2
28	FEB	0300	9	0.	.7	68.2	*	28	FEB	1115	42	8.	2.4	68.8	*	28	FEB	1930	75	50.	14.3	71.2
28	FEB	0315	10	0.	.8	68.3	*	28	FEB	1130	43	9.	2.5	68.8	*	28	FEB	1945	76	49.	14.0	71.1
28	FEB	0330	11	0.	.9	68.3	*	28	FEB	1145	44	10.	2.6	68.9	*	28	FEB	2000	77	49.	13.7	71.1
28	FEB	0345	12	0.	1.0	68.4	*	28	FEB	1200	45	11.	2.7	68.9	*	28	FEB	2015	78	48.	13.4	71.0
28	FEB	0400	13	0.	1.0	68.4	*	28	FEB	1215	46	12.	2.9	69.0	*	28	FEB	2030	79	48.	13.0	71.0
28	FEB	0415	14	0.	1.1	68.5	*	28	FEB	1230	47	13.	3.1	69.0	*	28	FEB	2045	80	47.	12.7	70.9
28	FEB	0430	15	0.	1.2	68.5	*	28	FEB	1245	48	16.	3.4	69.1	*	28	FEB	2100	81	47.	12.4	70.9
28	FEB	0445	16	1.	1.3	68.5	*	28	FEB	1300	49	19.	3.9	69.2	*	28	FEB	2115	82	46.	12.1	70.8
28	FEB	0500	17	1.	1.4	68.5	*	28	FEB	1315	50	25.	4.8	69.5	*	28	FEB	2130	83	45.	11.7	70.8
28	FEB	0515	18	2.	1.4	68.6	*	28	FEB	1330	51	35.	6.3	69.9	*	28	FEB	2145	84	45.	11.4	70.7
28	FEB	0530	19	2.	1.5	68.6	*	28	FEB	1345	52	40.	8.5	70.2	*	28	FEB	2200	85	44.	11.1	70.7
28	FEB	0545	20	2.	1.5	68.6	*	28	FEB	1400	53	44.	10.9	70.6	*	28	FEB	2215	86	44.	10.8	70.6
28	FEB	0600	21	3.	1.5	68.6	*	28	FEB	1415	54	48.	13.1	71.0	*	28	FEB	2230	87	43.	10.5	70.6
28	FEB	0615	22	3.	1.6	68.6	*	28	FEB	1430	55	50.	14.7	71.3	*	28	FEB	2245	88	43.	10.2	70.5
28	FEB	0630	23	3.	1.6	68.6	*	28	FEB	1445	56	52.	15.9	71.4	*	28	FEB	2300	89	42.	9.9	70.5
28	FEB	0645	24	3.	1.6	68.6	*	28	FEB	1500	57	53.	16.7	71.6	*	28	FEB	2315	90	42.	9.6	70.4
28	FEB	0700	25	3.	1.6	68.6	*	28	FEB	1515	58	54.	17.2	71.7	*	28	FEB	2330	91	41.	9.3	70.4
	EB	0715	26	3.	1.7	68.6	*	28	FEB	1530	59	54.	17.6	71.7	*	28	FEB	2345	92	41.	9.0	70.3
	FEB	0730	27	3.	1.7	68.6	*	28	FEB	1545	60	54.	17.7	71.7	*	1	MAR	0000	93	40.	8.7	70.3
28	FEB	0745	28	4.	1.7	68.6	*	28	FEB	1600	61	54.	17.8	71.8	*	1	MAR	0015	94	39.	8.4	70.2
28	FEB	0800	29	4.	1.7	68.6	*	28	FEB	1615	62	54.	17.8	71.7	*	1	MAR	0030	95	39.	8.1	70.2
28	FEB	0815	30	4.	1.7	68.6	*	28	FEB	1630	63	54.	17.7	71.7	*	1	MAR	0045	96	38.	7.8	70.1

```
 28 FEB 0830  31       4.      1.7    68.6 * 28 FEB 1645  64      54.     17.5    71.7 *  1 MAR 0100  97      38.      7.6    70.1
 28 FEB 0845  32       4.      1.8    68.7 * 28 FEB 1700  65      54.     17.2    71.7 *
 28 FEB 0900  33       4.      1.8    68.7 * 28 FEB 1715  66      53.     17.0    71.6 *
                                           *                                           *
*****************************************************************************************************************************

 PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+  (CFS)       (HR)
                          (CFS)
+     54.     15.00                    52.         25.         25.          25.
                        (INCHES)     1.845       3.592       3.592        3.592
                         (AC-FT)      26.         50.         50.          50.

PEAK STORAGE   TIME                          MAXIMUM AVERAGE STORAGE
                                      6-HR       24-HR       72-HR     24.00-HR
+ (AC-FT)      (HR)
      18.     15.00                    16.          7.          7.           7.

 PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                      6-HR       24-HR       72-HR     24.00-HR
+  (FEET)      (HR)
    71.75     15.00                  71.47       69.75       69.75        69.75

                        CUMULATIVE AREA =     .26 SQ MI


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


            **************
            *            *
  56 KK     *       5E   *
            *            *
            **************

  57 KO          OUTPUT CONTROL VARIABLES
                       IPRNT           1  PRINT CONTROL
                       IPLOT           0  PLOT CONTROL
                       QSCAL          0.  HYDROGRAPH PLOT SCALE
                                SCS RUNOFF CALCULATION TOWARD Rte 93

               SUBBASIN RUNOFF DATA

  59 BA          SUBBASIN CHARACTERISTICS
                       TAREA         .07  SUBBASIN AREA

                 PRECIPITATION DATA

  60 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                 ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                 5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                   .60    1.30    2.50    3.30    3.70    4.60    5.60    6.60     .00     .00     .00     .00

                                                  STORM AREA =     .07

  61 LS          SCS LOSS RATE
                       STRTL         .67  INITIAL ABSTRACTION
                      CRVNBR       75.00  CURVE NUMBER
                       RTIMP         .00  PERCENT IMPERVIOUS AREA

  62 UD          SCS DIMENSIONLESS UNITGRAPH
                        TLAG         .39  LAG
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WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

UNIT HYDROGRAPH
10 END-OF-PERIOD ORDINATES

28. 62. 45. 19. 9. 4. 2. 1. 0. 0.

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HYDROGRAPH AT STATION 5E

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DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
28 FEB 0100	1	.00	.00	.00	0.	28 FEB 1315	50	1.30	.38	.92	56.
28 FEB 0115	2	.02	.02	.00	0.	28 FEB 1330	51	.34	.08	.26	84.
28 FEB 0130	3	.02	.02	.00	0.	28 FEB 1345	52	.23	.05	.18	71.
28 FEB 0145	4	.02	.02	.00	0.	28 FEB 1400	53	.19	.04	.15	49.
28 FEB 0200	5	.02	.02	.00	0.	28 FEB 1415	54	.11	.02	.09	35.
28 FEB 0215	6	.02	.02	.00	0.	28 FEB 1430	55	.10	.02	.08	25.
28 FEB 0230	7	.02	.02	.00	0.	28 FEB 1445	56	.09	.02	.08	19.
28 FEB 0245	8	.02	.02	.00	0.	28 FEB 1500	57	.09	.02	.07	15.
28 FEB 0300	9	.02	.02	.00	0.	28 FEB 1515	58	.08	.01	.06	13.
28 FEB 0315	10	.02	.02	.00	0.	28 FEB 1530	59	.07	.01	.06	12.
28 FEB 0330	11	.02	.02	.00	0.	28 FEB 1545	60	.07	.01	.06	11.
28 FEB 0345	12	.02	.02	.00	0.	28 FEB 1600	61	.06	.01	.05	10.
28 FEB 0400	13	.02	.02	.00	0.	28 FEB 1615	62	.05	.01	.04	9.
28 FEB 0415	14	.02	.02	.00	0.	28 FEB 1630	63	.05	.01	.04	8.
28 FEB 0430	15	.02	.02	.00	0.	28 FEB 1645	64	.05	.01	.04	8.
28 FEB 0445	16	.02	.02	.00	0.	28 FEB 1700	65	.05	.01	.04	7.
28 FEB 0500	17	.02	.02	.00	0.	28 FEB 1715	66	.04	.01	.04	7.
28 FEB 0515	18	.02	.02	.00	0.	28 FEB 1730	67	.04	.01	.04	7.
28 FEB 0530	19	.02	.02	.00	0.	28 FEB 1745	68	.04	.01	.03	6.
28 FEB 0545	20	.02	.02	.00	0.	28 FEB 1800	69	.04	.01	.03	6.
28 FEB 0600	21	.02	.02	.00	0.	28 FEB 1815	70	.04	.01	.03	6.
28 FEB 0615	22	.02	.02	.00	0.	28 FEB 1830	71	.04	.01	.03	6.
28 FEB 0630	23	.03	.03	.00	0.	28 FEB 1845	72	.03	.01	.03	5.
28 FEB 0645	24	.03	.03	.00	0.	28 FEB 1900	73	.03	.00	.03	5.
28 FEB 0700	25	.03	.03	.00	0.	28 FEB 1915	74	.03	.00	.02	5.
28 FEB 0715	26	.03	.03	.00	0.	28 FEB 1930	75	.03	.00	.02	4.
28 FEB 0730	27	.03	.03	.00	0.	28 FEB 1945	76	.03	.00	.02	4.
28 FEB 0745	28	.04	.04	.00	0.	28 FEB 2000	77	.03	.00	.02	4.
28 FEB 0800	29	.04	.04	.00	0.	28 FEB 2015	78	.02	.00	.02	4.
28 FEB 0815	30	.04	.04	.00	0.	28 FEB 2030	79	.02	.00	.02	4.
28 FEB 0830	31	.04	.04	.00	0.	28 FEB 2045	80	.02	.00	.02	4.
28 FEB 0845	32	.04	.04	.00	0.	28 FEB 2100	81	.02	.00	.02	3.
28 FEB 0900	33	.04	.04	.00	0.	28 FEB 2115	82	.02	.00	.02	3.
28 FEB 0915	34	.04	.04	.00	0.	28 FEB 2130	83	.02	.00	.02	3.
28 FEB 0930	35	.05	.04	.01	1.	28 FEB 2145	84	.02	.00	.02	3.
28 FEB 0945	36	.05	.04	.01	1.	28 FEB 2200	85	.02	.00	.02	3.
28 FEB 1000	37	.05	.04	.01	1.	28 FEB 2215	86	.02	.00	.02	3.
28 FEB 1015	38	.06	.05	.01	1.	28 FEB 2230	87	.02	.00	.02	3.
28 FEB 1030	39	.06	.05	.01	2.	28 FEB 2245	88	.02	.00	.02	3.
28 FEB 1045	40	.07	.05	.02	2.	28 FEB 2300	89	.02	.00	.02	3.
28 FEB 1100	41	.07	.05	.02	3.	28 FEB 2315	90	.02	.00	.02	3.
28 FEB 1115	42	.08	.06	.02	3.	28 FEB 2330	91	.02	.00	.02	3.
28 FEB 1130	43	.09	.06	.03	4.	28 FEB 2345	92	.02	.00	.02	3.
28 FEB 1145	44	.09	.06	.03	4.	1 MAR 0000	93	.02	.00	.02	3.
28 FEB 1200	45	.10	.06	.04	5.	1 MAR 0015	94	.02	.00	.02	3.
28 FEB 1215	46	.17	.10	.07	7.	1 MAR 0030	95	.02	.00	.01	3.
28 FEB 1230	47	.21	.11	.10	10.	1 MAR 0045	96	.02	.00	.01	3.
28 FEB 1245	48	.28	.13	.14	14.	1 MAR 0100	97	.02	.00	.01	3.
28 FEB 1300	49	.59	.24	.35	25.						

****

TOTAL RAINFALL = 6.60, TOTAL LOSS = 2.80, TOTAL EXCESS = 3.80

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.00-HR
		(CFS)				
84.	12.50		21.	7.	7.	7.
		(INCHES)	3.026	3.767	3.767	3.767
		(AC-FT)	11.	13.	13.	13.

CUMULATIVE AREA = .07 SQ MI

1

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	SUB5A	41.	12.25	8.	3.	3.	.02		
HYDROGRAPH AT	SUB5B	193.	12.25	46.	15.	15.	.11		
HYDROGRAPH AT	SUB5C	111.	12.25	19.	6.	6.	.04		
3 COMBINED AT	5ABC	344.	12.25	73.	24.	24.	.17		
ROUTED TO	5SWMP	87.	13.25	44.	20.	20.	.17		
								74.80	13.25
HYDROGRAPH AT	SUB5D	98.	12.50	29.	9.	9.	.09		
2 COMBINED AT	5CD	159.	13.00	72.	29.	29.	.26		
ROUTED TO	5DSWP	54.	15.00	52.	25.	25.	.26		
								71.75	15.00
HYDROGRAPH AT	5E	84.	12.50	21.	7.	7.	.07		

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

APPENDIX 10-C

Analysis of Watersheds 6, 7, and 8

Subwatershed Areas

Golder Associates	SUBJECT ISRT / Woburn / Mass. Sub-subwatershed Areas in #6, #7 & #8		
	Job No. 903 6400 310	Made by RD	Date 2-25-91
	Ref. USGS Map of Reading, Ma	Checked VEET	Sheet 1 of 2
		Reviewed CRM	

Purpose: Determine area of the sub-subwatersheds in #6, #7 & #8 on attached USGS plan.

Method: Digital planimeter used to determine watershed areas.

References: USGS map of Reading, Mass. (scale 1" = 2083').

Areas:

Sub-subwatershed #	Area (ft^2)	Avg. Area (ft^2)
6A	2,690,111 2,690,111	2,690,111 (61.76 ac.)
6B	4,976,706 4,842,200	4,909,453 (112.71 ac.)
6C	6,523,520 6,523,520	6,523,520 (149.76 ac.)
7A	3,698,903 3,698,903	3,698,903 (84.92 ac.)
7B	3,228,133 3,228,133	3,228,133 (74.11 ac)
7C	1,479,561 1,479,561	1,479,561 (33.97 ac.)
7D	2,891,870 2,891,870	2,891,870 (66.39 ac.)
7E	1,277,803 1,277,803	1,277,803 (29.33 ac)

Golder Associates

SUBJECT Sub-subwatershed Areas in #6, #7, #8		
Job No. 903 6404 310	Made by RJ	Date 2-25-91
Ref. USGS map	Checked VEE7	Sheet 2 of 2
	Reviewed CRM	

Sub-subwatershed #	Area (Ft^2)	Avg. Area (Ft^2)
7F	5,850,992 5,649,223	5,750,108 (132.00 ac.)
7G	1,748,572 1,748,572	1,748,572 (40.14 ac.)
7H	5,178,464 5,178,464	5,178,464 (118.99 ac.)
8A	2,152,089 2,084,836	2,118,463 (48.63 ac.)
8B	9,146,378 9,348,136	9,247,257 (212.29 ac)
8C	3,295,386 3,160,881	3,228,134 (74.11 ac.)
6D	11,701,983 11,769,236	11,735,610 (269.41 ac.)
Total		65,705,962 (1508 ac.)
Total (planimeter all of 6,7 & 8 together)		65,638,712 (1507 ac.)

Curve Numbers

Golder Associates	SUBJECT CN calcs - Exist Cond. - Entire Drainage Area		
	Job No. 903-6400 Ref. ISRT	Made by VEE. Checked CRCR Reviewed	Date 12-14-90 Sheet 1 of 3

Objective: To calculate the weighted CN number for each of subwatersheds 6, 7 and 8.

Method: For each subwatershed, determine the percentage of each hydrologic soil type (A, B, C, D) that exists. Within each soil type, determine the percentage and accompanying CN for each land use. Calculate the weighted CN for each soil type by summing the multiplication of the land use CN by the percentage of land use and divide by 100 $\left[CN_f = \frac{\Sigma(CN_{LU} \times \%LU)}{100}\right]$.

Calculate the subwatershed weighted CN by summing the multiplication of the percentage by the CN_f for each soil type and divide by 100 $\left[\text{weighted } CN = \frac{\Sigma(CN_f \times \%Area)}{100}\right]$.

Golder Associates	SUBJECT CN calcs — Exist Cond.		
	Job No. 903-6400	Made by V.E.E.	Date 12.13.90
	Ref. ISRT	Checked CRM	Sheet 2 of 3
		Reviewed SAK	

For Subwatershed 6

Soil Type	% Area	Use	CN#/use	CN_f	% Area × CN_f
A	20	Residential (R-1) (60%) Open Spc, fair cdn (40%)	46 49	47	940
B	20	Residential (R-1) (20%) Open Spc, fair cdn (80%)	65 69	68	1360
C	30	Residential (R-1) (50%) Open Spc, fair cdn (50%)	77 79	78	2340
D	30	Open Spc, fair cdn (100%)	84	84	2520
TOTAL	100	—	—	—	7160

weighted CN = $\frac{7160}{100} \approx 72$

Golder Associates	SUBJECT CN calcs - Exist Cond		
	Job No. 903-6400	Made by V.E.E.	Date 12-13-90
	Ref. ISRT	Checked CAM	Sheet 3 of 3
		Reviewed	

For Subwatershed 7

Soil Type	%Area	Use	CN#/use	CN_f	%Area x CN_f
A	0	—	—	—	0
B	50	Residential (R-3) (70%) Open Spc, fair cdn (30%)	72 69	71	3550
C	25	Residential (R-3) (100%)	81	81	2025
D	25	Residential (R-3) (30%) Open Spc, fair cdn (70%)	86 84	87	2115
TOTAL:	100				7690

weighted $CN = \frac{7690}{100} \approx 77$

For Subwatershed 8

Soil Type	%Area	Use	CN#/use	CN_f	%Area x CN_f
A	5	Open Spc, good cdn (100%)	39	39	195
B	45	Residential (R-2) (80%) Open Spc, fair cdn (20%)	70 69	70	3150
C	35	Residential (R-2) (100%)	80	80	2800
D	15	Open Spc, fair cdn (100%)	84	84	1260
TOTAL	100	—	—	—	7405

Weighted $CN = \frac{7405}{100} \approx 74$

Times of Concentration

Golder Associates	SUBJECT Tc for Reading Subwatersheds		
	Job No. 903-6400.310 Ref. ISET	Made by WET / RD Checked MRT Reviewed RR	Date 2-28-91 Sheet 1 of 35

Objective: To determine the lag time of each of the Reading subwatersheds (i.e. 6,7 & 8) affecting the site for use in HEC-1 modeling.

Methods: Using the methods and formulas outlined in Chapter 3 U.S.D.A., S.C.S. TR-55 Manual, determine the T_c (time of concentration) for each subwatershed. Multiply T_c by 0.6 to obtain the T_{lag} (lag time).

References: 1. UNITED STATES D.A, S.C.S. TR-55 is the reference being cited unless otherwise noted.

2. National Engineering Handbook, Section 4, 1972.

Golder Associates	SUBJECT Tc for Reading Subwatersheds		
	Job No. 903-6400.310 Ref. 1SRT	Made by VBE7 Checked MRT Reviewed MR	Date 2-28-91 Sheet 2 of 35

Summary of Data

Subwatershed #	Tc (hrs)	Tlag (hrs) = 0.6Tc
6A	0.85	0.51 ≈ 0.5
6B	0.30	0.18 ≈ 0.2
6C	0.49	0.29 ≈ 0.3
7A	0.48	0.29 ≈ 0.3
7B	0.87	0.52 ≈ 0.5
7C	0.41	0.25 ≈ 0.25
7D	0.64	0.38 ≈ 0.4
7E	0.23	0.14 ≈ 0.14
7F	0.49	0.29 ≈ 0.3
7G	0.51	0.31 ≈ 0.3
7H	0.51	0.31 ≈ 0.3
8A	0.39	0.23 ≈ 0.23
8B	0.68	0.41 ≈ 0.4
8C	0.43	0.26 ≈ 0.26
6D	0.84	0.51 ≈ 0.5

Golder Associates	SUBJECT T_c for Reading Subwatersheds		
	Job No. 903-6400.310 Ref. ISRT	Made by UEE7J Checked MRT Reviewed PER	Date 2-27-91 Sheet 3 of 35

For Subwatershed 6A

A) for sheet flow

$L = 300$ ft
$\Delta h = 97 - 94 = 3$ ft
$n = 0.24$ (dense grass) (Table 3-1)

$S = \frac{\Delta h}{L} = \frac{3}{300} = 0.010$ ft/ft

$T_{t_{sf}} = \frac{(0.007)(nL)^{0.8}}{P_2^{0.5}\, S^{0.4}}$ (Eqn 3-3)

where $P_2 = 3.2$ inches (figure B-3)

$T_{t_{sf}} = \frac{(0.007)[(0.24)(300)]^{0.8}}{(3.2)^{0.5}\,(0.010)^{0.4}}$

$T_{t_{sf}} = 0.76$ hr

B) for shallow conc. flow

$L = 560$ ft
$\Delta h = 94 - 88 = 6$ ft

$S = \frac{\Delta h}{L} = \frac{6\text{ ft}}{560\text{ ft}} = 0.011$ ft/ft

From figure 3-1, for unpaved, $V = 1.7$ fps.

$T_{t_{scf}} = \frac{L}{3600\,V} = \frac{(560)}{(3600)(1.7)}$

$T_{t_{scf}} = 0.09$ hr.

$T_c = T_{t_{sf}} + T_{t_{scf}} = (0.76 + 0.09)$ hr

$T_c = 0.85$ hr

Golder Associates	SUBJECT T_c for Reading Subwatersheds		
	Job No. 903-6400.310 Ref. ISRT	Made by USE 7 Checked MRT Reviewed NER	Date 2-27-91 Sheet 4 of 35

For Subwatershed 6B

A) for sheet flow

$L = 300$ ft
$\Delta h = 109 - 90 = 19$ ft
$n = 0.15$ (short grass) (Table 3-1)

$$S = \frac{\Delta h}{L} = \frac{19}{300} = 0.063\%$$

$$T_{t_{sf}} = \frac{(0.007)(nL)^{0.8}}{P_2^{0.5}\, S^{0.4}} \quad \text{(Eqn 3-3)}$$

where $P_2 = 3.2$ inches (figure B-3)

$$T_{t_{sf}} = \frac{(0.007)[(0.15)(300)]^{0.8}}{(3.2)^{0.5}\,(0.063)^{0.4}}$$

$$T_{t_{sf}} = 0.25 \text{ hr}$$

B) for shallow conc. flow

$L = 500$ ft
$\Delta h = 90 - 82 = 8$ ft

$$S = \frac{\Delta h}{L} = \frac{8}{500} = 0.016\%$$

From figure 3-1, for paved, $V = 2.6$ fps

$$T_{t_{scf}} = \frac{L}{3600V} = \frac{(500)}{(3600)(2.6)}$$

$$T_{t_{scf}} = 0.05 \text{ hr}$$

$$T_c = T_{t_{sf}} + T_{t_{scf}} = (0.25 + 0.05)\text{ hr}$$

$$T_c = 0.30 \text{ hr}$$

Golder Associates	SUBJECT T_c for Reading Subw		
	Job No. 903-6400.310 Ref. .1SRT	Made by UEZ Checked MRT Reviewed PCR	Date 2-27-91 Sheet 5 of 35

For Subwatershed 6C

A) for sheet flow $L = 300\ ft$

$\Delta h = 146 - 141 = 5\ ft$

$n = 0.15$ (short grass) (Table 3-1)

$S = \frac{\Delta h}{L} = \frac{5}{300} = 0.017\ ft/ft$

$$T_{tsf} = \frac{(0.007)(nL)^{0.8}}{P_2^{0.5}\, S^{0.4}} \quad \text{(Eqn 3-3)}$$

where $P_2 = 3.2$ inches (figure B-3)

$$T_{tsf} = \frac{(0.007)[(0.15)(300)]^{0.8}}{(3.2)^{0.5}\,(0.017)^{0.4}}$$

$T_{tsf} = 0.42$ hr.

B) for shallow conc. flow

$L = 1000\ ft$

$\Delta h = 141 - 82 = 59\ ft$

$S = \frac{\Delta h}{L} = \frac{59}{1000} = 0.059\ ft/ft$

From figure 3-1, for unpaved, $V = 4$ fps

$$T_{tscf} = \frac{L}{3600V} = \frac{(1000)}{(3600)(4)}$$

$T_{tscf} = 0.07$ hr

$$T_c = T_{tsf} + T_{tscf} = (0.42 + 0.07)\ hr$$

$T_c = 0.49$ hr.

For Subwatershed 7A:

A) for sheet flow

$L = 300$ ft
$\Delta h = 123 - 116 = 7$ ft
$n = 0.15$ (short grass) (Table 3-1)

$S = \frac{\Delta h}{L} = \frac{7 ft}{300 ft} = 0.023$ ft/ft

$$T_{tsf} = \frac{(0.007)(nL)^{0.8}}{(P_2)^{0.5}(S)^{0.4}} \quad \text{(Eqn. 3-3)}$$

where $P_2 = 3.2$ inches (figure B-3)

$$T_{tsf} = \frac{(0.007)[(0.15)(300)]^{0.8}}{(3.2)^{0.5}(0.023)^{0.4}}$$

$T_{tsf} = 0.37$ hr

B) for shallow conc. flow

$L = 440$ ft
$\Delta h = 116 - 114 = 2$ ft

$S = \frac{\Delta h}{L} = \frac{2}{440} = 0.005$ ft/ft

From figure 3-1, for unpaved, $V = 1.15$ fps

$$T_{tscf} = \frac{L}{3600V} = \frac{(440)}{(3600)(1.15)}$$

$T_{tscf} = 0.11$ hr

$T_c = T_{tsf} + T_{tscf} = 0.37 + 0.11$

$T_c = 0.48$ hr.

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For Subwatershed 7B

A) for sheet flow

$L = 300$ ft
$\Delta h = 134 - 121 = 13$ ft
$n = 0.24$ (dense grass) (Table 3-1)

$$S = \frac{\Delta h}{L} = \frac{13 \text{ ft}}{300 \text{ ft}} = 0.043 \text{ ft/ft}$$

$$T_{tsf} = \frac{(0.007)(nL)^{0.8}}{(P_2)^{0.5}(S)^{0.4}} \quad \text{(Eqn. 3-3)}$$

where $P_2 = 3.2$ inches

$$T_{tsf} = \frac{(0.007)[(0.24)(300)]^{0.8}}{(3.2)^{0.5}(0.043)^{0.4}}$$

$$T_{tsf} = 0.42 \text{ hr}$$

B) for shallow conc. flow

$L = 2200$ ft
$\Delta h = 121 - 106 = 15$ ft

$$S = \frac{\Delta h}{L} = \frac{15 \text{ ft}}{2200 \text{ ft}} = 0.007 \text{ ft/ft}$$

From figure 3-1, for unpaved, $V = 1.35$ fps

$$T_{tscf} = \frac{L}{3600V} = \frac{(2200)}{(3600)(1.35)}$$

$$T_{tscf} = 0.45 \text{ hr}$$

$$T_c = T_{tsf} + T_{tscf} = (0.42 + 0.45) \text{ hr}$$

$$T_c = 0.87 \text{ hr}$$

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For Subwatershed 7C:

A) for sheet flow

$L = 300$ ft
$\Delta h = 119 - 99 = 20$ ft
$n = 0.24$ (dense grass) (Table 3-1)

$$S = \frac{\Delta h}{L} = \frac{20 \text{ ft}}{300 \text{ ft}} = 0.067\%$$

$$T_{t_{sf}} = \frac{(0.007)(nL)^{0.8}}{(P_2)^{0.5} S^{0.4}} \quad \text{(Eqn. 3-3)}$$

where $P_2 = 3.2$ inches (figure B-3)

$$T_{t_{sf}} = \frac{(0.007)[(0.24)(300)]^{0.8}}{(3.2)^{0.5}(0.067)^{0.4}}$$

$$T_{t_{sf}} = 0.35 \text{ hr} \quad ✓$$

B) for shallow conc. flow

$L = 450$ ft
$\Delta h = 99 - 92 = 7$ ft

$$S = \frac{\Delta h}{L} = \frac{7 \text{ ft}}{450 \text{ ft}} = 0.016\%$$

From figure 3-1, for unpaved, $V = 2.0$ fps

$$T_{t_{scf}} = \frac{L}{3600V} = \frac{(450)}{(3600)(2.0)}$$

$$T_{t_{scf}} = 0.06 \text{ hr} \quad ✓$$

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c) for open channel flow

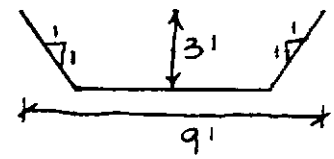
$L = 150$ ft

$\Delta h = 92 - 89 = 3$ ft

$S = \frac{\Delta h}{L} = \frac{3}{150} = 0.020$ 1/1

$A = \left(\frac{b+t}{2}\right)d = \left(\frac{3+9}{2}\right)(3)$

$A = 18$ s.f.



$P = b + 2\sqrt{2}d = (3) + 2\sqrt{2}(3)$

$P = 11.5$ ft

$R_h = \frac{A}{P} = \frac{18}{11.5} = 1.57$ ft

$n = 0.03$ (natural stream bed)

$V = \frac{1.49}{n} R_h^{2/3} S^{1/2} = \frac{1.49}{(0.03)} (1.57)^{2/3} (0.020)^{1/2}$

$V = 9.48$ fps ✓

$T_{t_c} = \frac{L}{3600V} = \frac{(150)}{(3600)(9.48)}$

$T_{t_c} = 0.004$ hr $\approx$ 0.00 hr ✓

$T_c = T_{t_{sf}} + T_{t_{scf}} + T_{t_c}$

$T_c = (0.35 + 0.06 + 0.00)$ hr ✓

$T_c = 0.41$ hr.

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For Subwatershed 7D:

A) for sheet flow

1) on grass

$L = 250$ ft

$\Delta h = 134 - 125 = 9$ ft

$n = 0.24$ (dense grass) (Table 3-1)

$S = \frac{\Delta h}{L} = \frac{9 \text{ ft}}{250 \text{ ft}} = 0.036$ 1/1

$$T_{t_{sf_1}} = \frac{(0.007)(nL)^{0.8}}{(P_2)^{0.5}(S)^{0.4}} \quad \text{(Eqn 3-3)}$$

where $P_2 = 3.2$ inches (Fig. B-3)

$$T_{t_{sf_1}} = \frac{(0.007)[(0.24)(250)]^{0.8}}{(3.2)^{0.5}(0.036)^{0.4}}$$

$T_{t_{sf_1}} = 0.39$ hr ✓

2) on bit. pav.

$L = 50$ ft

$\Delta h = 125 - 124 = 1$ ft

$n = 0.011$ (asphalt) (Table 3-1)

$S = \frac{\Delta h}{L} = \frac{1 \text{ ft}}{50 \text{ ft}} = 0.020$ 1/1

$$T_{t_{sf_2}} = \frac{(0.007)(nL)^{0.8}}{(P_2)^{0.5}(S)^{0.4}} \quad \text{(Eqn 3-3)}$$

where $P_2 = 3.2$ inches (Fig. B-3)

$$T_{t_{sf_2}} = \frac{(0.007)[(0.011)(50)]^{0.8}}{(3.2)^{0.5}(0.020)^{0.4}}$$

$T_{t_{sf_2}} = 0.01$ hr

B) for shallow conc. flow

1) on bit. pav.

$L = 140\,ft$

$\Delta h = 124 - 122.6 = 1.4\,ft$

$S = \frac{\Delta h}{L} = \frac{1.4\,ft}{140\,ft} = 0.010\ ft/ft$

From figure 3-1, for paved, $V = 2.0\,fps$

$$T_{t_{scf_1}} = \frac{L}{3600V} = \frac{(140)}{(3600)(2)}$$

$$T_{t_{scf_1}} = 0.02\ hr$$

2) on woods w/ light brush

$L = 620\,ft$

$\Delta h = 102.6 - 94 = 8.6\,ft$

$S = \frac{\Delta h}{L} = \frac{8.6\,ft}{620\,ft} = 0.014\ ft/ft$

From figure 3-1, for unpaved, $V = 1.9\,fps$

$$T_{t_{scf_2}} = \frac{L}{3600V} = \frac{(620)}{(3600)(1.9)}$$

$$T_{t_{scf_2}} = 0.09\ hr.$$

c) for pipe flow for 12" ϕ R.C.

$L = 1135\,ft$

$\Delta h = 119.9 - 102.6 = 17.3\,ft$

$S = \frac{\Delta h}{L} = 0.015\ ft/ft$

$n = 0.015$

Assuming full flow, $R_H = \frac{D}{4} = \frac{1\,ft}{4} = 0.25\,ft$

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from Manning

$$V = \frac{1.49}{n} R_H^{2/3} S^{1/2} = \frac{1.49}{(0.015)} (0.25)^{2/3} (0.015)^{1/2}$$

$$V = 4.87 \text{ fps}$$

$$T_{t_{pf}} = \frac{L}{3600\,V} = \frac{(1135)}{(3600)(4.87)}$$

$$T_{t_{pf}} = 0.07 \text{ hr}$$

$$T_c = T_{t_{sf_1}} + T_{t_{sf_2}} + T_{t_{scf_1}} + T_{t_{scf_2}} + T_{t_{pf}}$$

$$T_c = (0.39 + 0.01 + 0.02 + 0.09 + 0.07) \text{ hr}$$

$$T_c = 0.58 \text{ hr}$$

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For Subwatershed 7E:

* A Sheet Flow

$L = 300'$

$\Delta h = 148' - 127.5 = 20.5$

$S = \frac{\Delta h}{L} = \frac{20.5}{300} = .0683\ \%$

Using Table 3-1 from QTR-55,
$n = 0.011$ (smooth surface, asphalt)

$$T_{t_{sf}} = \frac{0.007(nL)^{0.8}}{(P_2)^{0.5} S^{0.4}} = \frac{0.007(.011 \times 300)^{0.8}}{(3.2)^{0.5}(.0683)^{0.4}}$$

$T_{t_{sf}} = 0.03$ hr.

* B Shallow Concentrated Flow

1 paved...

$L = 800'$

$\Delta h = 127.5 - 94.5 = 33$

$S = \frac{\Delta h}{L} = \frac{33}{800} = .0413$

Using Figure 3-1 from QTR-55,
for paved surface, $V = 4.1$ fps

$$T_{t_{scf}} = \frac{L}{3600V} = \frac{800}{3600(4.1)} = 0.05 \text{ hr}$$

2 unpaved...

$L = 670'$

$\Delta h = 94.5 - 90 = 4.5$

$S = \frac{\Delta h}{L} = \frac{4.5}{670} = .0067\ \%$

Using Figure 3-1 from QTR-55,
for unpaved surface, $V = 1.25$ fps

$$T_{t_{scf}} = \frac{L}{3600V} = \frac{670}{3600(1.25)} = 0.15 \text{ hr}$$

Golder Associates	SUBJECT T_c, T_t Calcs (7E)		
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$$T_c = T_{t_{SF}} + T_{t_{scf-p}} + T_{t_{scf-u}}$$

$$T_c = 0.03 + 0.05 + 0.15$$

$$T_c = 0.23 \text{ hr}$$

Golder Associates	SUBJECT T_c, T_t Calcs (7F)		
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For Subwatershed 7F:

A Sheet Flow

$L = 300'$

$\Delta h = 164.5 - 162.5 = 22$

$S = \frac{\Delta h}{L} = \frac{22}{300} = 0.0733$

From QTR55 Table 3-1

$n = 0.24$ (dense grass)

$$T_{t_{SF}} = \frac{0.007(nL)^{0.8}}{P_2^{0.5}\ S^{0.4}} = \frac{0.007(.24 \times 300)^{0.8}}{3.2^{0.5}\ (.0733)^{0.4}} = 0.34 \text{ hr}$$

B Shallow Concentrated Flow

1. Unpaved

$L = 400'$

$\Delta h = 162.5 - 149 = 13.5$

$S = \frac{\Delta h}{L} = \frac{13.5}{400} = 0.0338$

From QTR55 Figure 3-1, For unpaved surfaces, $V = 2.9$

$$T_{t_{scf_u}} = \frac{L}{3600\,V} = \frac{400}{3600 \times 2.9} = 0.04 \text{ hr}$$

2. Paved

$L = 80'$

$\Delta h = 149 - 148 = 1$

$S = \frac{\Delta h}{L} = \frac{1}{80} = 0.0125$

From Fig 3-1, For paved, $V = 2.3$

$$T_{t_{scf_p}} = \frac{80}{3600 \times 2.3} = 0.01 \text{ hr}$$

C Pipe Flow 18" RC

$L = 2770$

$\Delta h = 148 - 86 = 62$

$S = \frac{\Delta h}{L} = \frac{62}{2770} = .0224$

$n = .015$ (concrete pipe)

Assuming Full Flow, $\phi = 18''$ $r = 9''$

$A = \pi r^2 = \pi\left(\frac{9}{12}\right)^2 = 1.77 \text{ ft}^2$

$P = \pi d = \pi \frac{18}{12} = 4.71 \text{ ft}^2$

$R_h = \frac{A}{P} = \frac{1.77}{4.71} = .375$

From Manning, $V = \frac{1.49}{n} R_h^{2/3} S^{1/2} = \frac{1.49}{.015}(.375)^{2/3} \cdot (.0224)^{1/2}$

$V = 7.7$ fps

$T_{t_{pf}} = \frac{L}{3600V} = \frac{2770}{3600(7.7)} = 0.10$ hr

$T_c = T_{t_{sf}} + T_{t_{scf_u}} + T_{t_{scf_p}} + T_{t_{pf}}$

$= 0.34 + 0.04 + 0.01 + 0.10 = 0.49$ hr

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For Subwatershed 7G:

A) for sheet flow

$L = 300$ ft

$\Delta h = 96 - 91 = 5$ ft

$n = 0.15$ (short grass) (Table 3-1)

$S = \frac{\Delta h}{L} = \frac{5 \text{ ft}}{300 \text{ ft}} = 0.017$ %

$$T_{t_{sf}} = \frac{(0.007)(nL)^{0.8}}{(P_2)^{0.5}(S)^{0.4}} \quad \text{(Eqn. 3-3)}$$

where $P_2 = 3.2$ inches (figure B-3)

$$T_{t_{sf}} = \frac{(0.007)[(0.15)(300)]^{0.8}}{(3.2)^{0.5}(0.017)^{0.4}}$$

$$T_{t_{sf}} = 0.42 \text{ hr}$$

B) for swamp flow

$L = 210$ ft

$D = 1$ ft

$g = 32.2$ ft/s²

$$T_{t_{swp}} = \frac{L}{3600\sqrt{gD}}$$ where $\sqrt{gD} = V$ (Eqn. 15.5 from NEH, Sect. 4, 1972)

$$T_{t_{swp}} = \frac{(210)}{(3600)\sqrt{(32.2)(1)}}$$

$$T_{t_{swp}} = 0.01 \text{ hr}$$

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c) for shallow conc. flow

$L = 400$ ft

$\Delta h = 91 - 88 = 3$ ft

$S = \frac{\Delta h}{L} = \frac{3}{400} = 0.0075\%$

From figure 3-1, for unpaved, $V = 1.4$ fps

$$T_{t_{scf}} = \frac{L}{3600V} = \frac{(400)}{(3600)(1.4)}$$

$$T_{t_{scf}} = 0.08 \text{ hr}$$

$$T_c = T_{t_{sf}} + T_{t_{swp}} + T_{t_{scf}}$$

$$T_c = (0.42 + 0.01 + 0.08) \text{ hr}$$

$$T_c = 0.51 \text{ hr.}$$

For Subwatershed 7H

A) for sheet flow

$L = 300$ ft

$\Delta h = 158 - 138 = 20$ ft

$n = 0.24$ (dense grass) (Table 3-1)

$$S = \frac{\Delta h}{L} = \frac{20 \text{ ft}}{300 \text{ ft}} = 0.067 \text{ ft/ft}$$

$$T_{t_{sf}} = \frac{(0.007)(nL)^{0.8}}{(P_2)^{0.5}(S)^{0.4}} \quad \text{(Eqn. 3-3)}$$

where $P_2 = 3.2$ inches (figure 3-3)

$$T_{t_{sf}} = \frac{(0.007)[(0.24)(300)]^{0.8}}{(3.2)^{0.5}(0.067)^{0.4}}$$

$$T_{t_{sf}} = 0.35 \text{ hr}$$

B) for shallow conc. flow

1) on grass, $L = 450$ ft

$\Delta h = 138 - 118 = 20$ ft

$$S = \frac{\Delta h}{L} = \frac{20}{450} = 0.044 \text{ ft/ft}$$

From figure 3-1, for unpaved, $V = 3.$ fps

$$T_{t_{scf_1}} = \frac{L}{3600\,V} = \frac{(450)}{(3600)(3.4)}$$

$$T_{t_{scf_1}} = 0.04 \text{ hr.}$$

2) on bit. pav.

$L = 320$ ft

$\Delta h = 118 - 111 = 7$ ft

$S = \frac{\Delta h}{L} = \frac{7}{320} = 0.022$ %

From figure 3-1, for paved, $V = 3.0$ fps

$$T_{t_{scf_2}} = \frac{L}{3600V} = \frac{(320)}{(3600)(3)}$$

$$T_{t_{scf_2}} = 0.03 \text{ hr}$$

c) for pipe flow

1) 12" R.C.

$L = 610$

$\Delta h = 108.67 - 93.80 = 14.87$ ft

$S = \frac{\Delta h}{L} = \frac{14.87}{610} = 0.0244$ %

$R_h = \frac{D}{4} = \frac{(12/12)}{4} = 0.25$ ft (for full flow)

$n = 0.015$ (for conc. pipe)

from Manning, $V = \frac{1.49}{n} R_h^{2/3} S^{1/2} = \frac{1.49}{(0.015)} (0.25)^{2/3} (0.0244)^{1/2}$

$V = 6.16$ fps

$$T_{t_{p_1}} = \frac{L}{3600\,V} = \frac{(610)}{(3600)(6.16)}$$

$$T_{t_{p_1}} = 0.03 \text{ hr}$$

2) 18" R.C.

$L = 820$ ft

$\Delta h = 93.80 - 87.38 = 6.42$ ft

$S = \frac{\Delta h}{L} = \frac{6.42}{820} = 0.0078$ ft/ft

$R_H = \frac{D}{4} = \frac{(18/12)}{4} = 0.375$ ft

$n = 0.015$ (for conc. pipe)

from Manning,

$V = \frac{1.49}{n} R_H^{2/3} S^{1/2} = \frac{1.49}{(0.015)} (0.375)^{2/3} (0.0078)^{1/2}$

$V = 4.57$ fps

$T_{t_{p_2}} = \frac{L}{3600V} = \frac{(820)}{(3600)(4.57)}$

$T_{t_{p_2}} = 0.05$ hr.

3) 24" R.C.

$L = 250$ ft

$\Delta h = 87.38 - 84.61 = 2.77$

$S = \frac{\Delta h}{L} = \frac{2.77}{250} = 0.011$ ft/ft

$R_H = \frac{D}{4} = \frac{(24/12)}{4} = 0.50$ ft

$n = 0.015$ (for conc. pipe)

from Manning,

$V = \frac{1.49}{n} R_H^{2/3} S^{1/2} = \frac{1.49}{(0.015)} (0.50)^{2/3} (0.011)^{1/2}$

$V = 6.59$ fps

$T_{t_{p_3}} = \frac{L}{3600V} = \frac{(250)}{(3600)(6.59)}$

$T_{t_{p_3}} = 0.01$ hr

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$$T_c = T_{tsf} + T_{tscf_1} + T_{tscf_2} + T_{tp_1} + T_{tp_2} + T_{tp_3}$$

$$T_c = (0.35 + 0.04 + 0.03 + 0.03 + 0.05 + 0.01)\ hr$$

$$T_c = 0.51\ hr$$

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For Subwatershed 8A:

A) for sheet flow

$L = 300$ ft

$\Delta h = 137 - 116 = 21$ ft

$n = 0.15$ (short grass) (Table 3-1)

$S = \frac{\Delta h}{L} = \frac{21 \text{ ft}}{300 \text{ ft}} = 0.070\ \%$

$$T_{tsf} = \frac{(0.007)(nL)^{0.8}}{P_2^{0.5}\ S^{0.4}} \quad \text{(Eqn 3-3)}$$

where $P_2 = 3.2$ inches

$$T_{tsf} = \frac{(0.007)[(0.15)(300)]^{0.8}}{(3.2)^{0.5}(0.070)^{0.4}}$$

$$T_{tsf} = 0.24 \text{ hr.}$$

B) for shallow conc. flow

1) on bit pav.

$L = 300$ ft

$\Delta h = 116 - 106 = 10$ ft

$S = \frac{\Delta h}{L} = \frac{10 \text{ ft}}{300 \text{ ft}} = 0.033\ \%$

From figure 3-1, for paved, $V = 3.7$ fps

$$T_{tscf_1} = \frac{L}{3600V} = \frac{(300 \text{ ft})}{(3600)(3.7 \text{ fps})}$$

$$T_{tscf_1} = 0.02 \text{ hr}$$

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2) on grass

$L = 950$ ft
$\Delta h = 106 - 85 = 21$ ft

$S = \frac{\Delta h}{L} = \frac{21 ft}{950 ft} = 0.022$ 1/1

From figure 3-1, for unpaved, V = 2.4 fps

$T_{tscf_2} = \frac{L}{3600V} = \frac{(950)}{(3600)(2.4)}$

$T_{tscf_2} = 0.11$ hr

3) on bit pav

$L = 100$ ft
$\Delta h = 85 - 84 = 1$ ft

$S = \frac{\Delta h}{L} = \frac{1}{100} = 0.01$ 1/1

From figure 3-1, for paved, V = 2.0 fps

$T_{tscf_3} = \frac{L}{3600V} = \frac{(100)}{(3600)(2.0)}$

$T_{tscf_3} = 0.01$ hr.

C) for pipe flow
D = 15"

$L = 150$ ft
$\Delta h = 81 - 80 = 1$ ft
$S = \frac{\Delta h}{L} = \frac{1}{150} = 0.007$ 1/1
$R_H = \frac{D}{4} = \frac{(15/12)}{4} = 0.313$ (for full flow)

$\eta = 0.015$ (for R.C.P.

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$$V = \frac{1.49}{n} R_H^{2/3} S^{1/2} = \frac{1.49}{(0.015)} (0.313)^{2/3} (0.007)^{1/2}$$

$$V = 3.83 \text{ fps}$$

$$T_{t_p} = \frac{L}{3600\,V} = \frac{(150)}{(3600)(3.83)}$$

$$T_{t_p} = 0.01 \text{ hr}$$

$$T_c = T_{t_{scf}} + T_{t_{scf_1}} + T_{t_{scf_2}} + T_{t_{scf_3}} + T_{t_p}$$

$$T_c = (0.24 + 0.02 + 0.11 + 0.01 + 0.01) \text{ hr}$$

$$T_c = 0.39 \text{ hr}$$

For Subwatershed 8B:

A Sheet Flow

$L = 300'$
$\Delta h = 171 - 167 = 4'$
$S = 4/300 = .0133$
$n = .15$ (short grass prairie) From QTR55 Table 3-1

$$T_{t_{SF}} = \frac{.007(nL)^{0.8}}{(P_2)^{0.5} S^{0.4}}$$

$P_2 = 3.2$ inches (Figure 8-3)

$$T_{t_{SF}} = \frac{.007(.15 \times 300)^{0.8}}{(3.2)^{0.5} \times (.0133)^{0.4}} = .46 \text{ hr}$$

B Shallow Concentrated Flow

1. $L = 610'$ (unpaved)
$\Delta h = 167 - 154 = 13'$
$S = 13/610 = .0213$

From QTR55, Figure 3-1 for unpaved, $V = 2.3$ fps

$$T_{t_{SCF}} = \frac{L}{3600V} = \frac{610}{3600(2.3)} = .07 \text{ hr.}$$

C Swamp Flow

$L = 190'$
$D_m = \sim 1'$ assumed...

$$T_{t_{swf}} = \frac{L}{3600\sqrt{gD_m}} = \frac{190}{3600\sqrt{32.2 \times 1}} = .01 \text{ hr}$$

where $V = \sqrt{gD_m}$

Golder Associates	SUBJECT T_c for Reading Subwatershed - 8B		
	Job No. 903 6900 310	Made by RD	Date 2-27-91
	Ref. ISRT	Checked MRT	Sheet 27 of 35
		Reviewed ACR	

D Pipe Flow

$L = 760'$ (24" R.C.)

$\Delta h = 150 - 144 = 6'$

$S = 6/760 = .0079$ ft/ft

$n = 0.015$ (concrete pipe)

$R_h = D/4 = 2/4 = 0.5'$

From Manning, $V = \frac{1.49}{n} R_h^{2/3} S^{1/2} = \frac{1.49}{.015}(.5)^{2/3}(.0079)^{1/2}$

$V = 5.6$ fps

$T_{t_{pF}} = \frac{L}{3600V} = \frac{760}{3600(5.6)} = .04$ hr

E Swamp Flow

$L = 50'$

$D_m \approx 2'$

$T_{t_{swamp}} = \frac{L}{3600V} = \frac{L}{3600\sqrt{gD_m}} = \frac{50'}{3600(\sqrt{32.2 \times 2})}$

$T_{t_{swamp}} = .002$ hr ≈ 0.0 hr

F Shallow Concentrated Flow

$L = 210'$

$\Delta h = 146 - 143 = 3'$

$S = 3/210 = .0143$

From QTR55, Figure 3-1, for unpaved, $V = 1.9$ fps

$T_{t_{scf}} = \frac{L}{3600V} = \frac{210}{3600(1.9)} = .03$ hr

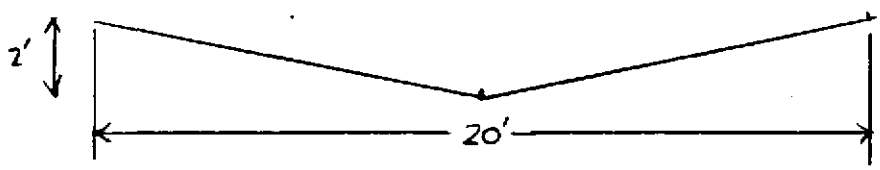
Golder Associates	SUBJECT T_c For Reading Subwatershed - 8B		
	Job No. 903 6900 310	Made by RD	Date 2-27-91
	Ref. 15RT	Checked MRT	Sheet 28 of 35
		Reviewed PCR	

G For Open Channel Flow

$L = 1510'$

$\Delta h = 143 - 94.5 = 48.5$

$S = \Delta h / L = 48.5 / 1510 = .0321 \ 1/1$



Typical Channel Geometry

Assuming Full Flow,

$A = \frac{1}{2} \times 20' \times 2' = 20 \text{ ft}^2$

$P = 2(\sqrt{a^2+b^2}) = 2\sqrt{2^2+10^2} = 20.4'$

$R_h = \frac{A}{P} = \frac{20}{20.4} = .98$

$n = 0.03$ (natural stream bed)

From Manning, $V = \frac{1.49}{n} R_h^{2/3} S^{1/2} = \frac{1.49}{.03}(.98)^{2/3}(.0321)^{1/2}$

$V = 8.8$ fps

$T_{t_{cf}} = \frac{L}{3600 V} = \frac{1510}{3600(8.8)} = 0.05$ hr

Golder Associates	SUBJECT T_c For Reading Subwatershed - 8B		
	Job No. 903 6400 310 Ref. 1SRT	Made by RD Checked MRT Reviewed	Date 2-27-91 Sheet 29 of 35

H Pipe Flow

$L = 1050$ 48" R.C.

$\Delta h = 94.35 - 70 = 24.35'$

$S = 24.35/1050 = .0232\ ft/ft$

$n = 0.015$ concrete pipe.

$R_h = D/4 = 4/4 = 1$

From Manning, $V = \frac{1.49}{n} R_h^{2/3} S^{1/2} = \frac{1.49}{.015}(1)^{2/3}(.0232)^{1/2}$

$V = 15.1$ fps

$T_{t_{pf}} = \frac{L}{3600V} = \frac{1050}{3600(15.1)} = 0.02$ hr

Golder Associates	SUBJECT T_c for Reading Subwatershed - 8B		
	Job No. 903 6900 310 Ref. ISRT	Made by RJ Checked MRT Reviewed MR	Date 2-27-91 Sheet 30 of 35

$$T_c = T_{t_A} + T_{t_B} + T_{t_C} + T_{t_D} + T_{t_E} + T_{t_F} + T_{t_G} + T_{t_H}$$

$$T_c = T_{t_{sf}} + T_{t_{ccf}} + T_{t_{swf}} + T_{t_{pf}} + T_{t_{swf}} + T_{t_{scf}} + T_{t_{cf}} + T_{t_{pf}}$$

$$T_c = 0.46 + 0.07 + 0.01 + 0.04 + 0.00 + 0.03 + 0.05 + 0.02 = 0.69$$

$$T_c = 0.68 \text{ hr}$$

Golder Associates	SUBJECT T_c For Reading Subwatersheds - 8C		
	Job No. 903 6400.310	Made by AD	Date 2-27-91
	Ref. ISRT	Checked MRT	Sheet 31 of 35
		Reviewed MR	

For Watershed 8C:

A Sheet Flow

$L = 300'$

$\Delta h = 233' - 216' = 17'$

$S = \frac{\Delta h}{L} = \frac{17}{300} = .0567$

$n = 0.15$ (short grass prairie) table 3-1: QTR55

$$T_{t_{sf}} = \frac{0.007(nL)^{0.8}}{(P_2)^{0.5}\, S^{0.4}} = \frac{0.007(.15 \times 300)^{0.8}}{(3.2)^{0.5} \times (.0567)^{0.4}} = 0.26 \text{ hr}$$

B Shallow Concentrated Flow

Path 1

1. $L = 680'$ (unpaved)
   $\Delta h = 216 - 152 = 64'$
   $S = \frac{\Delta h}{L} = \frac{64}{680} = .0941$

From Fig 3-1, QTR 55, $V_1 = 5.0$ fps

$T_{t_{scf_{u_1}}} = \frac{L}{3600V} = \frac{680}{3600(5)} = .04$ hr

2. $L = 420'$ (paved)
   $\Delta h = 152 - 120 = 32$
   $S = \frac{\Delta h}{L} = \frac{32}{420} = .0762$

From Fig 3-1, $V_1 = 5.6$ fps

$T_{t_{scf_p}} = \frac{420}{3600(5.6)} = .02$ hr

3. $L = 400'$ (unpaved)
   $\Delta h = 120 - 79 = 41$
   $S = 41/400 = .1025$

From Fig 3-1, $V_1 = 5.1$ fps

$T_{t_{scf_{u_1}}} = \frac{400}{3600(5.1)} = .02$ hr

Path 2

1. $L = 680$ (unpaved)
   $\Delta h = 64'$
   $S = .0941$

$V_1 = 5.0$ fps

$T_{t_{scf_{u_2}}} = .04$ hr

2. $L = 1150'$ (paved)
   $\Delta h = 152 - 122.5 = 29.5$
   $S = \frac{29.5}{1150} = .0257$

From Fig 3-1, $V_2 = 3.2$

$T_{t_{scf_{p_2}}} = \frac{1150}{3600(3.2)} = .10$ hr

3. $L = 480'$ (unpaved)
   Δh $122.5 - 79 = 48.5$
   $S = 48.5/480 = .1010$

From 3-1, $V_2 = 5.0$ fps

$T_{t_{scf_{u_2}}} = \frac{480}{3600(5.0)} = .03$ hr

Golder Associates	SUBJECT T_c For Reading Subwatershed - 8C		
	Job No. 903 6400 310 Ref. 1 3 2 T	Made by RD Checked MRT Reviewed MCR	Date 2-27-91 Sheet 32 of 35

B Shallow Concentrated Flow (continued)

Path 1	Path 2
4. $L = 270'$ (paved) $\Delta h = 79 - 76 = 3'$ $S = 3/270 = .0111$ From Fig 3-1 QTR55, $U_1 = 2.1$ fps $T_{t_{scF_{u_1}}} = \frac{270}{3600(2.1)} = .04$ hr	4. —

Total: $T_{t_{scF_1}} + T_{t_{scF_2}} + T_{t_{scF_3}} + T_{t_{scF_4}}$

Path 1 = .04 + .02 + .02 + .04 = 0.12 hr | Path 2 = .04 + .10 + .03 = 0.17 hr

∴ $T_{t_{scF}} = 0.17$ hr (Path 2) ...

C Pipe Flow - Path 1

$L = 130'$ (24" R.C) assumed...

$R_h = D/4$
$= 2'/4 = 0.5'$

$n = .015$ (concrete pipe)
$\Delta h = 76 - 65.2 = 10.8$
$S = \Delta h/L = 10.8/130 = .0831$

From Manning, $V = \frac{1.49}{n} R_h^{2/3} S^{1/2} = \frac{1.49}{.015}(.5)^{2/3}(.0831)^{1/2} = 18.0$ fps

or w/ 12" R.C. (assumed) $V = \frac{1.49}{.015}(.25)^{2/3}(.0831)^{1/2} = 11.4$ fps

Choosing ~~12"~~ 24" R.C, $T_{t_{pF}} = \frac{130}{3600(18.0)} = .002$ hr ~ 0.0 hr

or w/ 12" R.C, $T_{t_{pF}} = \frac{130}{3600(11.4)} = .003$ hr

Golder Associates	SUBJECT T_c for Reading Subwatersheds – 8C		
	Job No. 903 6400 310 Ref. 1SRT	Made by RD Checked MRT Reviewed MR	Date 2-27-91 Sheet 33 of 35

Path # 2 :

$$T_{c_2} = T_{t_{sf}} + T_{t_{scf}}$$

$$T_{c_2} = 0.26 + 0.17 = \underline{0.43} \text{ hr}$$

Path # 1 :

$$T_{c_1} = T_{t_{sf}} + T_{t_{scf}} + T_{t_{pf}}$$

$$T_{c_1} = 0.26 + 0.12 + 0.0 = 0.38 \text{ hr}$$

$\therefore$ T_c occurs along Path # 2 = 0.43 hr

Golder Associates	SUBJECT T_c for Reading Subwatersheds		
	Job No. 903-6400.310 Ref. 15RT	Made by VEEZ Checked Reviewed PCR	Date 3-25-91 Sheet 34 of 35

For subwatershed 6D

A) for sheet flow

$L = 300\ ft$
$\Delta h = 112 - 107\ ft = 5\ ft$
$n = 0.24$ (dense grass) (Table 3-1)
$S = \frac{\Delta h}{L} = \frac{5\ ft}{300\ ft} = 0.0167\ ft/ft$

$$T_{tsf} = \frac{(0.007)(nL)^{0.8}}{P_2^{0.5}\, S^{0.4}} \quad \text{(Eqn 3-3)}$$

where $P_2 = 3.2$ inches (figure B-3)

$$T_{tsf} = \frac{(0.007)[(0.24)(300)]^{0.8}}{(3.2)^{0.5}(0.0167)^{0.4}}$$

$T_{tsf} = 0.62\ hr$

B) for shallow conc. flow

$L = 1400\ ft$
$\Delta h = 107 - 90\ ft = 17\ ft$
$S = \frac{\Delta h}{L} = \frac{17\ ft}{1400\ ft} = 0.0121\ ft/ft$
From figure 3-1, for unpaved, $V = 1.75\ fps$

$$T_{tscf} = \frac{L}{3600V} = \frac{(1400)}{(3600)(1.75)}$$

$T_{tscf} = 0.22\ hr$

$T_c = T_{tsf} + T_{tscf} = (0.62 + 0.22)\ hr$
$T_c = 0.84\ hr$

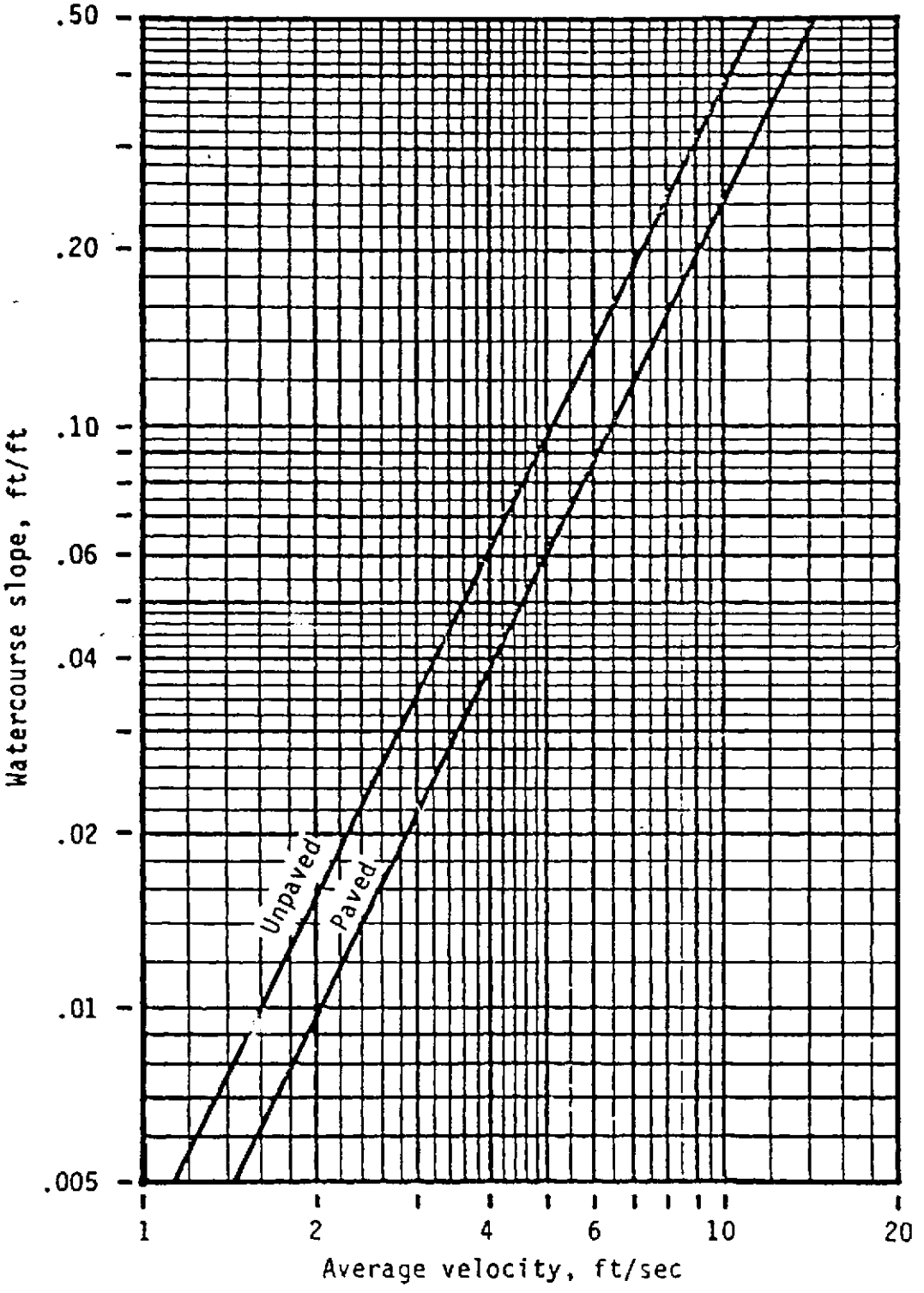


Figure 3-1.—Average velocities for estimating travel time for shallow concentrated flow.

Storage vs Elevation Relationships

Golder Associates	SUBJECT Storage vs Elevation - Reading Subwatersheds		
	Job No. 903-6400.310 Ref. 1SRT	Made by UEE7 Checked DP Reviewed PCR	Date 7-22-91 Sheet 1 of 13

Objective: To evaluate the storage vs. elevation relationship of the swamps/storage basins in the Reading Subwatersheds (Subwatersheds 6, 7, and 8).

Methods: Using the 100-scale drawings provided by Reading Town entitled "Proposed Drainage System", determine the upper limits of the storage area assuming houses and roads do NOT flood. Then, using a planimeter, determine the area that each contour within the storage area occupies (in sf and acres). Using the average end method, evaluate the storage/volume capabilities for each contour interval. The sum of the volume for each interval yields the total storage/volume of the swamp/detention area.

Golder Associates	SUBJECT Storage vs Elevation - Reading Subwatersheds		
	Job No. 903-6400.310	Made by VEEZ	Date 7-22-91
	Ref. ISRT	Checked DP	Sheet 2 of 13
		Reviewed PER	

Assumptions:

1. Water level in the swamp equals the invert elevation of the outlet at the beginning of the storm.

2. The slope of the swamp (beyond topographic mapping) is the same above and below the swamp line.

3. The maximum storage elevation for any area is either the lowest adjacent road or house elevation, whichever is lower. Therefore, neither the adjacent roads nor the houses will flood during the hydrologic modeling.

4. Use average end method for volume/storage calculations, such that

$$V = \left(\frac{A_1 + A_2}{2}\right) d$$

where A_1 = area at elev$_1$
A_2 = area at elev$_2$
$d = |\text{elev}_2 - \text{elev}_1|$

5. Since the area was already highly developed in 1976, the topography is generally considered unchanged.

6. The elevation vs. area relationship was the data actually input to the model. The volume was calculated as a check for the model.

References:

1. Plans for "Proposed Drainage System, Town of Reading" prepared by Whitman & Howard, Inc., December, 1976, sheets 7, 8, 11, 12, 13, 16, 17, 18, 22, 23, 27 & 28.

Golder Associates	SUBJECT: ISPT/Woburn, Mass Reading Subwatershed Storage Capacities		
	Job No. 903-6400 310 Ref. Whitman & Howard Sheet 17 of 30	Made by RD Copied by SNM Checked VEEF Reviewed CRM	Date 7-22-91 Sheet 3 of 13

Subwatershed 6A -
Location: Small Swamp Area between B&M Rail Line and Lowell Street; on both sides of Plymouth St. (north & South of...)

Elev. (ft.)	Area (ft^2)	Average Area (ft^2)	Depth (ft.)	Volume (ft^3)	Cumulative Volume (ft^3) Max. elev. = 86'
82	4,200 (0.10 ac.)				
		27,325	2	54,650	54,650
84	50,450 (1.16 ac.)				
		107,300	1	107,300	161,950
85	173,500 (3.98 ac.)				
		251,025	1	251,025	412,975
86	328,550 (7.54 ac.)				≈ 413,000

Maximum Storage Elevation = 86'

Minimum Storage Elevation = 82'

Total Storage Volume = 413,000 FT^3

Golder Associates	SUBJECT BRT/Worburn/Mass Reading Subwatershed Storage Capacities		
	Job No. 903-6400.310	Made by RD	Date 7-23-9
	Ref. Whitman & Howard Sheet 16 of 39	Checked UEEF	Sheet 4 of 13
		Reviewed CAM	

Subwatershed 6B -
Location: Very Large Swamp Area north of West Ave. and directly east of Rt. 93. Area extends east to just north of Jr High School Football Field and west of B&M Rail Line.

Elev. (ft.)	Area (ft.²)	Average Area (ft.²)	Depth (ft.)	Volume (ft.³)	Cumulative Volume (ft.³) Max. elev. = 82'
79	420,000 (9.64 ac.)				
		729,000	1	729,000	729,000
80	1,038,000 (23.83 ac.)				
		1,334,000	2	2,668,000	3,397,000
82	1,630,000 (37.42 ac)				

Maximum Storage Elevation = 82'

Minimum Storage Elevation = 79'

Total Storage Volume = 3,397,000 FT³

Golder Associates	SUBJECT ISRT/Woburn/Mass Reading Subwatershed Storage Capacities		
	Job No. 903-6400 313	Made by R.D.	Date 7-22-91
	Ref. Whitman & Howard, Inc Sheets 7, 11, 16 of 39	Checked Copied by SMM VEE7	Sheet 5 of 13
		Reviewed CRM	

Subwatershed 6C -
Location: Large storage area located directly east of Rt. 93 and extending from West Ave. South to N554500 grid line. ← (ridge area)

Elev. (ft.)	Area (ft.²)	Average Area (ft.²)	Depth (ft.)	Volume (ft.³)	Cumulative Volume (ft.³) Max. elev. = 82'
76'	101,700 (2.33 ac.)				
		324,100	2	648,200	648,200
78'	546,500 (12.55 ac.)				
		804,750	2	1,609,500	2,257,700
80'	1,063,000 (24.40 ac.)				
		1,261,800	2	2,523,600	4,781,300
82'	1,460,600 (33.53 ac.)				

Maximum Storage Elevation = 82'

Minimum Storage Elevation = 76'

Total Storage Volume = 4,781,300 FT³

Note: Sub storage basins at the far north and far south of the overall basin were not included in storage calculations. This is because they have the capacity to handle 100 yr. storm runoff without having to contribute to the overall basin discharge volume due to their topographic isolation. See attached sheets 5B and 5C.

Golder Associates	SUBJECT ISRT/Woburn/Mass Reading Subwatershed Storage Capacities		
	Job No. 903-6400.310	Made by VEE7	Date 7-22-91
	Ref. USGS Map	Checked VEE7	Sheet 6 of 13
		Reviewed CKN	

Subwatershed 6D

Location: North of subwatershed 5, west of I-93

Elev. (ft.)	Area (sf.) (ac.)	Average Area (sf.)	Depth (ft.)	Volume (ft.³)	Cumulative Volume (ft.³)
80	67,253 67,253 Avg. 67,253 (1.54 ac.)				
		347,391	10	3,473,910	3,473,910
90	627,528 627,528 Avg. 627,528 (14.41 ac.)				

Maximum Storage Elevation = 90 FT

Minimum Storage Elevation = 80 FT

Total Storage Volume = 3,473,910 FT³

Golder Associates	SUBJECT ISRT/Woburn/Mass Reading Subwatershed Storage Capacities		
	Job No. 903-6400-310	Made by RD	Date 7-22-91
	Ref. Whitman & Howard Sheet 27, 28 of 39	Checked [illegible]	Sheet 7 of 13
		Reviewed CNM	

Subwatershed 7A -
Location: Swamp area north of Van Norden St. and southeast of Bluebird Lane

	Elev. (ft.)	Area (ft.²)	Average Area (ft²)	Depth (ft.)	Volume (ft³)	Cumulative Volume (ft.³) Max. elev. =
A1 :	113	117,300 (2.69 ac.)				
			196,950	1	~ 197,000	197,000
	114	276,600 (6.35 ac.)				
A2 :	110	35,000 (0.80 ac.)				
			59,800	1	59,800	59,800
	111	84,600 (1.94 ac.)				
			136,800	1	136,800	196,600
	112	189,000 (4.34 ac.)				
			282,250	1	~ 282,300	478,900
	113	375,500 (8.62 ac.)				
			446,800	1	446,800	925,700
	114	518,100 (11.89 ac.)				

		A1	A2
Maximum Storage Elevation	=	114'	114'
Minimum Storage Elevation	=	113'	110'

Total Storage Volume = 197,000 + 925,700 = 1,122,700 FT

Golder Associates	SUBJECT Storage vs. Elevation - Reading		
	Job No. 103-6400.310	Made by MJC / DP	Date 7-22-91
	Ref. ISRT-95%	Checked VEE7	Sheet 8 of 13
		Reviewed CAM	

Subwatershed 7B (Swamp Area bordered by Van Norden Rd. & Forest Rd.)

Elev.	Area (sf)	Avg Area (sf)	Depth (ft)	Volume (cf)	Cum Volume (cf)
103	11,315 (0.26 ac)				
		19,724	1	19,724	19,724
104	28,133 (0.65 ac)				
		60,993	2	121,986	141,710
106	93,853 (2.16 ac)				
		124,892	2	249,784	391,494
108	155,930 (3.58 ac)				
		203,670	1	203,670	595,164
109	251,410 (5.77 ac)				

Max. Elev = 109

Min. Elev = 103

TOTAL Storage Volume = 595,164 cf

Golder Associates	SUBJECT ISRT/Woburn/MGSS SWAMP STORAGE CAPACITY		
	Job No. 903-6400.310	Made by MSC	Date 7-22-91
	Ref. Shirmar & Howard Sheet # 23 of 39	Checked VEET	Sheet 9 of 13
		Reviewed CRM	

Subwatershed 7A -
Swamp area ordered by Whittier Rd., Birch Meadow Dr. & Main St.

ELEV (FT)	AREA (FT²) $\frac{A_1+A_2}{2}$ = AVG	AVERAGE AREA (FT²)	DEPTH (FT)	VOLUME (cf)	Cumulative Volume (cf) Max. elev = 94'	Cumulative Volume (cf) Max. elev = 92'
88	25,110 24,955 AVG 25,033 (0.57ac.)					
		43,439	2	86,878	86,878	86,878
90	61,690 62,000 AVG 61,845 (1.42ac.)					
		85,212	2	170,423	257,301	257,301
92	109,120 108,035 AVG 108,578 (2.49ac.)					
		138,299	2	276,598	533,899	
94	167,070 168,950 AVG 168,020 (3.86ac.)					

Maximum Storage Elevation = 92'

30" R.C. Drainage Pipe Invert Elevation = 88.8'

Minimum Storage Elevation = 88'

Total Storage Volume = 257,301 cf.

Golder Associates	SUBJECT ISRT/Woburn/Mass Reading Subwatershed Storage Capacities		
	Job No. 903-6400.3100 Ref. Whitman & Howard Sheet 17 of 39	Made by RD Checked JEET Reviewed CHM	Date 7-22-91 Sheet 10 of 13

Subwatershed 7G
Location: Swamp Area north of Lowell St., East of Grove, and West of Intervale

ELEV. (Ft.)	Area (Ft.^{2})	Average Area (Ft.^{2})	Depth (Ft.)	Volume (Ft.^{3})	Cumulative Volume (Ft.^{3}) Max. elev. = 88'
85	0				
		12,450	1	12,450	12,450
86	24,900 (0.57 ac.)				
		67,475	1	67,475	79,925
87	110,050 (2.53 ac.)				
		167,150	1	167,150	247,075 ≈ 247,100
88	224,250 (5.15 ac.)				

Maximum Storage Elevation = 88'

Minimum Storage Elevation = 86'

Total Storage Volume = 247,100

Golder Associates	SUBJECT ISRT/Woburn/Mass Reading Subwatershed Capacities		
	Job No. 903-6400.310	Made by RL / SMN	Date 7-22-91
	Ref. Whitman & Howard Sheet 12 & 17 of 39	Checked VEE7	Sheet 11 of 13
		Reviewed CHM	

Subwatershed 7H -
Location: Swamp Storage Area between Lowell St. and the B&M Rail Line, in the vicinity of the Lowell St. School

Elev (ft.)	Area (ft.²)	Average Area (ft.²)	Depth (ft.)	Volume (ft.³)	Cumulative Volume (ft.³) Max. elev. = 82'
84	17,000 (0.39 ac.)				
		75,650	2	151,300	151,300
86	134,300 (3.08 ac.)				
		268,500	1	268,500	419,800
87	402,700 (9.24 ac.)				
		553,650	1	553,650	973,450
88	664,600 (15.26 ac.)				≈ 973,500

Maximum Storage Elevation = 82'

Minimum Storage Elevation = 84'

Total Storage Volume = 973,500 Ft.³

Golder Associates	SUBJECT ISRT/Woburn/Mass Reading Subwatershed Storage Capacities		
	Job No. 903-6400.315 Ref. Whitman & Howard Sheet 12 of 17 of 39	Made by SMM Checked UEEF Reviewed CAM	Date 7-22-91 Sheet 12 of 13

Subwatershed 8A -
Location: Storage Area southwest of intersection between B&M Rail Line and Willow Ave.

Elev. (ft.)	Area (ft.²)	Average Area (ft.²)	Depth (ft.)	Volume (ft.³)	Cumulative Volume (ft.³) Max elev. = 84'
78	0				
		52,750	2	105,500	105,500
80	105,500 (2.42 ac.)				
		165,750	2	331,500	437,000
82	226,000 (5.19 ac.)				
		326,900	2	653,800	1,090,800
84	427,800 (9.82 ac.)				

Maximum Storage Elevation = 84'

Minimum Storage Elevation = 78'

Total Storage Volume = 1,090,800 FT³

Golder Associates	SUBJECT ISRT/Woburn/Mass Reading Subwatershed Storage Capacities		
	Job No. 983-6400.310	Made by RD copied by SMM	Date 7-22-91
	Ref. Whitman & Howard Sheets 7 & 11 of 39	Checked UEE7	Sheet 13 of 13
		Reviewed RRM	

Subwatershed 8C -
Location: Swamp area directly east of 14'x4' Box Culvert and just north of Arnold Ave. cul-de-sac.

ELEV (ft.)	Area (ft.²)	Average Area (ft.²)	Depth (ft.)	Volume (ft³)	Cumulative Volume (ft.³) Max. elev. = 74'
64	48,600 (1.12 ac.)				
		65,800	2	131,600	131,600
66	83,000 (1.9 ac.)				
		112,900	2	225,800	357,400
68	142,800 (3.28 ac.)				
		195,500	2	391,000	748,400
70	248,200 (5.70 ac.)				
		315,450	2	630,900	1,379,300
72	382,700 (8.79 ac.)				
		432,750	2	865,500	2,244,800
74	482,800 (11.08 ac.)				

Maximum Storage Elevation = 74'

Minimum Storage Elevation = 64'

Total Storage Volume ≅ 2,245,000 FT³

HEC-1

25 Year, 24 Hour Storm

(Routing Watershed 7 Through 8)

1

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FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985
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THIS HEC-1 VERSION CONTAINS ALL OPTIONS EXCEPT ECONOMICS, AND THE NUMBER OF PLANS ARE REDUCED TO 3

1 HEC-1 INPUT PAGE 1

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

  1           ID        READING SUBWATERSHEDS
  2           ID        DETAILED STORAGE AND STREAM NETWORK
  3           ID        EXISTING CONDITIONS - 25 YR, 24 HR STORM
              *DIAGRAM
  4           IT      15 28FEB91     100      97
  5           IO       5

  6           KK   SUB7A
  7           KO       4
  8           KM        SCS RUNOFF CALCULATION
  9           BA   0.133
 10           PH              0     0.5     1.1     2.1     2.7     3.0     3.6     4.5     5.2
 11           LS             77
 12           UD     0.3

 13           KK   7ASWP
 14           KO       1
 15           KM        STORAGE ROUTING THROUGH 7A
 16           RS       1    ELEV     110
 17           SA    0.80    1.94    4.34   11.31   18.24
 18           SE     110     111     112     113     114
 19           SL   110.0    3.53     0.6     0.5
 20           SS   113.9       0       0     1.5

 21           KK   SUB7B
 22           KO       4
 23           KM        SCS RUNOFF CALCULATION
 24           BA   0.116
 25           PH              0     0.5     1.1     2.1     2.7     3.0     3.6     4.5     5.2
 26           LS             77
 27           UD     0.5

 28           KK     7AB
 29           KM        COMBINE HYDROGRAPHS FOR 7A & 7B
 30           HC       2

 31           KK   7BSWP
 32           KO       1
 33           KM        STORAGE ROUTING THROUGH 7B
 34           RS       1    ELEV     103
 35           SA    0.26    0.65    2.16    3.58    5.77
 36           SE     103     104     106     108     109
 37           SL     101    1.77     0.6     0.5
 38           SS   105.9       0       0     1.5

 39           KK   SUB7C
 40           KO       4
```

```
 41          KM        SCS RUNOFF CALCULATION
 42          BA   0.053
 43          PH              0     0.5     1.1     2.1     2.7     3.0     3.6     4.5     5.2
 44          LS             77
 45          UD    0.25
1                                        HEC-1 INPUT                                          PAGE  2

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


 46          KK     7BC
 47          KM        COMBINE HYDROGRAPHS FOR 7B & 7C
 48          HC       2

 49          KK   7CHNL
 50          KO       1
 51          KM        STORAGE ROUTING THROUGH 7C
 52          RS       1    STOR       0
 53          RC   0.080   0.030   0.080     400  0.0285      98
 54          RX       0      10      20      30      40      50      60      70
 55          RY      99    98.5      98      96      96      98    98.5      99

 56          KK   SUB7D
 57          KO       4
 58          KM        SCS RUNOFF CALCULATION
 59          BA   0.104
 60          PH              0     0.5     1.1     2.1     2.7     3.0     3.6     4.5     5.2
 61          LS             77
 62          UD     0.4

 63          KK   7DSWP
 64          KO       1
 65          KM        STORAGE ROUTING THROUGH 7D
 66          RS       1    ELEV    88.8
 67          SA    0.57    1.42    2.49    3.86
 68          SE      88      90      92      94
 69          SL    90.6    4.91     0.6     0.5
 70          SS      92      10     3.0     1.5

 71          KK   SUB7E
 72          KO       4
 73          KM        SCS RUNOFF CALCULATION
 74          BA   0.046
 75          PH              0     0.5     1.1     2.1     2.7     3.0     3.6     4.5     5.2
 76          LS             77
 77          UD    0.14

 78          KK    7CDE
 79          KM        COMBINE HYDROGRAPHS FOR 7C, 7D, & 7E
 80          HC       3

 81          KK   7ECHN
 82          KO       1
 83          KM        STORAGE ROUTING THROUGH 7CDE
 84          RS       1    STOR       0
 85          RC    0.08    0.03    0.08    7600   0.002      93
 86          RX       0       5      10      16      24      30      35      40
 87          RY      94    93.5      93      88      88      93    93.5      94
1                                        HEC-1 INPUT                                          PAGE  3

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


 88          KK   SUB7F
 89          KO       4
 90          KM        SCS RUNOFF CALCULATION
```

```
 91          BA   0.206
 92          PH              0     0.5     1.1     2.1     2.7     3.0     3.6     4.5     5.2
 93          LS             77
 94          UD     0.3

 95          KK    7EF
 96          KM        COMBINE HYDROGRAPHS FOR 7E & 7F
 97          HC       2

 98          KK   7FCHNL
 99          KO       1
100          KM        STORAGE ROUTING THROUGH 7F
101          RS       1    STOR       0
102          RC    0.08    0.03    0.08     500   0.003      90
103          RX       0       5      10      16      24      30      35      40
104          RY      90    90.5      90      86      86      90    90.5      91

105          KK   SUB7G
106          KO       4
107          KM        SCS RUNOFF CALCULATION
108          BA   0.063
109          PH              0     0.5     1.1     2.1     2.7     3.0     3.6     4.5     5.2
110          LS             77
111          UD     0.3

112          KK    7FG
113          KM        COMBINE HYDROGRAPHS FOR 7F & 7G
114          HC       2

115          KK   7GSWP
116          KO       1
117          KM        STORAGE ROUTING THROUGH 7G
118          RS       1    ELEV      85
119          SA       0    0.57    2.53    5.15
120          SE      85      86      87      88
121          SL    85.8   16.25     0.6     0.5
122          SS      88       0       0     1.5

123          KK   SUB7H
124          KO       4
125          KM        SCS RUNOFF CALCULATION
126          BA   0.186
127          PH              0     0.5     1.1     2.1     2.7     3.0     3.6     4.5     5.2
128          LS             77
129          UD     0.3
```



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

130          KK    7GH
131          KM        COMBINE HYDROGRAPHS FOR 7G & 7H
132          HC       2

133          KK   7HSWP
134          KO       1
135          KM        STORAGE ROUTING THROUGH 7H
136          RS       1    ELEV      84
137          SA    0.39    3.08    9.24   15.26
138          SE      84      86      87      88
139          SS      84      10     3.0     1.5

140          KK   SUB8A
141          KO       4
142          KM        SCS RUNOFF CALCULATION
143          BA   0.076
```

```
PH              0     0.5     1.1     2.1     2.7     3.0     3.6     4.5     5.2
LS             74
UD    0.23

KK    7H8A
KM        COMBINE HYDROGRAPHS FOR 7H & 8A
HC       2

KK   8ASWP
KO       1
KM        STORAGE ROUTING THROUGH 8A SWAMP
RS       1    ELEV      78
SA       0    2.42    5.19    9.82
SE      78      80      82      84
SL   78.85    28.3     0.6     0.5
SS    83.9       0       0     1.5

KK   SUB8B
KO       4
KM        SCS RUNOFF CALCULATION
BA   0.332
PH              0     0.5     1.1     2.1     2.7     3.0     3.6     4.5     5.2
LS             74
UD     0.4

KK     8AB
KM        COMBINE HYDROGRAPHS FOR 8A & 8B
HC       2

KK   8BSWP
KO       1
KM        STORAGE ROUTING THROUGH 8B
RS       1    STOR       0
RC    0.08    0.03    0.08    1200   0.003      82
RX       0       5      10      20      25      35      40      45
RY      84      83      82      75      75      82      83      84
```



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

KK   SUB8C
KO       4
KM        SCS RUNOFF CALCULATION
BA   0.116
PH              0     0.5     1.1     2.1     2.7     3.0     3.6     4.5     5.2
LS             74
UD    0.26

KK     8BC
KM        COMBINE HYDROGRAPHS FOR 8B & 8C
HC       2

KK   8CSWP
KO       1
KM        STORAGE ROUTING THROUGH 8C
RS       1    ELEV      64
SA    1.12    1.91    3.28    5.70    8.79   11.08
SE      64      66      68      70      72      74
SS      64      12     3.0     1.5

KK   SUB6A
KO       4
KM        SCS RUNOFF CALCULATION
BA   0.096
PH              0     0.5     1.1     2.1     2.7     3.0     3.6     4.5     5.2
```

```
197          LS              72
198          UD     0.5

199          KK   6ASWP
200          KO       1
201          KM        STORAGE ROUTING THROUGH 6A
202          RS       1    ELEV      82
203          SA    0.10    1.16    3.98    7.54
204          SE      82      84      85      86
205          SL      85    4.50     0.6     0.5
206          SS    85.9       0       0     1.5

207          KK   SUB6B
208          KO       4
209          KM        SCS RUNOFF CALCULATION
210          BA   0.176
211          PH              0     0.5     1.1     2.1     2.7     3.0     3.6     4.5     5.2
212          LS              72
213          UD     0.2

214          KK     6AB
215          KM        COMBINE HYDROGRAPHS FOR 6A & 6B
216          HC       2
1                                          HEC-1 INPUT                                        PAGE  6

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


217          KK   6BSWP
218          KO       1
219          KM        STORAGE ROUTING THROUGH 6B
220          RS       1    ELEV    79.5
221          SA    9.64   23.83   37.42
222          SE      79      80      82
223          SL    79.5    0.79     0.6     0.5
224          SL    80.6    11.3     0.6     0.5
225          SS    81.9       0     3.0     1.5

226          KK   SUB6D
227          KO       4
228          KM        SCS RUNOFF CALCULATION
229          BA   0.421
230          PH              0     0.5     1.1     2.1     2.7     3.0     3.6     4.5     5.2
231          LS              72
232          UD    0.50

233          KK   6DSWP
234          KO       1
235          KM        STORAGE ROUTING THROUGH 6D
236          RS       1    ELEV      80
237          SA    1.54    14.4
238          SE      80      90
239          SL      80   12.57     0.6     0.5
240          SS      90       0     3.0     1.5

241          KK   SUB6C
242          KO       4
243          KM        SCS RUNOFF CALCULATION
244          BA   0.234
245          PH              0     0.5     1.1     2.1     2.7     3.0     3.6     4.5     5.2
246          LS              72
247          UD     0.3

248          KK    6BCD
249          KM        COMBINE HYDROGRAPHS FOR 6B,6C & 6D
250          HC       3
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251          KK   6CSWP
252          KO       1
253          KM        STORAGE ROUTING THROUGH 6C
254          RS       1    ELEV    74.5
255          SA       0    2.33   12.55   24.40   33.53
256          SE    74.5      76      78      80      82
257          SL    74.5   19.64     0.6     0.5
258          SS    81.9       0       0     1.5
259          ZZ
1
              SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE     (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

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

     6      SUB7A
                V
                V
    13      7ASWP
                .
                .
    21          .       SUB7B
                .           .
                .           .
    28        7AB............
                V
                V
    31      7BSWP
                .
                .
    39          .       SUB7C
                .           .
                .           .
    46        7BC............
                V
                V
    49      7CHNL
                .
                .
    56          .       SUB7D
                .           V
                .           V
    63          .       7DSWP
                .           .
                .           .
    71          .           .       SUB7E
                .           .           .
                .           .           .
    78        7CDE........................
                V
                V
    81      7ECHN
                .
                .
    88          .       SUB7F
                .           .
                .           .
    95        7EF ............
                V
                V
    98      7FCHN
                .
                .
   105          .       SUB7G
```

```
            .          .
            .          .
112       7FG ............
            V
            V
 15      7GSWP
            .
            .
123         .       SUB7H
            .          .
            .          .
130       7GH ............
            V
            V
133      7HSWP
            .
            .
140         .       SUB8A
            .          .
            .          .
147       7H8A............
            V
            V
150      8ASWP
            .
            .
158         .       SUB8B
            .          .
            .          .
165        8AB............
            V
            V
  8      8BSWP
            .
            .
175         .       SUB8C
            .          .
            .          .
182        8BC............
            V
            V
185      8CSWP
            .
            .
192         .       SUB6A
            .          V
            .          V
199         .       6ASWP
            .          .
            .          .
207         .          .       SUB6B
            .          .          .
            .          .          .
214         .         6AB............
            .          V
            .          V
217         .       6BSWP
            .          .
            .          .
226         .          .       SUB6D
            .          .          V
            .          .          V
233         .          .       6DSWP
            .          .          .
            .          .          .
241         .          .          .       SUB6C
```

```
                .          .          .          .
                .          .          .          .
  248           .        6BCD.......................
                .          V
                .          V
  251           .       6CSWP

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1                                                          ****
                          FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985
              U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616
                                                           ****



                            READING SUBWATERSHEDS
                            DETAILED STORAGE AND STREAM NETWORK
                            EXISTING CONDITIONS - 25 YR, 24 HR STORM

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

    IT          HYDROGRAPH TIME DATA
                       NMIN          15  MINUTES IN COMPUTATION INTERVAL
                      IDATE     28FEB91  STARTING DATE
                      ITIME        0100  STARTING TIME
                         NQ          97  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      1MAR91  ENDING DATE
                     NDTIME        0100  ENDING TIME

                 COMPUTATION INTERVAL     .25 HOURS
                      TOTAL TIME BASE   24.00 HOURS

        ENGLISH UNITS


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


          **************
          *            *
  6 KK    *     SUB7A  *
          *            *
          **************

  7 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           4  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                            SCS RUNOFF CALCULATION

             SUBBASIN RUNOFF DATA

  9 BA          SUBBASIN CHARACTERISTICS
                      TAREA         .13  SUBBASIN AREA

                PRECIPITATION DATA

 10 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                  .50    1.10    2.10    2.70    3.00    3.60    4.50    5.20     .00     .00     .00     .00
```

```
                                        STORM AREA =     .13

 11 LS          SCS LOSS RATE
                     STRTL         .60  INITIAL ABSTRACTION
                    CRVNBR       77.00  CURVE NUMBER
                     RTIMP         .00  PERCENT IMPERVIOUS AREA

 12 UD          SCS DIMENSIONLESS UNITGRAPH
                      TLAG         .30  LAG

                                                        ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                  UNIT HYDROGRAPH
                                              8 END-OF-PERIOD ORDINATES
              97.      144.       63.       25.        9.        4.        1.        0.


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


          **************
          *            *
 13 KK    *     7ASWP  *
          *            *
          **************

 14 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           1  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                              STORAGE ROUTING THROUGH 7A

             HYDROGRAPH ROUTING DATA

 16 RS          STORAGE ROUTING
                     NSTPS           1  NUMBER OF SUBREACHES
                      ITYP        ELEV  TYPE OF INITIAL CONDITION
                    RSVRIC      110.00  INITIAL CONDITION
                         X         .00 WORKING R AND D COEFFICIENT

 17 SA              AREA          .8       1.9       4.3      11.3      18.2

 18 SE          ELEVATION      110.00    111.00    112.00    113.00    114.00

 19 SL          LOW-LEVEL OUTLET
                     ELEVL      110.00  ELEVATION AT CENTER OF OUTLET
                     CAREA        3.53  CROSS-SECTIONAL AREA
                      COQL         .60  COEFFICIENT
                      EXPL         .50  EXPONENT OF HEAD

 20 SS          SPILLWAY
                      CREL      113.90  SPILLWAY CREST ELEVATION
                     SPWID         .00  SPILLWAY WIDTH
                      COQW         .00  WEIR COEFFICIENT
                      EXPW        1.50  EXPONENT OF HEAD

                                                        ***

                                        COMPUTED STORAGE-ELEVATION DATA

          STORAGE        .00      1.33      4.39     11.94     26.58
        ELEVATION     110.00    111.00    112.00    113.00    114.00
```

COMPUTED OUTFLOW-ELEVATION DATA

OUTFLOW	.00	17.07	18.18	19.46	20.92	22.62	24.63	27.02	29.93	33.55
ELEVATION	110.00	111.01	111.15	111.31	111.52	111.77	112.10	112.53	113.11	113.90

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	1.33	1.63	2.03	2.61	3.48	4.39	4.86	7.53	11.94
OUTFLOW	.00	16.99	18.18	19.46	20.92	22.62	24.02	24.63	27.02	29.42
ELEVATION	110.00	111.00	111.15	111.31	111.52	111.77	112.00	112.10	112.53	113.00
STORAGE	13.17	24.79	26.58							
OUTFLOW	29.93	33.55	33.97							
ELEVATION	113.11	113.90	114.00							

HYDROGRAPH AT STATION 7ASWP

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
28	FEB	0100	1	0.	.0	110.0	28	FEB	0915	34	0.	.0	110.0	28	FEB	1730	67	25.	5.6	112.2
28	FEB	0115	2	0.	.0	110.0	28	FEB	0930	35	0.	.0	110.0	28	FEB	1745	68	25.	5.3	112.2
28	FEB	0130	3	0.	.0	110.0	28	FEB	0945	36	0.	.0	110.0	28	FEB	1800	69	25.	5.0	112.1
28	FEB	0145	4	0.	.0	110.0	28	FEB	1000	37	0.	.0	110.0	28	FEB	1815	70	24.	4.7	112.1
28	FEB	0200	5	0.	.0	110.0	28	FEB	1015	38	1.	.0	110.0	28	FEB	1830	71	24.	4.4	112.0
28	FEB	0215	6	0.	.0	110.0	28	FEB	1030	39	1.	.1	110.0	28	FEB	1845	72	24.	4.1	111.9
28	FEB	0230	7	0.	.0	110.0	28	FEB	1045	40	1.	.1	110.1	28	FEB	1900	73	23.	3.8	111
28	FEB	0245	8	0.	.0	110.0	28	FEB	1100	41	1.	.1	110.1	28	FEB	1915	74	23.	3.5	111
28	FEB	0300	9	0.	.0	110.0	28	FEB	1115	42	2.	.1	110.1	28	FEB	1930	75	22.	3.2	111.7
28	FEB	0315	10	0.	.0	110.0	28	FEB	1130	43	2.	.2	110.1	28	FEB	1945	76	21.	2.9	111.6
28	FEB	0330	11	0.	.0	110.0	28	FEB	1145	44	3.	.2	110.2	28	FEB	2000	77	21.	2.6	111.5
28	FEB	0345	12	0.	.0	110.0	28	FEB	1200	45	3.	.3	110.2	28	FEB	2015	78	20.	2.3	111.4
28	FEB	0400	13	0.	.0	110.0	28	FEB	1215	46	4.	.4	110.3	28	FEB	2030	79	19.	2.0	111.3
28	FEB	0415	14	0.	.0	110.0	28	FEB	1230	47	6.	.5	110.4	28	FEB	2045	80	18.	1.7	111.2
28	FEB	0430	15	0.	.0	110.0	28	FEB	1245	48	9.	.7	110.5	28	FEB	2100	81	17.	1.4	111.0
28	FEB	0445	16	0.	.0	110.0	28	FEB	1300	49	15.	1.2	110.9	28	FEB	2115	82	15.	1.2	110.9
28	FEB	0500	17	0.	.0	110.0	28	FEB	1315	50	21.	2.5	111.5	28	FEB	2130	83	13.	1.0	110.7
28	FEB	0515	18	0.	.0	110.0	28	FEB	1330	51	24.	4.7	112.1	28	FEB	2145	84	11.	.8	110.6
28	FEB	0530	19	0.	.0	110.0	28	FEB	1345	52	26.	6.7	112.4	28	FEB	2200	85	9.	.7	110.5
28	FEB	0545	20	0.	.0	110.0	28	FEB	1400	53	27.	7.8	112.6	28	FEB	2215	86	8.	.6	110.5
28	FEB	0600	21	0.	.0	110.0	28	FEB	1415	54	27.	8.3	112.6	28	FEB	2230	87	7.	.6	110.4
28	FEB	0615	22	0.	.0	110.0	28	FEB	1430	55	28.	8.5	112.6	28	FEB	2245	88	6.	.5	110.4
28	FEB	0630	23	0.	.0	110.0	28	FEB	1445	56	28.	8.5	112.6	28	FEB	2300	89	6.	.5	110.3
28	FEB	0645	24	0.	.0	110.0	28	FEB	1500	57	27.	8.3	112.6	28	FEB	2315	90	5.	.4	110.3
28	FEB	0700	25	0.	.0	110.0	28	FEB	1515	58	27.	8.1	112.6	28	FEB	2330	91	5.	.4	110.3
28	FEB	0715	26	0.	.0	110.0	28	FEB	1530	59	27.	7.9	112.6	28	FEB	2345	92	5.	.4	110.3
28	FEB	0730	27	0.	.0	110.0	28	FEB	1545	60	27.	7.6	112.5	1	MAR	0000	93	4.	.3	110.3
28	FEB	0745	28	0.	.0	110.0	28	FEB	1600	61	27.	7.3	112.5	1	MAR	0015	94	4.	.3	110.3
28	FEB	0800	29	0.	.0	110.0	28	FEB	1615	62	27.	7.0	112.5	1	MAR	0030	95	4.	.3	110.2
28	FEB	0815	30	0.	.0	110.0	28	FEB	1630	63	26.	6.8	112.4	1	MAR	0045	96	4.	.3	110.2
28	FEB	0830	31	0.	.0	110.0	28	FEB	1645	64	26.	6.5	112.4	1	MAR	0100	97	4.	.3	110.2
28	FEB	0845	32	0.	.0	110.0	28	FEB	1700	65	26.	6.2	112.3							
28	FEB	0900	33	0.	.0	110.0	28	FEB	1715	66	26.	5.9	112.3							

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW (CFS) 6-HR	24-HR	72-HR	24.00-HR
+ 28.	13.50	26.	10.	10.	10.

```
                    (INCHES)     1.803       2.732       2.732       2.732
                     (AC-FT)       13.         19.         19.         19.

PEAK STORAGE   TIME                        MAXIMUM AVERAGE STORAGE
                                   6-HR       24-HR       72-HR     24.00-HR
  (AC-FT)      (HR)
       9.     13.50                  6.          2.          2.          2.

 PEAK STAGE    TIME                        MAXIMUM AVERAGE STAGE
                                   6-HR       24-HR       72-HR     24.00-HR
+  (FEET)      (HR)
   112.63     13.50              112.32      110.79      110.79      110.79

                     CUMULATIVE AREA =     .13 SQ MI


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


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           *            *
  21 KK    *    SUB7B   *
           *            *
           **************

  22 KO         OUTPUT CONTROL VARIABLES
                     IPRNT           4  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                              SCS RUNOFF CALCULATION

              SUBBASIN RUNOFF DATA

  24 BA         SUBBASIN CHARACTERISTICS
                     TAREA         .12  SUBBASIN AREA

                PRECIPITATION DATA

  25 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                  .50    1.10    2.10    2.70    3.00    3.60    4.50    5.20     .00     .00     .00     .00

                                                  STORM AREA =     .12

  26 LS         SCS LOSS RATE
                     STRTL         .60  INITIAL ABSTRACTION
                    CRVNBR       77.00  CURVE NUMBER
                     RTIMP         .00  PERCENT IMPERVIOUS AREA

  27 UD         SCS DIMENSIONLESS UNITGRAPH
                      TLAG         .50  LAG

                                                          ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                     UNIT HYDROGRAPH
                                                 12 END-OF-PERIOD ORDINATES
              28.       84.       84.       51.       25.       13.        7.        4.        2.        1.
               1.        0.
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*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
 31 KK    *    7BSWP   *
          *            *
          **************

 32 KO        OUTPUT CONTROL VARIABLES
                    IPRNT          1  PRINT CONTROL
                    IPLOT          0  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE
                             STORAGE ROUTING THROUGH 7B

            HYDROGRAPH ROUTING DATA

 34 RS        STORAGE ROUTING
                    NSTPS          1  NUMBER OF SUBREACHES
                     ITYP       ELEV  TYPE OF INITIAL CONDITION
                   RSVRIC     103.00  INITIAL CONDITION
                        X        .00 WORKING R AND D COEFFICIENT

 35 SA            AREA          .3        .6       2.2       3.6       5.8

 36 SE        ELEVATION     103.00    104.00    106.00    108.00    109.00

 37 SL        LOW-LEVEL OUTLET
                    ELEVL     101.00  ELEVATION AT CENTER OF OUTLET
                    CAREA       1.77  CROSS-SECTIONAL AREA
                     COQL        .60  COEFFICIENT
                     EXPL        .50  EXPONENT OF HEAD

 38 SS        SPILLWAY
                     CREL     105.90  SPILLWAY CREST ELEVATION
                    SPWID        .00  SPILLWAY WIDTH
                     COQW        .00  WEIR COEFFICIENT
                     EXPW       1.50  EXPONENT OF HEAD

                                                    ***

                                        COMPUTED STORAGE-ELEVATION DATA

          STORAGE        .00       .44      3.10      8.78     13.42
        ELEVATION     103.00    104.00    106.00    108.00    109.00

                                        COMPUTED OUTFLOW-ELEVATION DATA

          OUTFLOW        .00     12.55     13.10     13.69     14.35     15.07     15.86     16.75     17.74     18.85
        ELEVATION     103.00    103.17    103.36    103.58    103.84    104.13    104.47    104.87    105.34    105.90


                                      COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE        .00       .05       .12       .21       .34       .44       .53       .81      1.23      1.88
          OUTFLOW      12.05     12.55     13.10     13.69     14.35     14.75     15.07     15.86     16.75     17.74
        ELEVATION     103.00    103.17    103.36    103.58    103.84    104.00    104.13    104.47    104.87    105.34

          STORAGE       2.89      3.10      8.78     13.42
          OUTFLOW      18.85     19.05     22.53     24.09
        ELEVATION     105.90    106.00    108.00    109.00

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                                        HYDROGRAPH AT STATION    7BSWP
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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
	FEB	0100	1	12.	.0	103.0	28	FEB	0915	34	11.	-.1	103.0	28	FEB	1730	67	24.	14.3	109.2
	FEB	0115	2	11.	-.1	103.0	28	FEB	0930	35	11.	-.1	103.0	28	FEB	1745	68	24.	14.5	109.2
28	FEB	0130	3	11.	-.1	103.0	28	FEB	0945	36	11.	-.1	103.0	28	FEB	1800	69	25.	14.7	109.3
28	FEB	0145	4	11.	-.1	103.0	28	FEB	1000	37	11.	-.1	103.0	28	FEB	1815	70	25.	14.9	109.3
28	FEB	0200	5	11.	-.1	103.0	28	FEB	1015	38	11.	-.1	103.0	28	FEB	1830	71	25.	15.1	109.4
28	FEB	0215	6	11.	-.1	103.0	28	FEB	1030	39	11.	-.1	103.0	28	FEB	1845	72	25.	15.3	109.4
28	FEB	0230	7	11.	-.1	103.0	28	FEB	1045	40	11.	-.1	103.0	28	FEB	1900	73	25.	15.4	109.4
28	FEB	0245	8	11.	-.1	103.0	28	FEB	1100	41	11.	-.1	103.0	28	FEB	1915	74	25.	15.5	109.5
28	FEB	0300	9	11.	-.1	103.0	28	FEB	1115	42	11.	-.1	103.0	28	FEB	1930	75	25.	15.6	109.5
28	FEB	0315	10	11.	-.1	103.0	28	FEB	1130	43	11.	-.1	103.0	28	FEB	1945	76	25.	15.7	109.5
28	FEB	0330	11	11.	-.1	103.0	28	FEB	1145	44	11.	-.1	103.0	28	FEB	2000	77	25.	15.8	109.5
28	FEB	0345	12	11.	-.1	103.0	28	FEB	1200	45	11.	-.1	103.0	28	FEB	2015	78	25.	15.8	109.5
28	FEB	0400	13	11.	-.1	103.0	28	FEB	1215	46	11.	-.1	103.0	28	FEB	2030	79	25.	15.8	109.5
28	FEB	0415	14	11.	-.1	103.0	28	FEB	1230	47	11.	-.1	103.0	28	FEB	2045	80	25.	15.7	109.5
28	FEB	0430	15	11.	-.1	103.0	28	FEB	1245	48	13.	.1	103.2	28	FEB	2100	81	25.	15.7	109.5
28	FEB	0445	16	11.	-.1	103.0	28	FEB	1300	49	15.	.4	104.0	28	FEB	2115	82	25.	15.6	109.5
28	FEB	0500	17	11.	-.1	103.0	28	FEB	1315	50	17.	1.3	104.9	28	FEB	2130	83	25.	15.4	109.4
28	FEB	0515	18	11.	-.1	103.0	28	FEB	1330	51	19.	3.0	105.9	28	FEB	2145	84	25.	15.2	109.4
28	FEB	0530	19	11.	-.1	103.0	28	FEB	1345	52	20.	5.1	106.7	28	FEB	2200	85	25.	15.0	109.3
28	FEB	0545	20	11.	-.1	103.0	28	FEB	1400	53	21.	7.0	107.4	28	FEB	2215	86	25.	14.8	109.3
28	FEB	0600	21	11.	-.1	103.0	28	FEB	1415	54	22.	8.5	107.9	28	FEB	2230	87	24.	14.5	109.2
28	FEB	0615	22	11.	-.1	103.0	28	FEB	1430	55	23.	9.6	108.2	28	FEB	2245	88	24.	14.2	109.2
28	FEB	0630	23	11.	-.1	103.0	28	FEB	1445	56	23.	10.4	108.4	28	FEB	2300	89	24.	13.9	109.1
28	FEB	0645	24	11.	-.1	103.0	28	FEB	1500	57	23.	11.1	108.5	28	FEB	2315	90	24.	13.6	109.0
28	FEB	0700	25	11.	-.1	103.0	28	FEB	1515	58	23.	11.6	108.6	28	FEB	2330	91	24.	13.3	109.0
28	FEB	0715	26	11.	-.1	103.0	28	FEB	1530	59	24.	12.0	108.7	28	FEB	2345	92	24.	12.9	108.9
28	FEB	0730	27	11.	-.1	103.0	28	FEB	1545	60	24.	12.4	108.8	1	MAR	0000	93	24.	12.6	108.8
28	FEB	0745	28	11.	-.1	103.0	28	FEB	1600	61	24.	12.7	108.8	1	MAR	0015	94	24.	12.3	108.8
	FEB	0800	29	11.	-.1	103.0	28	FEB	1615	62	24.	13.0	108.9	1	MAR	0030	95	24.	11.9	108.7
	FEB	0815	30	11.	-.1	103.0	28	FEB	1630	63	24.	13.3	109.0	1	MAR	0045	96	23.	11.6	108.6
28	FEB	0830	31	11.	-.1	103.0	28	FEB	1645	64	24.	13.6	109.0	1	MAR	0100	97	23.	11.2	108.5
28	FEB	0845	32	11.	-.1	103.0	28	FEB	1700	65	24.	13.8	109.1							
28	FEB	0900	33	11.	-.1	103.0	28	FEB	1715	66	24.	14.1	109.1							

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.00-HR
		(CFS)				
25.	19.25		25.	17.	17.	17.
		(INCHES)	.921	2.590	2.590	2.590
		(AC-FT)	12.	34.	34.	34.

PEAK STORAGE (AC-FT)	TIME (HR)	MAXIMUM AVERAGE STORAGE 6-HR	24-HR	72-HR	24.00-HR
16.	19.25	15.	6.	6.	6.

PEAK STAGE (FEET)	TIME (HR)	MAXIMUM AVERAGE STAGE 6-HR	24-HR	72-HR	24.00-HR
109.51	19.25	109.36	105.90	105.90	105.90

CUMULATIVE AREA = .25 SQ MI

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          **************
          *            *
 39 KK    *    SUB7C   *
          *            *
          **************

 40 KO        OUTPUT CONTROL VARIABLES
                    IPRNT          4  PRINT CONTROL
                    IPLOT          0  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE
                             SCS RUNOFF CALCULATION

            SUBBASIN RUNOFF DATA

 42 BA        SUBBASIN CHARACTERISTICS
                    TAREA        .05  SUBBASIN AREA

              PRECIPITATION DATA

 43 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
              ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
              5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                .50    1.10    2.10    2.70    3.00    3.60    4.50    5.20     .00     .00     .00     .00

                                                STORM AREA =     .05

 44 LS        SCS LOSS RATE
                    STRTL        .60  INITIAL ABSTRACTION
                   CRVNBR      77.00  CURVE NUMBER
                    RTIMP        .00  PERCENT IMPERVIOUS AREA

 45 UD        SCS DIMENSIONLESS UNITGRAPH
                     TLAG        .25  LAG

                                                          ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                     UNIT HYDROGRAPH
                                                 7 END-OF-PERIOD ORDINATES
            52.       56.       19.        7.        2.        1.        0.


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


          **************
          *            *
 49 KK    *    7CHNL   *
          *            *
          **************

 50 KO        OUTPUT CONTROL VARIABLES
                    IPRNT          1  PRINT CONTROL
                    IPLOT          0  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE
                             STORAGE ROUTING THROUGH 7C

            HYDROGRAPH ROUTING DATA

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

```
53 RC          NORMAL DEPTH CHANNEL ROUTING
                     ANL        .080  LEFT OVERBANK N-VALUE
                    ANCH        .030  MAIN CHANNEL N-VALUE
                     ANR        .080  RIGHT OVERBANK N-VALUE
                   RLNTH        400.  REACH LENGTH
                     SEL       .0285  ENERGY SLOPE
                   ELMAX        98.0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION
```

CROSS-SECTION DATA

		--- LEFT OVERBANK ---			+ ------ MAIN CHANNEL			------- + --- RIGHT OVERBANK ---	
55 RY	ELEVATION	99.00	98.50	98.00	96.00	96.00	98.00	98.50	99.00
54 RX	DISTANCE	.00	10.00	20.00	30.00	40.00	50.00	60.00	70.00

***

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	.01	.02	.03	.05	.06	.08	.09	.11	.13
OUTFLOW	.00	2.00	6.48	13.01	21.49	31.89	44.21	58.51	74.81	93.17
ELEVATION	96.00	96.11	96.21	96.32	96.42	96.53	96.63	96.74	96.84	96.95
STORAGE	.15	.17	.19	.21	.24	.26	.28	.31	.34	.37
OUTFLOW	113.65	136.29	161.16	188.33	217.84	249.76	284.15	321.07	360.59	402.75
ELEVATION	97.05	97.16	97.26	97.37	97.47	97.58	97.68	97.79	97.89	98.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 0. TO 403.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

****

HYDROGRAPH AT STATION 7CHNL

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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
28	FEB	0100	1	0.	.0	96.0	*	28	FEB	0915	34	11.	.0	96.3	*	28	FEB	1730	67	29.	.1	96.5
28	FEB	0115	2	19.	.0	96.4	*	28	FEB	0930	35	11.	.0	96.3	*	28	FEB	1745	68	29.	.1	96.5
28	FEB	0130	3	5.	.0	96.2	*	28	FEB	0945	36	11.	.0	96.3	*	28	FEB	1800	69	29.	.1	96.5
28	FEB	0145	4	15.	.0	96.3	*	28	FEB	1000	37	11.	.0	96.3	*	28	FEB	1815	70	29.	.1	96.5
28	FEB	0200	5	8.	.0	96.2	*	28	FEB	1015	38	12.	.0	96.3	*	28	FEB	1830	71	28.	.1	96.5
28	FEB	0215	6	13.	.0	96.3	*	28	FEB	1030	39	12.	.0	96.3	*	28	FEB	1845	72	28.	.1	96.5
28	FEB	0230	7	10.	.0	96.3	*	28	FEB	1045	40	12.	.0	96.3	*	28	FEB	1900	73	28.	.1	96.5
28	FEB	0245	8	12.	.0	96.3	*	28	FEB	1100	41	12.	.0	96.3	*	28	FEB	1915	74	28.	.1	96.5
28	FEB	0300	9	10.	.0	96.3	*	28	FEB	1115	42	12.	.0	96.3	*	28	FEB	1930	75	27.	.1	96.5
28	FEB	0315	10	11.	.0	96.3	*	28	FEB	1130	43	13.	.0	96.3	*	28	FEB	1945	76	27.	.1	96.5
28	FEB	0330	11	11.	.0	96.3	*	28	FEB	1145	44	13.	.0	96.3	*	28	FEB	2000	77	27.	.1	96.5
28	FEB	0345	12	11.	.0	96.3	*	28	FEB	1200	45	14.	.0	96.3	*	28	FEB	2015	78	27.	.1	96.5
28	FEB	0400	13	11.	.0	96.3	*	28	FEB	1215	46	15.	.0	96.3	*	28	FEB	2030	79	27.	.1	96.5
28	FEB	0415	14	11.	.0	96.3	*	28	FEB	1230	47	17.	.0	96.4	*	28	FEB	2045	80	27.	.1	96.5
28	FEB	0430	15	11.	.0	96.3	*	28	FEB	1245	48	22.	.0	96.4	*	28	FEB	2100	81	27.	.1	96.5
28	FEB	0445	16	11.	.0	96.3	*	28	FEB	1300	49	34.	.1	96.5	*	28	FEB	2115	82	27.	.1	96.5
28	FEB	0500	17	11.	.0	96.3	*	28	FEB	1315	50	69.	.1	96.8	*	28	FEB	2130	83	27.	.1	96.5
28	FEB	0515	18	11.	.0	96.3	*	28	FEB	1330	51	78.	.1	96.9	*	28	FEB	2145	84	26.	.1	96.5
28	FEB	0530	19	11.	.0	96.3	*	28	FEB	1345	52	55.	.1	96.7	*	28	FEB	2200	85	26.	.1	96.5
28	FEB	0545	20	11.	.0	96.3	*	28	FEB	1400	53	45.	.1	96.6	*	28	FEB	2215	86	26.	.1	96.5
28	FEB	0600	21	11.	.0	96.3	*	28	FEB	1415	54	38.	.1	96.6	*	28	FEB	2230	87	26.	.1	96.5
	FEB	0615	22	11.	.0	96.3	*	28	FEB	1430	55	34.	.1	96.5	*	28	FEB	2245	88	26.	.1	96.5
	FEB	0630	23	11.	.0	96.3	*	28	FEB	1445	56	31.	.1	96.5	*	28	FEB	2300	89	26.	.1	96.5
	FEB	0645	24	11.	.0	96.3	*	28	FEB	1500	57	30.	.1	96.5	*	28	FEB	2315	90	26.	.1	96.5
28	FEB	0700	25	11.	.0	96.3	*	28	FEB	1515	58	30.	.1	96.5	*	28	FEB	2330	91	26.	.1	96.5
28	FEB	0715	26	11.	.0	96.3	*	28	FEB	1530	59	29.	.1	96.5	*	28	FEB	2345	92	25.	.1	96.5
28	FEB	0730	27	11.	.0	96.3	*	28	FEB	1545	60	29.	.1	96.5	*	1	MAR	0000	93	25.	.1	96.5

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 28 FEB 0745  28      11.       .0    96.3 * 28 FEB 1600  61      29.       .1    96.5 *  1 MAR 0015  94      25.       .1    96.5
 28 FEB 0800  29      11.       .0    96.3 * 28 FEB 1615  62      29.       .1    96.5 *  1 MAR 0030  95      25.       .1    96.5
 28 FEB 0815  30      11.       .0    96.3 * 28 FEB 1630  63      29.       .1    96.5 *  1 MAR 0045  96      25.       .1    96.5
 28 FEB 0830  31      11.       .0    96.3 * 28 FEB 1645  64      29.       .1    96.5 *  1 MAR 0100  97      25.       .1    96.5
 28 FEB 0845  32      11.       .0    96.3 * 28 FEB 1700  65      29.       .1    96.5 *
 28 FEB 0900  33      11.       .0    96.3 * 28 FEB 1715  66      29.       .1    96.5 *
                                          *                                          *
*****************************************************************************************************************************

 PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+  (CFS)       (HR)
                          (CFS)
+     78.     12.50                   35.         21.         21.         21.
                        (INCHES)    1.084       2.620       2.620       2.620
                         (AC-FT)      17.         42.         42.         42.

 PEAK STORAGE   TIME                         MAXIMUM AVERAGE STORAGE
                                     6-HR       24-HR       72-HR     24.00-HR
+  (AC-FT)      (HR)
       0.     12.50                    0.          0.          0.          0.

 PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                     6-HR       24-HR       72-HR     24.00-HR
+  (FEET)      (HR)
    96.86     12.50                 96.55       96.40       96.40       96.40

                        CUMULATIVE AREA =     .30 SQ MI


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            **************
            *            *
  56 KK     *    SUB7D   *
            *            *
            **************

  57 KO          OUTPUT CONTROL VARIABLES
                       IPRNT           4  PRINT CONTROL
                       IPLOT           0  PLOT CONTROL
                       QSCAL          0.  HYDROGRAPH PLOT SCALE
                                SCS RUNOFF CALCULATION

               SUBBASIN RUNOFF DATA

  59 BA          SUBBASIN CHARACTERISTICS
                       TAREA         .10  SUBBASIN AREA

                 PRECIPITATION DATA

  60 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                 ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                 5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                   .50    1.10    2.10    2.70    3.00    3.60    4.50    5.20     .00     .00     .00     .00

                                                  STORM AREA =     .10

  61 LS          SCS LOSS RATE
                       STRTL         .60  INITIAL ABSTRACTION
                      CRVNBR       77.00  CURVE NUMBER
                       RTIMP         .00  PERCENT IMPERVIOUS AREA
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62 UD          SCS DIMENSIONLESS UNITGRAPH
                     TLAG          .40  LAG

                                                        ***

 .ING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                   UNIT HYDROGRAPH
                                              10 END-OF-PERIOD ORDINATES
              42.       96.       72.       32.       15.        7.        3.        1.        1.        0.


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


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          *            *
63 KK     *     7DSWP  *
          *            *
          **************

64 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           1  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                              STORAGE ROUTING THROUGH 7D

             HYDROGRAPH ROUTING DATA

66 RS          STORAGE ROUTING
                     NSTPS           1  NUMBER OF SUBREACHES
                      ITYP        ELEV  TYPE OF INITIAL CONDITION
                    RSVRIC       88.80  INITIAL CONDITION
                         X         .00 WORKING R AND D COEFFICIENT

67 SA               AREA          .6       1.4       2.5       3.9

68 SE          ELEVATION       88.00     90.00     92.00     94.00

69 SL          LOW-LEVEL OUTLET
                     ELEVL       90.60  ELEVATION AT CENTER OF OUTLET
                     CAREA        4.91  CROSS-SECTIONAL AREA
                      COQL         .60  COEFFICIENT
                      EXPL         .50  EXPONENT OF HEAD

70 SS          SPILLWAY
                      CREL       92.00  SPILLWAY CREST ELEVATION
                     SPWID       10.00  SPILLWAY WIDTH
                      COQW        3.00  WEIR COEFFICIENT
                      EXPW        1.50  EXPONENT OF HEAD

                                                        ***

                                          COMPUTED STORAGE-ELEVATION DATA

          STORAGE        .00      1.93      5.79     12.09
        ELEVATION      88.00     90.00     92.00     94.00

                                          COMPUTED OUTFLOW-ELEVATION DATA

          OUTFLOW        .00       .00     24.70     25.11     25.55     25.99     26.46     26.94     27.44     27.96
        ELEVATION      88.00     90.60     91.69     91.73     91.77     91.81     91.85     91.90     91.95     92.00

          OUTFLOW      30.29     32.92     36.97     42.70     50.41     60.37     72.86     88.17    106.59    128.42
        ELEVATION      92.12     92.21     92.34     92.49     92.67     92.88     93.12     93.38     93.68     94.00
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COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	1.93	2.86	5.05	5.14	5.23	5.33	5.43	5.54	5.66
OUTFLOW	.00	.00	.00	24.70	25.11	25.55	25.99	26.46	26.94	27.44
ELEVATION	88.00	90.00	90.60	91.69	91.73	91.77	91.81	91.85	91.90	91.95
STORAGE	5.79	6.08	6.33	6.66	7.08	7.59	8.22	8.96	9.84	10.88
OUTFLOW	27.96	30.29	32.92	36.97	42.70	50.41	60.37	72.86	88.17	106.59
ELEVATION	92.00	92.12	92.21	92.34	92.49	92.67	92.88	93.12	93.38	93.68
STORAGE	12.09									
OUTFLOW	128.42									
ELEVATION	94.00									

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HYDROGRAPH AT STATION 7DSWP

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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
28	FEB	0100	1	0.	.6	88.6	28	FEB	0915	34	0.	.6	88.6	28	FEB	1730	67	13.	4.0	91.2
28	FEB	0115	2	0.	.6	88.6	28	FEB	0930	35	0.	.6	88.6	28	FEB	1745	68	12.	4.0	91.1
28	FEB	0130	3	0.	.6	88.6	28	FEB	0945	36	0.	.6	88.6	28	FEB	1800	69	12.	3.9	91.1
28	FEB	0145	4	0.	.6	88.6	28	FEB	1000	37	0.	.6	88.6	28	FEB	1815	70	11.	3.8	91.1
28	FEB	0200	5	0.	.6	88.6	28	FEB	1015	38	0.	.6	88.6	28	FEB	1830	71	10.	3.8	91.1
28	FEB	0215	6	0.	.6	88.6	28	FEB	1030	39	0.	.6	88.7	28	FEB	1845	72	10.	3.7	91.0
28	FEB	0230	7	0.	.6	88.6	28	FEB	1045	40	0.	.7	88.7	28	FEB	1900	73	9.	3.7	91.0
28	FEB	0245	8	0.	.6	88.6	28	FEB	1100	41	0.	.7	88.7	28	FEB	1915	74	9.	3.6	91.0
28	FEB	0300	9	0.	.6	88.6	28	FEB	1115	42	0.	.7	88.8	28	FEB	1930	75	8.	3.6	9[illegible]
28	FEB	0315	10	0.	.6	88.6	28	FEB	1130	43	0.	.8	88.8	28	FEB	1945	76	8.	3.5	90.[illegible]
28	FEB	0330	11	0.	.6	88.6	28	FEB	1145	44	0.	.9	88.9	28	FEB	2000	77	7.	3.5	90.9
28	FEB	0345	12	0.	.6	88.6	28	FEB	1200	45	0.	.9	89.0	28	FEB	2015	78	6.	3.4	90.9
28	FEB	0400	13	0.	.6	88.6	28	FEB	1215	46	0.	1.1	89.1	28	FEB	2030	79	6.	3.4	90.9
28	FEB	0415	14	0.	.6	88.6	28	FEB	1230	47	0.	1.2	89.3	28	FEB	2045	80	5.	3.3	90.8
28	FEB	0430	15	0.	.6	88.6	28	FEB	1245	48	0.	1.5	89.5	28	FEB	2100	81	5.	3.3	90.8
28	FEB	0445	16	0.	.6	88.6	28	FEB	1300	49	0.	1.9	90.0	28	FEB	2115	82	5.	3.3	90.8
28	FEB	0500	17	0.	.6	88.6	28	FEB	1315	50	0.	2.8	90.6	28	FEB	2130	83	5.	3.3	90.8
28	FEB	0515	18	0.	.6	88.6	28	FEB	1330	51	17.	4.4	91.4	28	FEB	2145	84	4.	3.2	90.8
28	FEB	0530	19	0.	.6	88.6	28	FEB	1345	52	29.	5.9	92.0	28	FEB	2200	85	4.	3.2	90.8
28	FEB	0545	20	0.	.6	88.6	28	FEB	1400	53	38.	6.7	92.4	28	FEB	2215	86	4.	3.2	90.8
28	FEB	0600	21	0.	.6	88.6	28	FEB	1415	54	41.	7.0	92.5	28	FEB	2230	87	4.	3.2	90.8
28	FEB	0615	22	0.	.6	88.6	28	FEB	1430	55	40.	6.9	92.4	28	FEB	2245	88	4.	3.2	90.8
28	FEB	0630	23	0.	.6	88.6	28	FEB	1445	56	37.	6.6	92.3	28	FEB	2300	89	4.	3.2	90.8
28	FEB	0645	24	0.	.6	88.6	28	FEB	1500	57	33.	6.3	92.2	28	FEB	2315	90	3.	3.2	90.8
28	FEB	0700	25	0.	.6	88.6	28	FEB	1515	58	30.	6.0	92.1	28	FEB	2330	91	3.	3.2	90.7
28	FEB	0715	26	0.	.6	88.6	28	FEB	1530	59	28.	5.7	92.0	28	FEB	2345	92	3.	3.2	90.7
28	FEB	0730	27	0.	.6	88.6	28	FEB	1545	60	26.	5.4	91.8	1	MAR	0000	93	3.	3.1	90.7
28	FEB	0745	28	0.	.6	88.6	28	FEB	1600	61	25.	5.1	91.7	1	MAR	0015	94	3.	3.1	90.7
28	FEB	0800	29	0.	.6	88.6	28	FEB	1615	62	22.	4.8	91.6	1	MAR	0030	95	3.	3.1	90.7
28	FEB	0815	30	0.	.6	88.6	28	FEB	1630	63	19.	4.6	91.5	1	MAR	0045	96	3.	3.1	90.7
28	FEB	0830	31	0.	.6	88.6	28	FEB	1645	64	17.	4.4	91.4	1	MAR	0100	97	3.	3.1	90.7
28	FEB	0845	32	0.	.6	88.6	28	FEB	1700	65	16.	4.3	91.3							
28	FEB	0900	33	0.	.6	88.6	28	FEB	1715	66	14.	4.1	91.2							

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.00-HR
+ (CFS)	(HR)	(CFS)				
+ 41.	13.25		21.	6.	6.	6.
		(INCHES)	1.910	2.308	2.308	2.308

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                    (AC-FT)      11.        13.        13.        13.

 PEAK STORAGE   TIME                      MAXIMUM AVERAGE STORAGE
                                    6-HR       24-HR      72-HR     24.00-HR
+  (AC-FT)      (HR)
       7.      13.25                 5.         2.         2.         2.

  PEAK STAGE    TIME                      MAXIMUM AVERAGE STAGE
                                    6-HR       24-HR      72-HR     24.00-HR
+   (FEET)      (HR)
    92.45      13.25               91.59      89.93      89.93      89.93

                    CUMULATIVE AREA =     .10 SQ MI


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


          **************
          *            *
  71 KK   *    SUB7E   *
          *            *
          **************

  72 KO         OUTPUT CONTROL VARIABLES
                     IPRNT          4  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                             SCS RUNOFF CALCULATION

             SUBBASIN RUNOFF DATA

     BA         SUBBASIN CHARACTERISTICS
                     TAREA        .05  SUBBASIN AREA

                PRECIPITATION DATA

  75 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                  .50    1.10    2.10    2.70    3.00    3.60    4.50    5.20     .00     .00     .00     .00

                                                STORM AREA =     .05

  76 LS         SCS LOSS RATE
                     STRTL        .60  INITIAL ABSTRACTION
                    CRVNBR      77.00  CURVE NUMBER
                     RTIMP        .00  PERCENT IMPERVIOUS AREA

  77 UD         SCS DIMENSIONLESS UNITGRAPH
                      TLAG        .14  LAG

                                                        ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                   UNIT HYDROGRAPH
                                              5 END-OF-PERIOD ORDINATES
             83.       28.        6.        1.        0.


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          **************
          *            *
81 KK     *    7ECHN   *
          *            *
          **************

82 KO          OUTPUT CONTROL VARIABLES
                    IPRNT           1  PRINT CONTROL
                    IPLOT           0  PLOT CONTROL
                    QSCAL         . 0.  HYDROGRAPH PLOT SCALE
                             STORAGE ROUTING THROUGH 7CDE

             HYDROGRAPH ROUTING DATA

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

85 RC          NORMAL DEPTH CHANNEL ROUTING
                      ANL        .080  LEFT OVERBANK N-VALUE
                     ANCH        .030  MAIN CHANNEL N-VALUE
                      ANR        .080  RIGHT OVERBANK N-VALUE
                    RLNTH       7600.  REACH LENGTH
                      SEL       .0020  ENERGY SLOPE
                    ELMAX        93.0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                   CROSS-SECTION DATA
                      --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
87 RY        ELEVATION    94.00     93.50     93.00     88.00     88.00     93.00     93.50     94.00
86 RX        DISTANCE       .00      5.00     10.00     16.00     24.00     30.00     35.00     40.00

                                                   ***

                                   COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE       .00       .38       .79      1.23      1.70      2.20      2.73      3.28      3.87      4.48
          OUTFLOW       .00      1.92      6.11     12.07     19.64     28.75     39.36     51.47     65.08     80.21
        ELEVATION     88.00     88.26     88.53     88.79     89.05     89.32     89.58     89.84     90.11     90.37

          STORAGE      5.12      5.79      6.50      7.23      7.98      8.77      9.59     10.43     11.31     12.21
          OUTFLOW     96.87    115.10    134.92    156.35    179.44    204.21    230.70    258.94    288.96    320.80
        ELEVATION     90.63     90.89     91.16     91.42     91.68     91.95     92.21     92.47     92.74     93.00

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                                   HYDROGRAPH AT STATION    7ECHN

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                                                *                                                *
DA MON HRMN ORD  OUTFLOW  STORAGE   STAGE * DA MON HRMN ORD  OUTFLOW  STORAGE   STAGE * DA MON HRMN ORD  OUTFLOW  STORAGE   STAGE
                                                *                                                *
28 FEB 0100   1      0.       .0    88.0 * 28 FEB 0915  34      11.      1.1    88.7 * 28 FEB 1730  67      49.      3.2    89.8
28 FEB 0115   2      1.       .2    88.1 * 28 FEB 0930  35      11.      1.2    88.7 * 28 FEB 1745  68      48.      3.1    89.8
28 FEB 0130   3      2.       .4    88.3 * 28 FEB 0945  36      11.      1.2    88.7 * 28 FEB 1800  69      47.      3.1    89.7
28 FEB 0145   4      4.       .5    88.4 * 28 FEB 1000  37      11.      1.2    88.8 * 28 FEB 1815  70      45.      3.0    89.7
28 FEB 0200   5      5.       .7    88.5 * 28 FEB 1015  38      11.      1.2    88.8 * 28 FEB 1830  71      44.      2.9    89
28 FEB 0215   6      6.       .8    88.5 * 28 FEB 1030  39      12.      1.2    88.8 * 28 FEB 1845  72      43.      2.9    89
28 FEB 0230   7      7.       .9    88.6 * 28 FEB 1045  40      12.      1.2    88.8 * 28 FEB 1900  73      42.      2.9    89.6
28 FEB 0245   8      8.       .9    88.6 * 28 FEB 1100  41      12.      1.2    88.8 * 28 FEB 1915  74      41.      2.8    89.6
28 FEB 0300   9      9.      1.0    88.6 * 28 FEB 1115  42      12.      1.3    88.8 * 28 FEB 1930  75      40.      2.8    89.6
28 FEB 0315  10      9.      1.0    88.7 * 28 FEB 1130  43      13.      1.3    88.8 * 28 FEB 1945  76      39.      2.7    89.6
28 FEB 0330  11     10.      1.1    88.7 * 28 FEB 1145  44      13.      1.3    88.8 * 28 FEB 2000  77      38.      2.7    89.5
```

28 FEB 0345	12	10.	1.1	88.7 *	28 FEB 1200	45	14.	1.4	88.9 *	28 FEB 2015	78	37.	2.6	89.5
28 FEB 0400	13	10.	1.1	88.7 *	28 FEB 1215	46	15.	1.4	88.9 *	28 FEB 2030	79	36.	2.6	89.5
28 FEB 0415	14	10.	1.1	88.7 *	28 FEB 1230	47	17.	1.5	89.0 *	28 FEB 2045	80	36.	2.5	89.5
28 FEB 0430	15	11.	1.1	88.7 *	28 FEB 1245	48	20.	1.7	89.1 *	28 FEB 2100	81	35.	2.5	89.5
28 FEB 0445	16	11.	1.1	88.7 *	28 FEB 1300	49	28.	2.2	89.3 *	28 FEB 2115	82	34.	2.5	89.5
FEB 0500	17	11.	1.1	88.7 *	28 FEB 1315	50	53.	3.4	89.9 *	28 FEB 2130	83	34.	2.4	89.4
FEB 0515	18	11.	1.1	88.7 *	28 FEB 1330	51	87.	4.7	90.5 *	28 FEB 2145	84	33.	2.4	89.4
28 FEB 0530	19	11.	1.1	88.7 *	28 FEB 1345	52	101.	5.3	90.7 *	28 FEB 2200	85	33.	2.4	89.4
28 FEB 0545	20	11.	1.1	88.7 *	28 FEB 1400	53	101.	5.3	90.7 *	28 FEB 2215	86	33.	2.4	89.4
28 FEB 0600	21	11.	1.1	88.7 *	28 FEB 1415	54	98.	5.2	90.6 *	28 FEB 2230	87	32.	2.4	89.4
28 FEB 0615	22	11.	1.1	88.7 *	28 FEB 1430	55	92.	5.0	90.6 *	28 FEB 2245	88	32.	2.4	89.4
28 FEB 0630	23	11.	1.1	88.7 *	28 FEB 1445	56	86.	4.7	90.5 *	28 FEB 2300	89	31.	2.3	89.4
28 FEB 0645	24	11.	1.1	88.7 *	28 FEB 1500	57	80.	4.5	90.4 *	28 FEB 2315	90	31.	2.3	89.4
28 FEB 0700	25	11.	1.1	88.7 *	28 FEB 1515	58	75.	4.3	90.3 *	28 FEB 2330	91	31.	2.3	89.4
28 FEB 0715	26	11.	1.1	88.7 *	28 FEB 1530	59	70.	4.1	90.2 *	28 FEB 2345	92	31.	2.3	89.4
28 FEB 0730	27	11.	1.1	88.7 *	28 FEB 1545	60	66.	3.9	90.1 *	1 MAR 0000	93	30.	2.3	89.4
28 FEB 0745	28	11.	1.1	88.7 *	28 FEB 1600	61	63.	3.8	90.1 *	1 MAR 0015	94	30.	2.3	89.3
28 FEB 0800	29	11.	1.1	88.7 *	28 FEB 1615	62	61.	3.7	90.0 *	1 MAR 0030	95	30.	2.3	89.3
28 FEB 0815	30	11.	1.1	88.7 *	28 FEB 1630	63	58.	3.6	90.0 *	1 MAR 0045	96	30.	2.2	89.3
28 FEB 0830	31	11.	1.1	88.7 *	28 FEB 1645	64	56.	3.5	89.9 *	1 MAR 0100	97	29.	2.2	89.3
28 FEB 0845	32	11.	1.1	88.7 *	28 FEB 1700	65	53.	3.4	89.9 *					
28 FEB 0900	33	11.	1.1	88.7 *	28 FEB 1715	66	51.	3.3	89.8 *					
				*					*					

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 101.	13.00		65.	30.	30.	30.
		(INCHES)	1.341	2.472	2.472	2.472
		(AC-FT)	32.	60.	60.	60.

STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.00-HR
+ (AC-FT)	(HR)				
5.	13.00	4.	2.	2.	2.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.00-HR
+ (FEET)	(HR)				
90.70	13.00	90.08	89.23	89.23	89.23

CUMULATIVE AREA = .45 SQ MI

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              **************
              *            *
  88 KK       *    SUB7F   *
              *            *
              **************

  89 KO          OUTPUT CONTROL VARIABLES
                       IPRNT          4  PRINT CONTROL
                       IPLOT          0  PLOT CONTROL
                       QSCAL         0.  HYDROGRAPH PLOT SCALE
                              SCS RUNOFF CALCULATION

               SUBBASIN RUNOFF DATA

  91 BA          SUBBASIN CHARACTERISTICS
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                TAREA          .21  SUBBASIN AREA

            PRECIPITATION DATA

 92 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
            ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
            5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
              .50    1.10    2.10    2.70    3.00    3.60    4.50    5.20     .00     .00     .00     .00

                                                STORM AREA =     .21

 93 LS      SCS LOSS RATE
                STRTL          .60  INITIAL ABSTRACTION
               CRVNBR        77.00  CURVE NUMBER
                RTIMP          .00  PERCENT IMPERVIOUS AREA

 94 UD      SCS DIMENSIONLESS UNITGRAPH
                 TLAG          .30  LAG

                                                    ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                UNIT HYDROGRAPH
                                            8 END-OF-PERIOD ORDINATES
          150.      223.       98.       38.       14.        6.        2.        1.


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


        **************
        *            *
 98 KK  *     7FCHN  *     L
        *            *
        **************

 99 KO      OUTPUT CONTROL VARIABLES
                IPRNT           1  PRINT CONTROL
                IPLOT           0  PLOT CONTROL
                QSCAL          0.  HYDROGRAPH PLOT SCALE
                         STORAGE ROUTING THROUGH 7F

          HYDROGRAPH ROUTING DATA

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

102 RC      NORMAL DEPTH CHANNEL ROUTING
                  ANL        .080  LEFT OVERBANK N-VALUE
                 ANCH        .030  MAIN CHANNEL N-VALUE
                  ANR        .080  RIGHT OVERBANK N-VALUE
                RLNTH        500.  REACH LENGTH
                  SEL       .0030  ENERGY SLOPE
                ELMAX        90.0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                      CROSS-SECTION DATA
                        --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
104 RY     ELEVATION     90.00     90.50     90.00     86.00     86.00     90.00     90.50     91.00
103 RX     DISTANCE        .00      5.00     10.00     16.00     24.00     30.00     35.00     40.00

                                                    ***
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COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	.02	.04	.06	.09	.12	.14	.17	.20	.24
OUTFLOW	.00	1.63	5.20	10.32	16.84	24.71	33.90	44.41	56.26	69.44
ELEVATION	86.00	86.21	86.42	86.63	86.84	87.05	87.26	87.47	87.68	87.89
STORAGE	.27	.30	.34	.38	.42	.46	.50	.55	.60	.64
OUTFLOW	83.98	99.91	117.25	136.02	156.26	177.99	201.24	226.04	252.43	280.43
ELEVATION	88.11	88.32	88.53	88.74	88.95	89.16	89.37	89.58	89.79	90.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 2. TO 280.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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HYDROGRAPH AT STATION 7FCHN

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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
28	FEB	0100	1	0.	.0	86.0	28	FEB	0915	34	11.	.1	86.7	28	FEB	1730	67	67.	.2	87.9
28	FEB	0115	2	0.	.0	86.1	28	FEB	0930	35	11.	.1	86.7	28	FEB	1745	68	65.	.2	87.8
28	FEB	0130	3	1.	.0	86.2	28	FEB	0945	36	12.	.1	86.7	28	FEB	1800	69	63.	.2	87.8
28	FEB	0145	4	3.	.0	86.3	28	FEB	1000	37	13.	.1	86.7	28	FEB	1815	70	61.	.2	87.8
28	FEB	0200	5	5.	.0	86.4	28	FEB	1015	38	14.	.1	86.7	28	FEB	1830	71	59.	.2	87.7
28	FEB	0215	6	6.	.0	86.5	28	FEB	1030	39	14.	.1	86.8	28	FEB	1845	72	58.	.2	87.7
28	FEB	0230	7	7.	.1	86.5	28	FEB	1045	40	15.	.1	86.8	28	FEB	1900	73	57.	.2	87.7
28	FEB	0245	8	8.	.1	86.5	28	FEB	1100	41	16.	.1	86.8	28	FEB	1915	74	54.	.2	87.6
	FEB	0300	9	9.	.1	86.6	28	FEB	1115	42	17.	.1	86.9	28	FEB	1930	75	51.	.2	87.6
	FEB	0315	10	9.	.1	86.6	28	FEB	1130	43	19.	.1	86.9	28	FEB	1945	76	48.	.2	87.5
28	FEB	0330	11	10.	.1	86.6	28	FEB	1145	44	21.	.1	87.0	28	FEB	2000	77	47.	.2	87.5
28	FEB	0345	12	10.	.1	86.6	28	FEB	1200	45	23.	.1	87.0	28	FEB	2015	78	45.	.2	87.5
28	FEB	0400	13	10.	.1	86.6	28	FEB	1215	46	28.	.1	87.1	28	FEB	2030	79	44.	.2	87.5
28	FEB	0415	14	10.	.1	86.6	28	FEB	1230	47	38.	.2	87.3	28	FEB	2045	80	43.	.2	87.4
28	FEB	0430	15	10.	.1	86.6	28	FEB	1245	48	52.	.2	87.6	28	FEB	2100	81	42.	.2	87.4
28	FEB	0445	16	11.	.1	86.6	28	FEB	1300	49	92.	.3	88.2	28	FEB	2115	82	42.	.2	87.4
28	FEB	0500	17	11.	.1	86.6	28	FEB	1315	50	217.	.5	89.5	28	FEB	2130	83	41.	.2	87.4
28	FEB	0515	18	11.	.1	86.6	28	FEB	1330	51	312.	.7	90.2	28	FEB	2145	84	40.	.2	87.4
28	FEB	0530	19	11.	.1	86.6	28	FEB	1345	52	258.	.6	89.8	28	FEB	2200	85	40.	.2	87.4
28	FEB	0545	20	11.	.1	86.6	28	FEB	1400	53	202.	.5	89.4	28	FEB	2215	86	39.	.2	87.4
28	FEB	0600	21	11.	.1	86.6	28	FEB	1415	54	169.	.4	89.1	28	FEB	2230	87	39.	.2	87.4
28	FEB	0615	22	11.	.1	86.6	28	FEB	1430	55	140.	.4	88.8	28	FEB	2245	88	38.	.2	87.3
28	FEB	0630	23	11.	.1	86.6	28	FEB	1445	56	124.	.4	88.6	28	FEB	2300	89	38.	.2	87.3
28	FEB	0645	24	11.	.1	86.6	28	FEB	1500	57	110.	.3	88.4	28	FEB	2315	90	37.	.2	87.3
28	FEB	0700	25	11.	.1	86.6	28	FEB	1515	58	101.	.3	88.3	28	FEB	2330	91	37.	.2	87.3
28	FEB	0715	26	11.	.1	86.6	28	FEB	1530	59	93.	.3	88.2	28	FEB	2345	92	36.	.2	87.3
28	FEB	0730	27	11.	.1	86.6	28	FEB	1545	60	88.	.3	88.2	1	MAR	0000	93	36.	.1	87.3
28	FEB	0745	28	11.	.1	86.6	28	FEB	1600	61	83.	.3	88.1	1	MAR	0015	94	36.	.1	87.3
28	FEB	0800	29	11.	.1	86.6	28	FEB	1615	62	80.	.3	88.0	1	MAR	0030	95	35.	.1	87.3
28	FEB	0815	30	11.	.1	86.6	28	FEB	1630	63	78.	.3	88.0	1	MAR	0045	96	35.	.1	87.3
28	FEB	0830	31	11.	.1	86.6	28	FEB	1645	64	75.	.2	88.0	1	MAR	0100	97	35.	.1	87.3
28	FEB	0845	32	11.	.1	86.6	28	FEB	1700	65	72.	.2	87.9							
28	FEB	0900	33	11.	.1	86.7	28	FEB	1715	66	69.	.2	87.9							

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(FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.00-HR
		(CFS)				
+ 312.	12.50		114.	45.	45.	45.
		(INCHES)	1.609	2.562	2.562	2.562

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                    (AC-FT)      56.        90.        90.        90.

 PEAK STORAGE   TIME                      MAXIMUM AVERAGE STORAGE
                                     6-HR       24-HR      72-HR    24.00-HR
+  (AC-FT)      (HR)
       1.      12.50                  0.         0.         0.         0.

 PEAK STAGE     TIME                      MAXIMUM AVERAGE STAGE
                                     6-HR       24-HR      72-HR    24.00-HR
+   (FEET)      (HR)
    90.24      12.50                88.39      87.29      87.29      87.29

                    CUMULATIVE AREA =     .66 SQ MI


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


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          *            *
 105 KK   *     SUB7G  *
          *            *
          **************

 106 KO         OUTPUT CONTROL VARIABLES
                      IPRNT          4  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE
                               SCS RUNOFF CALCULATION

             SUBBASIN RUNOFF DATA

 108 BA         SUBBASIN CHARACTERISTICS
                      TAREA        .06  SUBBASIN AREA

                PRECIPITATION DATA

 109 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                  .50    1.10    2.10    2.70    3.00    3.60    4.50    5.20     .00     .00     .00     .00

                                                   STORM AREA =     .06

 110 LS         SCS LOSS RATE
                      STRTL        .60  INITIAL ABSTRACTION
                     CRVNBR      77.00  CURVE NUMBER
                      RTIMP        .00  PERCENT IMPERVIOUS AREA

 111 UD         SCS DIMENSIONLESS UNITGRAPH
                       TLAG        .30  LAG

                                                        ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                   UNIT HYDROGRAPH
                                               8 END-OF-PERIOD ORDINATES
             46.       68.       30.       12.        4.        2.        1.        0.


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          *            *
115 KK    *    7GSWP   *
          *            *
          **************

116 KO        OUTPUT CONTROL VARIABLES
                    IPRNT          1  PRINT CONTROL
                    IPLOT          0  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE
                             STORAGE ROUTING THROUGH 7G

            HYDROGRAPH ROUTING DATA

118 RS        STORAGE ROUTING
                    NSTPS          1  NUMBER OF SUBREACHES
                     ITYP       ELEV  TYPE OF INITIAL CONDITION
                   RSVRIC      85.00  INITIAL CONDITION
                        X        .00 WORKING R AND D COEFFICIENT

119 SA             AREA          .0        .6       2.5       5.2

120 SE        ELEVATION       85.00     86.00     87.00     88.00

121 SL        LOW-LEVEL OUTLET
                    ELEVL      85.80  ELEVATION AT CENTER OF OUTLET
                    CAREA      16.25  CROSS-SECTIONAL AREA
                     COQL        .60  COEFFICIENT
                     EXPL        .50  EXPONENT OF HEAD

122 SS        SPILLWAY
                     CREL      88.00  SPILLWAY CREST ELEVATION
                    SPWID        .00  SPILLWAY WIDTH
                     COQW        .00  WEIR COEFFICIENT
                     EXPW       1.50  EXPONENT OF HEAD

                                                    ***

                                        COMPUTED STORAGE-ELEVATION DATA

          STORAGE        .00       .19      1.62      5.39
        ELEVATION      85.00     86.00     87.00     88.00

                                        COMPUTED OUTFLOW-ELEVATION DATA

          OUTFLOW        .00       .00    109.32    110.22    111.14    112.08    113.03    114.00    114.98    115.98
        ELEVATION      85.00     85.80     87.75     87.79     87.82     87.85     87.89     87.93     87.96     88.00

                                      COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE        .00       .10       .19      1.62      4.21      4.36      4.51      4.67      4.84      5.01
          OUTFLOW        .00       .00     34.97     85.66    109.32    110.22    111.14    112.08    113.03    114.00
        ELEVATION      85.00     85.80     86.00     87.00     87.75     87.79     87.82     87.85     87.89     87.93

          STORAGE       5.19      5.39
          OUTFLOW     114.98    115.98
        ELEVATION      87.96     88.00

   WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN        0. TO       35.
              THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
              THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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HYDROGRAPH AT STATION 7GSWP

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STA.
28	FEB	0100	1	0.	.0	85.0	28	FEB	0915	34	11.	.1	85.9	28	FEB	1730	67	111.	4.5	87.8
28	FEB	0115	2	0.	.0	85.0	28	FEB	0930	35	12.	.1	85.9	28	FEB	1745	68	105.	3.8	87.6
28	FEB	0130	3	0.	.0	85.2	28	FEB	0945	36	12.	.1	85.9	28	FEB	1800	69	99.	3.1	87.4
28	FEB	0145	4	0.	.1	85.6	28	FEB	1000	37	13.	.1	85.9	28	FEB	1815	70	93.	2.5	87.2
28	FEB	0200	5	4.	.1	85.8	28	FEB	1015	38	14.	.1	85.9	28	FEB	1830	71	88.	1.9	87.1
28	FEB	0215	6	6.	.1	85.8	28	FEB	1030	39	15.	.1	85.9	28	FEB	1845	72	81.	1.5	86.9
28	FEB	0230	7	7.	.1	85.8	28	FEB	1045	40	16.	.1	85.9	28	FEB	1900	73	70.	1.2	86.7
28	FEB	0245	8	8.	.1	85.8	28	FEB	1100	41	17.	.1	85.9	28	FEB	1915	74	65.	1.0	86.6
28	FEB	0300	9	9.	.1	85.8	28	FEB	1115	42	19.	.1	85.9	28	FEB	1930	75	60.	.9	86.5
28	FEB	0315	10	9.	.1	85.9	28	FEB	1130	43	21.	.2	85.9	28	FEB	1945	76	56.	.8	86.4
28	FEB	0330	11	10.	.1	85.9	28	FEB	1145	44	23.	.2	85.9	28	FEB	2000	77	53.	.7	86.3
28	FEB	0345	12	10.	.1	85.9	28	FEB	1200	45	26.	.2	85.9	28	FEB	2015	78	50.	.6	86.3
28	FEB	0400	13	10.	.1	85.9	28	FEB	1215	46	32.	.2	86.0	28	FEB	2030	79	49.	.6	86.3
28	FEB	0415	14	10.	.1	85.9	28	FEB	1230	47	38.	.3	86.1	28	FEB	2045	80	47.	.5	86.2
28	FEB	0430	15	10.	.1	85.9	28	FEB	1245	48	46.	.5	86.2	28	FEB	2100	81	46.	.5	86.2
28	FEB	0445	16	11.	.1	85.9	28	FEB	1300	49	69.	1.1	86.7	28	FEB	2115	82	45.	.5	86.2
28	FEB	0500	17	11.	.1	85.9	28	FEB	1315	50	102.	3.4	87.5	28	FEB	2130	83	44.	.4	86.2
28	FEB	0515	18	11.	.1	85.9	28	FEB	1330	51	128.	7.7	88.5	28	FEB	2145	84	43.	.4	86.2
28	FEB	0530	19	11.	.1	85.9	28	FEB	1345	52	150.	11.9	89.3	28	FEB	2200	85	43.	.4	86.1
28	FEB	0545	20	11.	.1	85.9	28	FEB	1400	53	162.	14.2	89.7	28	FEB	2215	86	42.	.4	86.1
28	FEB	0600	21	11.	.1	85.9	28	FEB	1415	54	167.	15.2	89.9	28	FEB	2230	87	41.	.4	86.1
28	FEB	0615	22	11.	.1	85.9	28	FEB	1430	55	168.	15.3	89.9	28	FEB	2245	88	41.	.4	86.1
28	FEB	0630	23	11.	.1	85.9	28	FEB	1445	56	165.	14.9	89.9	28	FEB	2300	89	40.	.3	86.1
28	FEB	0645	24	11.	.1	85.9	28	FEB	1500	57	161.	14.1	89.7	28	FEB	2315	90	40.	.3	86.1
28	FEB	0700	25	11.	.1	85.9	28	FEB	1515	58	156.	13.2	89.5	28	FEB	2330	91	39.	.3	86.1
28	FEB	0715	26	11.	.1	85.9	28	FEB	1530	59	151.	12.2	89.3	28	FEB	2345	92	39.	.3	86
28	FEB	0730	27	11.	.1	85.9	28	FEB	1545	60	146.	11.1	89.1	1	MAR	0000	93	38.	.3	86
28	FEB	0745	28	11.	.1	85.9	28	FEB	1600	61	140.	10.0	88.9	1	MAR	0015	94	38.	.3	86.1
28	FEB	0800	29	11.	.1	85.9	28	FEB	1615	62	135.	9.0	88.7	1	MAR	0030	95	37.	.3	86.0
28	FEB	0815	30	11.	.1	85.9	28	FEB	1630	63	130.	8.0	88.5	1	MAR	0045	96	37.	.3	86.0
28	FEB	0830	31	11.	.1	85.9	28	FEB	1645	64	125.	7.1	88.3	1	MAR	0100	97	37.	.2	86.0
28	FEB	0845	32	11.	.1	85.9	28	FEB	1700	65	120.	6.2	88.2							
28	FEB	0900	33	11.	.1	85.9	28	FEB	1715	66	116.	5.3	88.0							

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 168.	13.50		128.	50.	50.	50.
		(INCHES)	1.649	2.575	2.575	2.575
		(AC-FT)	63.	99.	99.	99.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.00-HR
+ (AC-FT)	(HR)				
15.	13.50	8.	2.	2.	2.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.00-HR
+ (FEET)	(HR)				
89.95	13.50	88.49	86.60	86.60	86.60

CUMULATIVE AREA = .72 SQ MI

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              **************
              *            *
  3 KK        *     SUB7H  *
              *            *
              **************

 124 KO          OUTPUT CONTROL VARIABLES
                       IPRNT           4  PRINT CONTROL
                       IPLOT           0  PLOT CONTROL
                       QSCAL          0.  HYDROGRAPH PLOT SCALE
                                SCS RUNOFF CALCULATION

               SUBBASIN RUNOFF DATA

 126 BA          SUBBASIN CHARACTERISTICS
                       TAREA         .19  SUBBASIN AREA

                 PRECIPITATION DATA

 127 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                 ..... HYDRO-35 .......   ............... TP-40 ...............   ........... TP-49 ...........
                 5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                   .50    1.10    2.10    2.70    3.00    3.60    4.50    5.20     .00     .00     .00     .00

                                                   STORM AREA =     .19

 128 LS          SCS LOSS RATE
                       STRTL         .60  INITIAL ABSTRACTION
                      CRVNBR       77.00  CURVE NUMBER
                       RTIMP         .00  PERCENT IMPERVIOUS AREA

   ) UD          SCS DIMENSIONLESS UNITGRAPH
                        TLAG         .30  LAG

                                                                  ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                        UNIT HYDROGRAPH
                                                   8 END-OF-PERIOD ORDINATES
               136.      201.       88.       34.       13.        5.        2.        1.


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              *            *
 133 KK       *     7HSWP  *
              *            *
              **************

 134 KO          OUTPUT CONTROL VARIABLES
                       IPRNT           1  PRINT CONTROL
                       IPLOT           0  PLOT CONTROL
                       QSCAL          0.  HYDROGRAPH PLOT SCALE
                                STORAGE ROUTING THROUGH 7H

               HYDROGRAPH ROUTING DATA

 136 RS          STORAGE ROUTING
                       NSTPS           1  NUMBER OF SUBREACHES
                        ITYP        ELEV  TYPE OF INITIAL CONDITION
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                RSVRIC      84.00  INITIAL CONDITION
                     X        .00 WORKING R AND D COEFFICIENT

137 SA           AREA         .4       3.1       9.2      15.3

138 SE      ELEVATION      84.00     86.00     87.00     88.00

139 SS      SPILLWAY
                  CREL      84.00  SPILLWAY CREST ELEVATION
                 SPWID      10.00  SPILLWAY WIDTH
                  COQW       3.00  WEIR COEFFICIENT
                  EXPW       1.50  EXPONENT OF HEAD
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COMPUTED STORAGE-ELEVATION DATA

STORAGE	.00	3.04	8.93	21.05
ELEVATION	84.00	86.00	87.00	88.00

COMPUTED OUTFLOW-ELEVATION DATA

OUTFLOW	.00	.00	.04	.33	1.11	2.63	5.14	8.89	14.12	21.07
ELEVATION	84.00	84.00	84.01	84.05	84.11	84.20	84.31	84.44	84.60	84.79
OUTFLOW	30.00	41.15	54.77	71.11	90.41	112.92	138.89	168.56	202.18	240.00
ELEVATION	85.00	85.23	85.49	85.78	86.09	86.42	86.78	87.16	87.57	88.00

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	.00	.02	.05	.09	.16	.25	.39	.58	.85
OUTFLOW	.00	.04	.33	1.11	2.63	5.14	8.89	14.12	21.07	30.00
ELEVATION	84.00	84.01	84.05	84.11	84.20	84.31	84.44	84.60	84.79	85.00
STORAGE	1.22	1.73	2.41	3.04	3.33	4.77	7.06	8.93	10.48	15.07
OUTFLOW	41.15	54.77	71.11	84.85	90.41	112.92	138.89	155.88	168.56	202.18
ELEVATION	85.23	85.49	85.78	86.00	86.09	86.42	86.78	87.00	87.16	87.57
STORAGE	21.05									
OUTFLOW	240.00									
ELEVATION	88.00									

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HYDROGRAPH AT STATION 7HSWP

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DA MON HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA MON HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA MON HRMN	ORD	OUTFLOW	STORAGE	STAGE
28 FEB 0100	1	0.	.0	84.0	*	28 FEB 0915	34	11.	.3	84.5	*	28 FEB 1730	67	157.	9.1	87.0
28 FEB 0115	2	0.	.0	84.0	*	28 FEB 0930	35	11.	.3	84.5	*	28 FEB 1745	68	152.	8.5	86.9
28 FEB 0130	3	0.	.0	84.0	*	28 FEB 0945	36	12.	.3	84.5	*	28 FEB 1800	69	146.	7.8	86.9
28 FEB 0145	4	0.	.0	84.0	*	28 FEB 1000	37	13.	.4	84.6	*	28 FEB 1815	70	140.	7.1	86.8
28 FEB 0200	5	1.	.0	84.1	*	28 FEB 1015	38	15.	.4	84.6	*	28 FEB 1830	71	132.	6.5	86.7
28 FEB 0215	6	3.	.1	84.2	*	28 FEB 1030	39	16.	.4	84.7	*	28 FEB 1845	72	125.	5.8	86.6
28 FEB 0230	7	5.	.2	84.3	*	28 FEB 1045	40	17.	.5	84.7	*	28 FEB 1900	73	117.	5.2	86.5
28 FEB 0245	8	6.	.2	84.4	*	28 FEB 1100	41	19.	.5	84.7	*	28 FEB 1915	74	108.	4.5	86.4
28 FEB 0300	9	7.	.2	84.4	*	28 FEB 1115	42	21.	.6	84.8	*	28 FEB 1930	75	98.	3.8	86.2
28 FEB 0315	10	8.	.2	84.4	*	28 FEB 1130	43	23.	.6	84.8	*	28 FEB 1945	76	89.	3.3	86
28 FEB 0330	11	9.	.3	84.4	*	28 FEB 1145	44	26.	.7	84.9	*	28 FEB 2000	77	80.	2.8	85..
28 FEB 0345	12	9.	.3	84.5	*	28 FEB 1200	45	29.	.8	85.0	*	28 FEB 2015	78	72.	2.5	85.8
28 FEB 0400	13	10.	.3	84.5	*	28 FEB 1215	46	34.	1.0	85.1	*	28 FEB 2030	79	66.	2.2	85.7
28 FEB 0415	14	10.	.3	84.5	*	28 FEB 1230	47	42.	1.3	85.3	*	28 FEB 2045	80	62.	2.0	85.6
28 FEB 0430	15	10.	.3	84.5	*	28 FEB 1245	48	53.	1.7	85.5	*	28 FEB 2100	81	58.	1.9	85.6

28 FEB 0445	16	10.	.3	84.5	*	28 FEB 1300	49	73.	2.5	85.8	*	28 FEB 2115	82	56.	1.8	85.5
28 FEB 0500	17	11.	.3	84.5	*	28 FEB 1315	50	112.	4.7	86.4	*	28 FEB 2130	83	54.	1.7	85.5
28 FEB 0515	18	11.	.3	84.5	*	28 FEB 1330	51	149.	8.2	86.9	*	28 FEB 2145	84	52.	1.6	85.4
28 FEB 0530	19	11.	.3	84.5	*	28 FEB 1345	52	174.	11.2	87.2	*	28 FEB 2200	85	51.	1.6	85.4
FEB 0545	20	11.	.3	84.5	*	28 FEB 1400	53	187.	13.0	87.4	*	28 FEB 2215	86	50.	1.5	85.4
FEB 0600	21	11.	.3	84.5	*	28 FEB 1415	54	194.	14.0	87.5	*	28 FEB 2230	87	49.	1.5	85.4
FEB 0615	22	11.	.3	84.5	*	28 FEB 1430	55	198.	14.5	87.5	*	28 FEB 2245	88	48.	1.5	85.4
28 FEB 0630	23	11.	.3	84.5	*	28 FEB 1445	56	199.	14.6	87.5	*	28 FEB 2300	89	47.	1.4	85.3
28 FEB 0645	24	11.	.3	84.5	*	28 FEB 1500	57	198.	14.5	87.5	*	28 FEB 2315	90	46.	1.4	85.3
28 FEB 0700	25	11.	.3	84.5	*	28 FEB 1515	58	196.	14.2	87.5	*	28 FEB 2330	91	46.	1.4	85.3
28 FEB 0715	26	11.	.3	84.5	*	28 FEB 1530	59	193.	13.8	87.5	*	28 FEB 2345	92	45.	1.4	85.3
28 FEB 0730	27	11.	.3	84.5	*	28 FEB 1545	60	189.	13.3	87.4	*	1 MAR 0000	93	44.	1.3	85.3
28 FEB 0745	28	11.	.3	84.5	*	28 FEB 1600	61	185.	12.8	87.4	*	1 MAR 0015	94	44.	1.3	85.3
28 FEB 0800	29	11.	.3	84.5	*	28 FEB 1615	62	181.	12.2	87.3	*	1 MAR 0030	95	43.	1.3	85.3
28 FEB 0815	30	11.	.3	84.5	*	28 FEB 1630	63	177.	11.6	87.3	*	1 MAR 0045	96	43.	1.3	85.3
28 FEB 0830	31	11.	.3	84.5	*	28 FEB 1645	64	172.	11.0	87.2	*	1 MAR 0100	97	42.	1.3	85.3
28 FEB 0845	32	11.	.3	84.5	*	28 FEB 1700	65	168.	10.4	87.1	*					
28 FEB 0900	33	11.	.3	84.5	*	28 FEB 1715	66	162.	9.7	87.1	*					
					*						*					

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 199.	13.75		167.	63.	63.	63.
		(INCHES)	1.708	2.589	2.589	2.589
		(AC-FT)	83.	125.	125.	125.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.00-HR
+ (AC-FT)	(HR)				
15.	13.75	11.	3.	3.	3.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.00-HR
+ (FEET)	(HR)				
87.52	13.75	87.13	85.44	85.44	85.44

CUMULATIVE AREA = .91 SQ MI

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          *             *
140 KK    *    SUB8A    *
          *             *
          ***************

141 KO        OUTPUT CONTROL VARIABLES
                    IPRNT          4  PRINT CONTROL
                    IPLOT          0  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE
                              SCS RUNOFF CALCULATION

            SUBBASIN RUNOFF DATA

    BA        SUBBASIN CHARACTERISTICS
                    TAREA        .08  SUBBASIN AREA

              PRECIPITATION DATA
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144 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
              ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
              5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                .50    1.10    2.10    2.70    3.00    3.60    4.50    5.20     .00     .00     .00     .00

                                                STORM AREA =     .08

145 LS        SCS LOSS RATE
                    STRTL         .70  INITIAL ABSTRACTION
                   CRVNBR       74.00  CURVE NUMBER
                    RTIMP         .00  PERCENT IMPERVIOUS AREA

146 UD        SCS DIMENSIONLESS UNITGRAPH
                     TLAG         .23  LAG

                                                        ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                    UNIT HYDROGRAPH
                                                 7 END-OF-PERIOD ORDINATES
             83.       78.       24.        8.        2.        1.        0.


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          *            *
150 KK    *     8ASWP  *
          *            *
          **************

151 KO        OUTPUT CONTROL VARIABLES
                   IPRNT           1  PRINT CONTROL
                   IPLOT           0  PLOT CONTROL
                   QSCAL          0.  HYDROGRAPH PLOT SCALE
                            STORAGE ROUTING THROUGH 8A SWAMP

            HYDROGRAPH ROUTING DATA

153 RS        STORAGE ROUTING
                   NSTPS           1  NUMBER OF SUBREACHES
                    ITYP        ELEV  TYPE OF INITIAL CONDITION
                  RSVRIC       78.00  INITIAL CONDITION
                       X         .00 WORKING R AND D COEFFICIENT

154 SA            AREA          .0       2.4       5.2       9.8

155 SE        ELEVATION       78.00     80.00     82.00     84.00

156 SL        LOW-LEVEL OUTLET
                   ELEVL       78.85  ELEVATION AT CENTER OF OUTLET
                   CAREA       28.30  CROSS-SECTIONAL AREA
                    COQL         .60  COEFFICIENT
                    EXPL         .50  EXPONENT OF HEAD

157 SS        SPILLWAY
                    CREL       83.90  SPILLWAY CREST ELEVATION
                   SPWID         .00  SPILLWAY WIDTH
                    COQW         .00  WEIR COEFFICIENT
                    EXPW        1.50  EXPONENT OF HEAD

                                                        ***
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COMPUTED STORAGE-ELEVATION DATA

STORAGE	.00	1.61	9.05	23.82
ELEVATION	78.00	80.00	82.00	84.00

COMPUTED OUTFLOW-ELEVATION DATA

OUTFLOW	.00	.00	225.12	233.96	243.52	253.89	265.18	277.53	291.08	306.03
ELEVATION	78.00	78.85	81.58	81.80	82.05	82.33	82.64	83.00	83.42	83.90

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	.12	1.61	7.02	8.05	9.05	9.30	10.85	12.80	15.30
OUTFLOW	.00	.00	146.04	225.12	233.96	241.69	243.52	253.89	265.18	277.53
ELEVATION	78.00	78.85	80.00	81.58	81.80	82.00	82.05	82.33	82.64	83.00

STORAGE	18.55	22.85	23.82
OUTFLOW	291.08	306.03	309.04
ELEVATION	83.42	83.90	84.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 0. TO 146.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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HYDROGRAPH AT STATION 8ASWP

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DA MON HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA MON HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA MON HRMN	ORD	OUTFLOW	STORAGE	STAGE
FEB 0100	1	0.	.0	78.0	*	28 FEB 0915	34	11.	.2	78.9	*	28 FEB 1730	67	178.	3.8	80.6
28 FEB 0115	2	0.	.0	78.0	*	28 FEB 0930	35	11.	.2	78.9	*	28 FEB 1745	68	174.	3.5	80.6
28 FEB 0130	3	0.	.0	78.0	*	28 FEB 0945	36	12.	.2	78.9	*	28 FEB 1800	69	169.	3.2	80.5
28 FEB 0145	4	0.	.0	78.0	*	28 FEB 1000	37	13.	.3	79.0	*	28 FEB 1815	70	163.	2.8	80.3
28 FEB 0200	5	0.	.0	78.1	*	28 FEB 1015	38	14.	.3	79.0	*	28 FEB 1830	71	157.	2.4	80.2
28 FEB 0215	6	0.	.0	78.3	*	28 FEB 1030	39	16.	.3	79.0	*	28 FEB 1845	72	151.	2.0	80.1
28 FEB 0230	7	0.	.1	78.9	*	28 FEB 1045	40	17.	.3	79.0	*	28 FEB 1900	73	141.	1.6	80.0
28 FEB 0245	8	6.	.2	78.9	*	28 FEB 1100	41	19.	.3	79.0	*	28 FEB 1915	74	117.	1.3	79.8
28 FEB 0300	9	7.	.2	78.9	*	28 FEB 1115	42	21.	.3	79.0	*	28 FEB 1930	75	107.	1.2	79.7
28 FEB 0315	10	8.	.2	78.9	*	28 FEB 1130	43	23.	.4	79.0	*	28 FEB 1945	76	97.	1.1	79.6
28 FEB 0330	11	9.	.2	78.9	*	28 FEB 1145	44	26.	.4	79.1	*	28 FEB 2000	77	87.	1.0	79.5
28 FEB 0345	12	9.	.2	78.9	*	28 FEB 1200	45	30.	.4	79.1	*	28 FEB 2015	78	79.	.9	79.5
28 FEB 0400	13	10.	.2	78.9	*	28 FEB 1215	46	35.	.5	79.1	*	28 FEB 2030	79	72.	.9	79.4
28 FEB 0415	14	10.	.2	78.9	*	28 FEB 1230	47	44.	.6	79.2	*	28 FEB 2045	80	66.	.8	79.4
28 FEB 0430	15	10.	.2	78.9	*	28 FEB 1245	48	57.	.7	79.3	*	28 FEB 2100	81	62.	.8	79.3
28 FEB 0445	16	10.	.2	78.9	*	28 FEB 1300	49	83.	1.0	79.5	*	28 FEB 2115	82	59.	.7	79.3
28 FEB 0500	17	10.	.2	78.9	*	28 FEB 1315	50	144.	1.6	80.0	*	28 FEB 2130	83	57.	.7	79.3
28 FEB 0515	18	11.	.2	78.9	*	28 FEB 1330	51	161.	2.7	80.3	*	28 FEB 2145	84	55.	.7	79.3
28 FEB 0530	19	11.	.2	78.9	*	28 FEB 1345	52	177.	3.7	80.6	*	28 FEB 2200	85	54.	.7	79.3
28 FEB 0545	20	11.	.2	78.9	*	28 FEB 1400	53	187.	4.4	80.8	*	28 FEB 2215	86	52.	.7	79.3
28 FEB 0600	21	11.	.2	78.9	*	28 FEB 1415	54	194.	4.9	81.0	*	28 FEB 2230	87	51.	.6	79.3
28 FEB 0615	22	11.	.2	78.9	*	28 FEB 1430	55	199.	5.2	81.1	*	28 FEB 2245	88	50.	.6	79.2
28 FEB 0630	23	11.	.2	78.9	*	28 FEB 1445	56	202.	5.4	81.1	*	28 FEB 2300	89	50.	.6	79.2
28 FEB 0645	24	11.	.2	78.9	*	28 FEB 1500	57	204.	5.6	81.2	*	28 FEB 2315	90	49.	.6	79.2
28 FEB 0700	25	11.	.2	78.9	*	28 FEB 1515	58	204.	5.6	81.2	*	28 FEB 2330	91	48.	.6	79.2
28 FEB 0715	26	11.	.2	78.9	*	28 FEB 1530	59	204.	5.6	81.2	*	28 FEB 2345	92	47.	.6	79.2
28 FEB 0730	27	11.	.2	78.9	*	28 FEB 1545	60	202.	5.5	81.1	*	1 MAR 0000	93	47.	.6	79.2
FEB 0745	28	11.	.2	78.9	*	28 FEB 1600	61	200.	5.3	81.1	*	1 MAR 0015	94	46.	.6	79.2
FEB 0800	29	11.	.2	78.9	*	28 FEB 1615	62	197.	5.1	81.0	*	1 MAR 0030	95	46.	.6	79.2
28 FEB 0815	30	11.	.2	78.9	*	28 FEB 1630	63	194.	4.9	81.0	*	1 MAR 0045	96	45.	.6	79.2
28 FEB 0830	31	11.	.2	78.9	*	28 FEB 1645	64	191.	4.7	80.9	*	1 MAR 0100	97	44.	.6	79.2
28 FEB 0845	32	11.	.2	78.9	*	28 FEB 1700	65	187.	4.4	80.8	*					
28 FEB 0900	33	11.	.2	78.9	*	28 FEB 1715	66	183.	4.1	80.7	*					

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 PEAK FLOW     TIME                                MAXIMUM AVERAGE FLOW
                                          6-HR       24-HR       72-HR     24.00-HR
+   (CFS)      (HR)
                                 (CFS)
+     204.     14.25                      181.        68.         68.         68.
                             (INCHES)    1.715       2.572       2.572       2.572
                              (AC-FT)     90.        135.        135.        135.

 PEAK STORAGE  TIME                               MAXIMUM AVERAGE STORAGE
                                          6-HR       24-HR       72-HR     24.00-HR
+  (AC-FT)     (HR)
       6.     14.25                        4.          1.          1.          1.

 PEAK STAGE    TIME                                MAXIMUM AVERAGE STAGE
                                          6-HR       24-HR       72-HR     24.00-HR
+   (FEET)     (HR)
    81.16     14.25                      80.72       79.45       79.45       79.45

                             CUMULATIVE AREA =     .98 SQ MI


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            *            *
 158 KK     *     SUB8B  *
            *            *
            **************

 159 KO          OUTPUT CONTROL VARIABLES
                       IPRNT           4  PRINT CONTROL
                       IPLOT           0  PLOT CONTROL
                       QSCAL          0.  HYDROGRAPH PLOT SCALE
                                SCS RUNOFF CALCULATION

               SUBBASIN RUNOFF DATA

 161 BA          SUBBASIN CHARACTERISTICS
                       TAREA         .33  SUBBASIN AREA

                 PRECIPITATION DATA

 162 PH                                  DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                 ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                 5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                   .50    1.10    2.10    2.70    3.00    3.60    4.50    5.20     .00     .00     .00     .00

                                                   STORM AREA =     .33

 163 LS          SCS LOSS RATE
                       STRTL         .70  INITIAL ABSTRACTION
                      CRVNBR       74.00  CURVE NUMBER
                       RTIMP         .00  PERCENT IMPERVIOUS AREA

 164 UD          SCS DIMENSIONLESS UNITGRAPH
                        TLAG         .40  LAG

                                                          ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG
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UNIT HYDROGRAPH
10 END-OF-PERIOD ORDINATES

133.	306.	231.	101.	47.	22.	10.	5.	2.	1.

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          *            *
168 KK    *     8BSWP  *
          *            *
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169 KO OUTPUT CONTROL VARIABLES

IPRNT	1	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

STORAGE ROUTING THROUGH 8B

HYDROGRAPH ROUTING DATA

171 RS STORAGE ROUTING

NSTPS	1	NUMBER OF SUBREACHES
ITYP	STOR	TYPE OF INITIAL CONDITION
RSVRIC	.00	INITIAL CONDITION
X	.00	WORKING R AND D COEFFICIENT

172 RC NORMAL DEPTH CHANNEL ROUTING

ANL	.080	LEFT OVERBANK N-VALUE
ANCH	.030	MAIN CHANNEL N-VALUE
ANR	.080	RIGHT OVERBANK N-VALUE
RLNTH	1200.	REACH LENGTH
SEL	.0030	ENERGY SLOPE
ELMAX	82.0	MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

CROSS-SECTION DATA

		--- LEFT OVERBANK ---			+ ------ MAIN CHANNEL		------- + --- RIGHT OVERBANK ---		
174 RY	ELEVATION	84.00	83.00	82.00	75.00	75.00	82.00	83.00	84.00
173 RX	DISTANCE	.00	5.00	10.00	20.00	25.00	35.00	40.00	45.00

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COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	.06	.12	.20	.29	.39	.50	.62	.75	.89
OUTFLOW	.00	2.61	8.53	17.35	29.10	43.92	61.94	83.36	108.33	137.04
ELEVATION	75.00	75.37	75.74	76.11	76.47	76.84	77.21	77.58	77.95	78.32
STORAGE	1.04	1.20	1.38	1.56	1.76	1.96	2.18	2.41	2.64	2.89
OUTFLOW	169.67	206.38	247.34	292.73	342.72	397.46	457.12	521.86	591.83	667.20
ELEVATION	78.68	79.05	79.42	79.79	80.16	80.53	80.89	81.26	81.63	82.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 9. TO 667.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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HYDROGRAPH AT STATION 8BSWP

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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
28	FEB	0100	1	0.	.0	75.0	28	FEB	0915	34	11.	.1	75.8	28	FEB	1730	67	207.	1.2	79.1
28	FEB	0115	2	0.	.0	75.0	28	FEB	0930	35	11.	.1	75.8	28	FEB	1745	68	201.	1.2	79.0
28	FEB	0130	3	0.	.0	75.0	28	FEB	0945	36	12.	.1	75.9	28	FEB	1800	69	195.	1.2	78.[illegible]
28	FEB	0145	4	0.	.0	75.0	28	FEB	1000	37	13.	.2	75.9	28	FEB	1815	70	189.	1.1	7[illegible]
28	FEB	0200	5	0.	.0	75.0	28	FEB	1015	38	14.	.2	76.0	28	FEB	1830	71	182.	1.1	78.[illegible]
28	FEB	0215	6	0.	.0	75.0	28	FEB	1030	39	16.	.2	76.1	28	FEB	1845	72	175.	1.1	78.7
28	FEB	0230	7	0.	.0	75.0	28	FEB	1045	40	19.	.2	76.2	28	FEB	1900	73	165.	1.0	78.6
28	FEB	0245	8	2.	.0	75.3	28	FEB	1100	41	21.	.2	76.2	28	FEB	1915	74	144.	.9	78.4
28	FEB	0300	9	6.	.1	75.6	28	FEB	1115	42	24.	.3	76.3	28	FEB	1930	75	126.	.8	78.2
28	FEB	0315	10	7.	.1	75.7	28	FEB	1130	43	28.	.3	76.4	28	FEB	1945	76	115.	.8	78.0
28	FEB	0330	11	8.	.1	75.7	28	FEB	1145	44	32.	.3	76.6	28	FEB	2000	77	103.	.7	77.9
28	FEB	0345	12	9.	.1	75.8	28	FEB	1200	45	38.	.3	76.7	28	FEB	2015	78	94.	.7	77.7
28	FEB	0400	13	9.	.1	75.8	28	FEB	1215	46	47.	.4	76.9	28	FEB	2030	79	86.	.6	77.6
28	FEB	0415	14	10.	.1	75.8	28	FEB	1230	47	62.	.5	77.2	28	FEB	2045	80	80.	.6	77.5
28	FEB	0430	15	10.	.1	75.8	28	FEB	1245	48	87.	.6	77.6	28	FEB	2100	81	75.	.6	77.4
28	FEB	0445	16	10.	.1	75.8	28	FEB	1300	49	138.	.9	78.3	28	FEB	2115	82	71.	.5	77.4
28	FEB	0500	17	10.	.1	75.8	28	FEB	1315	50	284.	1.5	79.7	28	FEB	2130	83	69.	.5	77.3
28	FEB	0515	18	11.	.1	75.8	28	FEB	1330	51	440.	2.1	80.8	28	FEB	2145	84	66.	.5	77.3
28	FEB	0530	19	11.	.1	75.8	28	FEB	1345	52	445.	2.1	80.8	28	FEB	2200	85	64.	.5	77.3
28	FEB	0545	20	11.	.1	75.8	28	FEB	1400	53	376.	1.9	80.4	28	FEB	2215	86	63.	.5	77.2
28	FEB	0600	21	11.	.1	75.8	28	FEB	1415	54	325.	1.7	80.0	28	FEB	2230	87	62.	.5	77.2
28	FEB	0615	22	11.	.1	75.8	28	FEB	1430	55	293.	1.6	79.8	28	FEB	2245	88	60.	.5	77.2
28	FEB	0630	23	11.	.1	75.8	28	FEB	1445	56	270.	1.5	79.6	28	FEB	2300	89	59.	.5	77.2
28	FEB	0645	24	11.	.1	75.8	28	FEB	1500	57	257.	1.4	79.5	28	FEB	2315	90	58.	.5	77.1
28	FEB	0700	25	11.	.1	75.8	28	FEB	1515	58	249.	1.4	79.4	28	FEB	2330	91	57.	.5	77.1
28	FEB	0715	26	11.	.1	75.8	28	FEB	1530	59	243.	1.4	79.4	28	FEB	2345	92	56.	.5	77.1
28	FEB	0730	27	11.	.1	75.8	28	FEB	1545	60	237.	1.3	79.3	1	MAR	0000	93	56.	.5	77.1
28	FEB	0745	28	11.	.1	75.8	28	FEB	1600	61	232.	1.3	79.3	1	MAR	0015	94	55.	.5	77.1
28	FEB	0800	29	11.	.1	75.8	28	FEB	1615	62	228.	1.3	79.2	1	MAR	0030	95	54.	.4	77.1
28	FEB	0815	30	11.	.1	75.8	28	FEB	1630	63	225.	1.3	79.2	1	MAR	0045	96	53.	.4	77.0
28	FEB	0830	31	11.	.1	75.8	28	FEB	1645	64	221.	1.3	79.2	1	MAR	0100	97	53.	.4	77.0
28	FEB	0845	32	11.	.1	75.8	28	FEB	1700	65	217.	1.2	79.1							
28	FEB	0900	33	11.	.1	75.8	28	FEB	1715	66	212.	1.2	79.1							

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 445.	12.75		252.	90.	90.	90.
		(INCHES)	1.784	2.548	2.548	2.548
		(AC-FT)	125.	179.	179.	179.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.00-HR
+ (AC-FT)	(HR)				
2.	12.75	1.	1.	1.	1.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.00-HR
+ (FEET)	(HR)				
80.82	12.75	79.41	77.15	77.15	77.15

CUMULATIVE AREA = 1.31 SQ MI

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175 KK     *     SUB8C  *
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176 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           4  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                               SCS RUNOFF CALCULATION

              SUBBASIN RUNOFF DATA

178 BA          SUBBASIN CHARACTERISTICS
                      TAREA         .12  SUBBASIN AREA

                PRECIPITATION DATA

179 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                  .50    1.10    2.10    2.70    3.00    3.60    4.50    5.20     .00     .00     .00     .00

                                                   STORM AREA =     .12

180 LS          SCS LOSS RATE
                      STRTL         .70  INITIAL ABSTRACTION
                     CRVNBR       74.00  CURVE NUMBER
                      RTIMP         .00  PERCENT IMPERVIOUS AREA

181 UD          SCS DIMENSIONLESS UNITGRAPH
                       TLAG         .26  LAG

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   ING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                       UNIT HYDROGRAPH
                                                   7 END-OF-PERIOD ORDINATES
              107.      125.       44.       16.        5.        2.        1.


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185 KK     *     8CSWP  *
           *            *
           **************

186 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           1  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                               STORAGE ROUTING THROUGH 8C

              HYDROGRAPH ROUTING DATA

188 RS          STORAGE ROUTING
                      NSTPS           1  NUMBER OF SUBREACHES
                       ITYP        ELEV  TYPE OF INITIAL CONDITION
                     RSVRIC       64.00  INITIAL CONDITION
                          X         .00 WORKING R AND D COEFFICIENT

189 SA              AREA         1.1       1.9       3.3       5.7       8.8      11.1
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190 SE          ELEVATION       64.00     66.00     68.00     70.00     72.00     74.00

191 SS          SPILLWAY
                      CREL       64.00  SPILLWAY CREST ELEVATION
                     SPWID       12.00  SPILLWAY WIDTH
                      COQW        3.00  WEIR COEFFICIENT
                      EXPW        1.50  EXPONENT OF HEAD
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COMPUTED STORAGE-ELEVATION DATA

STORAGE	.00	3.00	8.12	16.99	31.37	51.20
ELEVATION	64.00	66.00	68.00	70.00	72.00	74.00

COMPUTED OUTFLOW-ELEVATION DATA

OUTFLOW	.00	.00	.20	1.56	5.27	12.49	24.40	42.16	66.95	99.94
ELEVATION	64.00	64.00	64.03	64.12	64.28	64.49	64.77	65.11	65.51	65.98
OUTFLOW	142.30	195.20	259.81	337.31	428.86	535.64	658.81	799.55	959.03	1138.42
ELEVATION	66.50	67.09	67.73	68.44	69.22	70.05	70.94	71.90	72.92	74.00

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	.03	.14	.32	.60	.97	1.47	2.12	2.95	3.00
OUTFLOW	.00	.20	1.56	5.27	12.49	24.40	42.16	66.95	99.94	101.82
ELEVATION	64.00	64.03	64.12	64.28	64.49	64.77	65.11	65.51	65.98	66.00
STORAGE	4.03	5.44	7.28	8.12	9.69	12.93	16.99	17.28	23.01	30.51
OUTFLOW	142.30	195.20	259.81	288.00	337.31	428.86	529.09	535.64	658.81	799.55
ELEVATION	66.50	67.09	67.73	68.00	68.44	69.22	70.00	70.05	70.94	71.90
STORAGE	31.37	39.92	51.20							
OUTFLOW	814.59	959.03	1138.42							
ELEVATION	72.00	72.92	74.00							

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HYDROGRAPH AT STATION 8CSWP

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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
28	FEB	0100	1	0.	.0	64.0	28	FEB	0915	34	11.	.5	64.4	28	FEB	1730	67	223.	6.2	67.4
28	FEB	0115	2	0.	.0	64.0	28	FEB	0930	35	11.	.5	64.4	28	FEB	1745	68	218.	6.1	67.3
28	FEB	0130	3	0.	.0	64.0	28	FEB	0945	36	11.	.5	64.5	28	FEB	1800	69	212.	5.9	67.3
28	FEB	0145	4	0.	.0	64.0	28	FEB	1000	37	12.	.6	64.5	28	FEB	1815	70	206.	5.7	67.2
28	FEB	0200	5	0.	.0	64.0	28	FEB	1015	38	13.	.6	64.5	28	FEB	1830	71	199.	5.6	67.1
28	FEB	0215	6	0.	.0	64.0	28	FEB	1030	39	14.	.7	64.5	28	FEB	1845	72	192.	5.4	67.1
28	FEB	0230	7	0.	.0	64.0	28	FEB	1045	40	16.	.7	64.6	28	FEB	1900	73	184.	5.1	67.0
28	FEB	0245	8	0.	.0	64.0	28	FEB	1100	41	19.	.8	64.6	28	FEB	1915	74	172.	4.8	66.8
28	FEB	0300	9	1.	.1	64.1	28	FEB	1115	42	22.	.9	64.7	28	FEB	1930	75	154.	4.4	66.6
28	FEB	0315	10	3.	.2	64.2	28	FEB	1130	43	25.	1.0	64.8	28	FEB	1945	76	138.	3.9	66.4
28	FEB	0330	11	4.	.3	64.2	28	FEB	1145	44	29.	1.1	64.9	28	FEB	2000	77	124.	3.6	66.3
28	FEB	0345	12	6.	.4	64.3	28	FEB	1200	45	35.	1.3	65.0	28	FEB	2015	78	112.	3.2	66.1
28	FEB	0400	13	7.	.4	64.3	28	FEB	1215	46	42.	1.5	65.1	28	FEB	2030	79	101.	3.0	66.0
28	FEB	0415	14	8.	.4	64.4	28	FEB	1230	47	54.	1.8	65.3	28	FEB	2045	80	93.	2.8	65
28	FEB	0430	15	9.	.5	64.4	28	FEB	1245	48	73.	2.3	65.6	28	FEB	2100	81	86.	2.6	65.
28	FEB	0445	16	10.	.5	64.4	28	FEB	1300	49	112.	3.3	66.1	28	FEB	2115	82	81.	2.5	65.7
28	FEB	0500	17	10.	.5	64.4	28	FEB	1315	50	207.	5.8	67.2	28	FEB	2130	83	77.	2.4	65.6
28	FEB	0515	18	10.	.5	64.4	28	FEB	1330	51	342.	9.8	68.5	28	FEB	2145	84	73.	2.3	65.6
28	FEB	0530	19	10.	.5	64.4	28	FEB	1345	52	429.	12.9	69.2	28	FEB	2200	85	71.	2.2	65.6

28 FEB 0545	20	10.	.5	64.4	*	28 FEB 1400	53	445.	13.6	69.3	*	28 FEB 2215	86	69.	2.2	65.5
28 FEB 0600	21	11.	.5	64.4	*	28 FEB 1415	54	422.	12.7	69.2	*	28 FEB 2230	87	67.	2.1	65.5
28 FEB 0615	22	11.	.5	64.4	*	28 FEB 1430	55	383.	11.3	68.8	*	28 FEB 2245	88	65.	2.1	65.5
28 FEB 0630	23	11.	.5	64.4	*	28 FEB 1445	56	346.	10.0	68.5	*	28 FEB 2300	89	64.	2.0	65.5
28 FEB 0645	24	11.	.5	64.4	*	28 FEB 1500	57	314.	9.0	68.2	*	28 FEB 2315	90	63.	2.0	65.4
28 FEB 0700	25	11.	.5	64.4	*	28 FEB 1515	58	291.	8.2	68.0	*	28 FEB 2330	91	62.	2.0	65.4
FEB 0715	26	11.	.5	64.4	*	28 FEB 1530	59	274.	7.7	67.9	*	28 FEB 2345	92	61.	2.0	65.4
FEB 0730	27	11.	.5	64.4	*	28 FEB 1545	60	262.	7.4	67.8	*	1 MAR 0000	93	60.	1.9	65.4
28 FEB 0745	28	11.	.5	64.4	*	28 FEB 1600	61	253.	7.1	67.7	*	1 MAR 0015	94	59.	1.9	65.4
28 FEB 0800	29	11.	.5	64.4	*	28 FEB 1615	62	246.	6.9	67.6	*	1 MAR 0030	95	58.	1.9	65.4
28 FEB 0815	30	11.	.5	64.4	*	28 FEB 1630	63	241.	6.7	67.5	*	1 MAR 0045	96	57.	1.9	65.4
28 FEB 0830	31	11.	.5	64.4	*	28 FEB 1645	64	237.	6.6	67.5	*	1 MAR 0100	97	57.	1.8	65.3
28 FEB 0845	32	11.	.5	64.4	*	28 FEB 1700	65	233.	6.5	67.5	*					
28 FEB 0900	33	11.	.5	64.4	*	28 FEB 1715	66	228.	6.4	67.4	*					
					*						*					

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 445.	13.00		274.	97.	97.	97.
		(INCHES)	1.779	2.521	2.521	2.521
		(AC-FT)	136.	192.	192.	192.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.00-HR
+ (AC-FT)	(HR)				
14.	13.00	8.	3.	3.	3.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.00-HR
+ (FEET)	(HR)				
69.35	13.00	67.83	65.63	65.63	65.63

CUMULATIVE AREA = 1.43 SQ MI

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            *            *
192 KK      *    SUB6A   *
            *            *
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193 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          4  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE
                               SCS RUNOFF CALCULATION

               SUBBASIN RUNOFF DATA

195 BA          SUBBASIN CHARACTERISTICS
                      TAREA        .10  SUBBASIN AREA

                PRECIPITATION DATA

    PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                ..... HYDRO-35 ......  ............... TP-40 ...............  ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN   2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                  .50    1.10    2.10   2.70    3.00    3.60    4.50    5.20     .00     .00     .00     .00
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                                        STORM AREA =      .10

197 LS          SCS LOSS RATE
                     STRTL        .78  INITIAL ABSTRACTION
                    CRVNBR      72.00  CURVE NUMBER
                     RTIMP        .00  PERCENT IMPERVIOUS AREA

198 UD          SCS DIMENSIONLESS UNITGRAPH
                      TLAG        .50  LAG

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WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                              UNIT HYDROGRAPH
                                         12 END-OF-PERIOD ORDINATES
              23.      70.      70.      42.      21.      11.       6.       3.       2.       1.
               0.       0.


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          *            *
199 KK    *     6ASWP  *
          *            *
          **************

200 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           1  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                              STORAGE ROUTING THROUGH 6A

             HYDROGRAPH ROUTING DATA

202 RS          STORAGE ROUTING
                     NSTPS           1  NUMBER OF SUBREACHES
                      ITYP        ELEV  TYPE OF INITIAL CONDITION
                    RSVRIC       82.00  INITIAL CONDITION
                         X         .00 WORKING R AND D COEFFICIENT

203 SA              AREA          .1       1.2       4.0       7.5

204 SE          ELEVATION       82.00     84.00     85.00     86.00

205 SL          LOW-LEVEL OUTLET
                     ELEVL       85.00  ELEVATION AT CENTER OF OUTLET
                     CAREA        4.50  CROSS-SECTIONAL AREA
                      COQL         .60  COEFFICIENT
                      EXPL         .50  EXPONENT OF HEAD

206 SS          SPILLWAY
                      CREL       85.90  SPILLWAY CREST ELEVATION
                     SPWID         .00  SPILLWAY WIDTH
                      COQW         .00  WEIR COEFFICIENT
                      EXPW        1.50  EXPONENT OF HEAD

                                                  ***

                                        COMPUTED STORAGE-ELEVATION DATA

          STORAGE        .00      1.07      3.50      9.16
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ELEVATION	82.00	84.00	85.00	86.00

COMPUTED OUTFLOW-ELEVATION DATA

OUTFLOW	.00	.00	21.62	21.46	21.30	21.14	20.99	20.84	20.69	20.54
ELEVATION	82.00	85.00	86.00	85.98	85.97	85.95	85.94	85.93	85.91	85.90

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	1.07	3.50	9.14
OUTFLOW	.00	.00	.00	21.62
ELEVATION	82.00	84.00	85.00	86.00

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HYDROGRAPH AT STATION 6ASWP

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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
28	FEB	0100	1	0.	.0	82.0	*	28	FEB	0915	34	0.	.0	82.0	*	28	FEB	1730	67	11.	6.2	85.5
28	FEB	0115	2	0.	.0	82.0	*	28	FEB	0930	35	0.	.0	82.0	*	28	FEB	1745	68	10.	6.2	85.5
28	FEB	0130	3	0.	.0	82.0	*	28	FEB	0945	36	0.	.0	82.0	*	28	FEB	1800	69	10.	6.1	85.5
28	FEB	0145	4	0.	.0	82.0	*	28	FEB	1000	37	0.	.0	82.0	*	28	FEB	1815	70	10.	6.1	85.5
28	FEB	0200	5	0.	.0	82.0	*	28	FEB	1015	38	0.	.0	82.0	*	28	FEB	1830	71	10.	6.0	85.4
28	FEB	0215	6	0.	.0	82.0	*	28	FEB	1030	39	0.	.0	82.0	*	28	FEB	1845	72	9.	5.9	85.4
28	FEB	0230	7	0.	.0	82.0	*	28	FEB	1045	40	0.	.0	82.0	*	28	FEB	1900	73	9.	5.9	85.4
28	FEB	0245	8	0.	.0	82.0	*	28	FEB	1100	41	0.	.0	82.0	*	28	FEB	1915	74	9.	5.8	85.4
28	FEB	0300	9	0.	.0	82.0	*	28	FEB	1115	42	0.	.0	82.0	*	28	FEB	1930	75	9.	5.7	85.4
28	FEB	0315	10	0.	.0	82.0	*	28	FEB	1130	43	0.	.0	82.1	*	28	FEB	1945	76	8.	5.7	85.4
	FEB	0330	11	0.	.0	82.0	*	28	FEB	1145	44	0.	.1	82.1	*	28	FEB	2000	77	8.	5.6	85.4
	FEB	0345	12	0.	.0	82.0	*	28	FEB	1200	45	0.	.1	82.2	*	28	FEB	2015	78	8.	5.5	85.4
28	FEB	0400	13	0.	.0	82.0	*	28	FEB	1215	46	0.	.2	82.3	*	28	FEB	2030	79	7.	5.4	85.3
28	FEB	0415	14	0.	.0	82.0	*	28	FEB	1230	47	0.	.2	82.4	*	28	FEB	2045	80	7.	5.3	85.3
28	FEB	0430	15	0.	.0	82.0	*	28	FEB	1245	48	0.	.4	82.7	*	28	FEB	2100	81	7.	5.3	85.3
28	FEB	0445	16	0.	.0	82.0	*	28	FEB	1300	49	0.	.6	83.1	*	28	FEB	2115	82	7.	5.2	85.3
28	FEB	0500	17	0.	.0	82.0	*	28	FEB	1315	50	0.	1.1	84.0	*	28	FEB	2130	83	6.	5.1	85.3
28	FEB	0515	18	0.	.0	82.0	*	28	FEB	1330	51	0.	2.2	84.5	*	28	FEB	2145	84	6.	5.1	85.3
28	FEB	0530	19	0.	.0	82.0	*	28	FEB	1345	52	0.	3.6	85.0	*	28	FEB	2200	85	6.	5.0	85.3
28	FEB	0545	20	0.	.0	82.0	*	28	FEB	1400	53	5.	4.8	85.2	*	28	FEB	2215	86	6.	4.9	85.3
28	FEB	0600	21	0.	.0	82.0	*	28	FEB	1415	54	8.	5.6	85.4	*	28	FEB	2230	87	5.	4.9	85.2
28	FEB	0615	22	0.	.0	82.0	*	28	FEB	1430	55	10.	6.1	85.5	*	28	FEB	2245	88	5.	4.8	85.2
28	FEB	0630	23	0.	.0	82.0	*	28	FEB	1445	56	11.	6.4	85.5	*	28	FEB	2300	89	5.	4.8	85.2
28	FEB	0645	24	0.	.0	82.0	*	28	FEB	1500	57	12.	6.6	85.5	*	28	FEB	2315	90	5.	4.7	85.2
28	FEB	0700	25	0.	.0	82.0	*	28	FEB	1515	58	12.	6.7	85.6	*	28	FEB	2330	91	5.	4.7	85.2
28	FEB	0715	26	0.	.0	82.0	*	28	FEB	1530	59	12.	6.7	85.6	*	28	FEB	2345	92	4.	4.7	85.2
28	FEB	0730	27	0.	.0	82.0	*	28	FEB	1545	60	12.	6.6	85.6	*	1	MAR	0000	93	4.	4.6	85.2
28	FEB	0745	28	0.	.0	82.0	*	28	FEB	1600	61	12.	6.6	85.5	*	1	MAR	0015	94	4.	4.6	85.2
28	FEB	0800	29	0.	.0	82.0	*	28	FEB	1615	62	12.	6.5	85.5	*	1	MAR	0030	95	4.	4.5	85.2
28	FEB	0815	30	0.	.0	82.0	*	28	FEB	1630	63	11.	6.5	85.5	*	1	MAR	0045	96	4.	4.5	85.2
28	FEB	0830	31	0.	.0	82.0	*	28	FEB	1645	64	11.	6.4	85.5	*	1	MAR	0100	97	4.	4.5	85.2
28	FEB	0845	32	0.	.0	82.0	*	28	FEB	1700	65	11.	6.4	85.5	*							
28	FEB	0900	33	0.	.0	82.0	*	28	FEB	1715	66	11.	6.3	85.5	*							

****

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.00-HR
CFS)	(HR)					
		(CFS)				
+ 12.	14.50		10.	4.	4.	4.
		(INCHES)	1.000	1.452	1.452	1.452
		(AC-FT)	5.	7.	7.	7.

```
 PEAK STORAGE   TIME                          MAXIMUM AVERAGE STORAGE
                                     6-HR       24-HR       72-HR     24.00-HR
+  (AC-FT)      (HR)
       7.     14.50                   6.          3.          3.          3.

 PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                     6-HR       24-HR       72-HR     24.00-HR
+   (FEET)      (HR)
    85.56     14.50                  85.48      83.67       83.67       83.67

                       CUMULATIVE AREA =     .10 SQ MI
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          **************
          *            *
 207 KK   *     SUB6B  *
          *            *
          **************

 208 KO          OUTPUT CONTROL VARIABLES
                       IPRNT           4  PRINT CONTROL
                       IPLOT           0  PLOT CONTROL
                       QSCAL          0.  HYDROGRAPH PLOT SCALE
                                SCS RUNOFF CALCULATION

               SUBBASIN RUNOFF DATA

 210 BA          SUBBASIN CHARACTERISTICS
                       TAREA         .18  SUBBASIN AREA

                 PRECIPITATION DATA

 211 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                 ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                 5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                   .50    1.10    2.10    2.70    3.00    3.60    4.50    5.20     .00     .00     .00     .00

                                                   STORM AREA =     .18

 212 LS          SCS LOSS RATE
                       STRTL         .78  INITIAL ABSTRACTION
                      CRVNBR       72.00  CURVE NUMBER
                       RTIMP         .00  PERCENT IMPERVIOUS AREA

 213 UD          SCS DIMENSIONLESS UNITGRAPH
                        TLAG         .20  LAG

                                                          ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                     UNIT HYDROGRAPH
                                                 6 END-OF-PERIOD ORDINATES
               230.      163.       45.       13.        4.        1.
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          *           *
217 KK    *    6BSWP  *
          *           *
          **************

3 KO          OUTPUT CONTROL VARIABLES
                    IPRNT           1  PRINT CONTROL
                    IPLOT           0  PLOT CONTROL
                    QSCAL          0.  HYDROGRAPH PLOT SCALE
                             STORAGE ROUTING THROUGH 6B

             HYDROGRAPH ROUTING DATA

220 RS        STORAGE ROUTING
                    NSTPS           1  NUMBER OF SUBREACHES
                     ITYP        ELEV  TYPE OF INITIAL CONDITION
                   RSVRIC       79.50  INITIAL CONDITION
                        X         .00 WORKING R AND D COEFFICIENT

221 SA             AREA         9.6      23.8      37.4

222 SE        ELEVATION       79.00     80.00     82.00

224 SL        LOW-LEVEL OUTLET
                    ELEVL       80.60  ELEVATION AT CENTER OF OUTLET
                    CAREA       11.30  CROSS-SECTIONAL AREA
                     COQL         .60  COEFFICIENT
                     EXPL         .50  EXPONENT OF HEAD

225 SS        SPILLWAY
                     CREL       81.90  SPILLWAY CREST ELEVATION
                    SPWID         .00  SPILLWAY WIDTH
                     COQW         .00  WEIR COEFFICIENT
                     EXPW        1.50  EXPONENT OF HEAD

                                                    ***

                                        COMPUTED STORAGE-ELEVATION DATA

          STORAGE        .00     16.21     76.95
        ELEVATION      79.00     80.00     82.00

                                        COMPUTED OUTFLOW-ELEVATION DATA

          OUTFLOW        .00       .00     67.92     67.00     66.11     65.25     64.40     63.58     62.78     62.00
        ELEVATION      79.00     80.60     82.16     82.12     82.08     82.04     82.00     81.97     81.93     81.90


                                      COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE        .00     16.21     31.62     76.95     83.04
          OUTFLOW        .00       .00       .00     64.34     67.92
        ELEVATION      79.00     80.00     80.60     82.00     82.16

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                                        HYDROGRAPH AT STATION    6BSWP

*****************************************************************************************************************************
                                                *                                                *
   MON HRMN ORD  OUTFLOW  STORAGE   STAGE * DA MON HRMN ORD  OUTFLOW  STORAGE   STAGE * DA MON HRMN ORD  OUTFLOW  STORAGE   STAGE
                                                *                                                *
 28 FEB 0100   1      0.      6.3    79.4 * 28 FEB 0915  34      0.      6.3    79.4 * 28 FEB 1730  67      0.     27.3    80.4
 28 FEB 0115   2      0.      6.3    79.4 * 28 FEB 0930  35      0.      6.3    79.4 * 28 FEB 1745  68      0.     27.8    80.5
 28 FEB 0130   3      0.      6.3    79.4 * 28 FEB 0945  36      0.      6.3    79.4 * 28 FEB 1800  69      0.     28.3    80.5
 28 FEB 0145   4      0.      6.3    79.4 * 28 FEB 1000  37      0.      6.3    79.4 * 28 FEB 1815  70      0.     28.7    80.5
```

28	FEB	0200	5	0.	6.3	79.4	*	28	FEB	1015	38	0.	6.3	79.4	*	28	FEB	1830	71	0.	29.2	80.5	
28	FEB	0215	6	0.	6.3	79.4	*	28	FEB	1030	39	0.	6.3	79.4	*	28	FEB	1845	72	0.	29.6	80.5	
28	FEB	0230	7	0.	6.3	79.4	*	28	FEB	1045	40	0.	6.4	79.4	*	28	FEB	1900	73	0.	30.0	80.5	
28	FEB	0245	8	0.	6.3	79.4	*	28	FEB	1100	41	0.	6.4	79.4	*	28	FEB	1915	74	0.	30.4	80 [illegible]	
28	FEB	0300	9	0.	6.3	79.4	*	28	FEB	1115	42	0.	6.4	79.4	*	28	FEB	1930	75	0.	30.8	8[illegible]	
28	FEB	0315	10	0.	6.3	79.4	*	28	FEB	1130	43	0.	6.5	79.4	*	28	FEB	1945	76	0.	31.1	80.[illegible]	
28	FEB	0330	11	0.	6.3	79.4	*	28	FEB	1145	44	0.	6.5	79.4	*	28	FEB	2000	77	0.	31.4	80.6	
28	FEB	0345	12	0.	6.3	79.4	*	28	FEB	1200	45	0.	6.6	79.4	*	28	FEB	2015	78	0.	31.7	80.6	
28	FEB	0400	13	0.	6.3	79.4	*	28	FEB	1215	46	0.	6.8	79.4	*	28	FEB	2030	79	0.	31.9	80.6	
28	FEB	0415	14	0.	6.3	79.4	*	28	FEB	1230	47	0.	7.0	79.4	*	28	FEB	2045	80	1.	32.2	80.6	
28	FEB	0430	15	0.	6.3	79.4	*	28	FEB	1245	48	0.	7.5	79.5	*	28	FEB	2100	81	1.	32.4	80.6	
28	FEB	0445	16	0.	6.3	79.4	*	28	FEB	1300	49	0.	8.4	79.5	*	28	FEB	2115	82	1.	32.7	80.6	
28	FEB	0500	17	0.	6.3	79.4	*	28	FEB	1315	50	0.	10.8	79.7	*	28	FEB	2130	83	2.	32.9	80.6	
28	FEB	0515	18	0.	6.3	79.4	*	28	FEB	1330	51	0.	14.3	79.9	*	28	FEB	2145	84	2.	33.1	80.6	
28	FEB	0530	19	0.	6.3	79.4	*	28	FEB	1345	52	0.	16.7	80.0	*	28	FEB	2200	85	2.	33.3	80.7	
28	FEB	0545	20	0.	6.3	79.4	*	28	FEB	1400	53	0.	18.3	80.1	*	28	FEB	2215	86	3.	33.4	80.7	
28	FEB	0600	21	0.	6.3	79.4	*	28	FEB	1415	54	0.	19.4	80.1	*	28	FEB	2230	87	3.	33.6	80.7	
28	FEB	0615	22	0.	6.3	79.4	*	28	FEB	1430	55	0.	20.3	80.2	*	28	FEB	2245	88	3.	33.7	80.7	
28	FEB	0630	23	0.	6.3	79.4	*	28	FEB	1445	56	0.	21.1	80.2	*	28	FEB	2300	89	3.	33.9	80.7	
28	FEB	0645	24	0.	6.3	79.4	*	28	FEB	1500	57	0.	21.8	80.2	*	28	FEB	2315	90	3.	34.0	80.7	
28	FEB	0700	25	0.	6.3	79.4	*	28	FEB	1515	58	0.	22.4	80.2	*	28	FEB	2330	91	4.	34.1	80.7	
28	FEB	0715	26	0.	6.3	79.4	*	28	FEB	1530	59	0.	23.0	80.3	*	28	FEB	2345	92	4.	34.2	80.7	
28	FEB	0730	27	0.	6.3	79.4	*	28	FEB	1545	60	0.	23.6	80.3	*	1	MAR	0000	93	4.	34.3	80.7	
28	FEB	0745	28	0.	6.3	79.4	*	28	FEB	1600	61	0.	24.2	80.3	*	1	MAR	0015	94	4.	34.4	80.7	
28	FEB	0800	29	0.	6.3	79.4	*	28	FEB	1615	62	0.	24.7	80.3	*	1	MAR	0030	95	4.	34.5	80.7	
28	FEB	0815	30	0.	6.3	79.4	*	28	FEB	1630	63	0.	25.3	80.4	*	1	MAR	0045	96	4.	34.6	80.7	
28	FEB	0830	31	0.	6.3	79.4	*	28	FEB	1645	64	0.	25.8	80.4	*	1	MAR	0100	97	4.	34.7	80.7	
28	FEB	0845	32	0.	6.3	79.4	*	28	FEB	1700	65	0.	26.3	80.4	*								
28	FEB	0900	33	0.	6.3	79.4	*	28	FEB	1715	66	0.	26.8	80.4	*								
							*								*								

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 4.	24.00		2.	1.	1.	1.
		(INCHES)	.073	.073	.073	.073
		(AC-FT)	1.	1.	1.	1.

PEAK STORAGE	TIME		MAXIMUM AVERAGE STORAGE			
			6-HR	24-HR	72-HR	24.00-HR
+ (AC-FT)	(HR)					
35.	24.00		33.	17.	17.	17.

PEAK STAGE	TIME		MAXIMUM AVERAGE STAGE			
			6-HR	24-HR	72-HR	24.00-HR
+ (FEET)	(HR)					
80.69	24.00		80.64	79.92	79.92	79.92

CUMULATIVE AREA = .27 SQ MI

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           **************
           *            *
226 KK     *   SUB6D    *
           *            *
           **************

227 KO        OUTPUT CONTROL VARIABLES
                    IPRNT          4  PRINT CONTROL
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                    IPLOT          0  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE
                            SCS RUNOFF CALCULATION

            SUBBASIN RUNOFF DATA

229 BA        SUBBASIN CHARACTERISTICS
                    TAREA        .42  SUBBASIN AREA

              PRECIPITATION DATA

230 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
              ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
              5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                .50    1.10    2.10    2.70    3.00    3.60    4.50    5.20     .00     .00     .00     .00

                                                STORM AREA =     .42

231 LS        SCS LOSS RATE
                    STRTL        .78  INITIAL ABSTRACTION
                   CRVNBR      72.00  CURVE NUMBER
                    RTIMP        .00  PERCENT IMPERVIOUS AREA

232 UD        SCS DIMENSIONLESS UNITGRAPH
                     TLAG        .50  LAG

                                                          ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                     UNIT HYDROGRAPH
                                                 12 END-OF-PERIOD ORDINATES
            102.     305.     305.     184.      92.      48.      25.      13.       7.       4.
              2.       1.


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


          **************
          *            *
233 KK    *     6DSWP  *
          *            *
          **************

234 KO        OUTPUT CONTROL VARIABLES
                    IPRNT          1  PRINT CONTROL
                    IPLOT          0  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE
                            STORAGE ROUTING THROUGH 6D

            HYDROGRAPH ROUTING DATA

236 RS        STORAGE ROUTING
                   NSTPS          1  NUMBER OF SUBREACHES
                    ITYP       ELEV  TYPE OF INITIAL CONDITION
                  RSVRIC      80.00  INITIAL CONDITION
                       X        .00 WORKING R AND D COEFFICIENT

    SA            AREA        1.5      14.4

238 SE        ELEVATION      80.00     90.00

239 SL        LOW-LEVEL OUTLET
                   ELEVL      80.00  ELEVATION AT CENTER OF OUTLET
```

CAREA	12.57	CROSS-SECTIONAL AREA
COQL	.60	COEFFICIENT
EXPL	.50	EXPONENT OF HEAD

240 SS SPILLWAY

CREL	90.00	SPILLWAY CREST ELEVATION
SPWID	.00	SPILLWAY WIDTH
COQW	.00	WEIR COEFFICIENT
EXPW	1.50	EXPONENT OF HEAD

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COMPUTED STORAGE-ELEVATION DATA

STORAGE	.00	68.83
ELEVATION	80.00	90.00

COMPUTED OUTFLOW-ELEVATION DATA

OUTFLOW	.00	84.17	90.50	97.87	106.54	116.90	129.48	145.11	165.02	191.28
ELEVATION	80.00	81.94	82.24	82.62	83.10	83.73	84.58	85.76	87.44	90.00

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	4.33	5.28	6.59	8.48	11.30	15.80	23.50	37.99	68.83
OUTFLOW	.00	84.17	90.50	97.87	106.54	116.90	129.48	145.11	165.02	191.28
ELEVATION	80.00	81.94	82.24	82.62	83.10	83.73	84.58	85.76	87.44	90.00

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HYDROGRAPH AT STATION 60SWP

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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
28	FEB	0100	1	0.	.0	80.0	28	FEB	0915	34	0.	.0	80.0	28	FEB	1730	67	54.	2.8	81.2
28	FEB	0115	2	0.	.0	80.0	28	FEB	0930	35	0.	.0	80.0	28	FEB	1745	68	47.	2.4	81.1
28	FEB	0130	3	0.	.0	80.0	28	FEB	0945	36	0.	.0	80.0	28	FEB	1800	69	42.	2.1	81.0
28	FEB	0145	4	0.	.0	80.0	28	FEB	1000	37	0.	.0	80.0	28	FEB	1815	70	38.	1.9	80.9
28	FEB	0200	5	0.	.0	80.0	28	FEB	1015	38	0.	.0	80.0	28	FEB	1830	71	35.	1.8	80.8
28	FEB	0215	6	0.	.0	80.0	28	FEB	1030	39	0.	.0	80.0	28	FEB	1845	72	33.	1.7	80.8
28	FEB	0230	7	0.	.0	80.0	28	FEB	1045	40	0.	.0	80.0	28	FEB	1900	73	31.	1.6	80.7
28	FEB	0245	8	0.	.0	80.0	28	FEB	1100	41	1.	.0	80.0	28	FEB	1915	74	30.	1.5	80.7
28	FEB	0300	9	0.	.0	80.0	28	FEB	1115	42	1.	.1	80.0	28	FEB	1930	75	28.	1.4	80.6
28	FEB	0315	10	0.	.0	80.0	28	FEB	1130	43	2.	.1	80.0	28	FEB	1945	76	25.	1.3	80.6
28	FEB	0330	11	0.	.0	80.0	28	FEB	1145	44	3.	.2	80.1	28	FEB	2000	77	23.	1.2	80.5
28	FEB	0345	12	0.	.0	80.0	28	FEB	1200	45	5.	.2	80.1	28	FEB	2015	78	21.	1.1	80.5
28	FEB	0400	13	0.	.0	80.0	28	FEB	1215	46	7.	.3	80.2	28	FEB	2030	79	19.	1.0	80.4
28	FEB	0415	14	0.	.0	80.0	28	FEB	1230	47	10.	.5	80.2	28	FEB	2045	80	18.	.9	80.4
28	FEB	0430	15	0.	.0	80.0	28	FEB	1245	48	16.	.8	80.4	28	FEB	2100	81	17.	.9	80.4
28	FEB	0445	16	0.	.0	80.0	28	FEB	1300	49	27.	1.4	80.6	28	FEB	2115	82	16.	.8	80.4
28	FEB	0500	17	0.	.0	80.0	28	FEB	1315	50	55.	2.8	81.3	28	FEB	2130	83	15.	.8	80.3
28	FEB	0515	18	0.	.0	80.0	28	FEB	1330	51	94.	5.9	82.4	28	FEB	2145	84	14.	.7	80.3
28	FEB	0530	19	0.	.0	80.0	28	FEB	1345	52	112.	9.9	83.4	28	FEB	2200	85	14.	.7	80.3
28	FEB	0545	20	0.	.0	80.0	28	FEB	1400	53	122.	13.1	84.1	28	FEB	2215	86	13.	.7	80.3
28	FEB	0600	21	0.	.0	80.0	28	FEB	1415	54	127.	14.8	84.4	28	FEB	2230	87	13.	.7	80.3
28	FEB	0615	22	0.	.0	80.0	28	FEB	1430	55	128.	15.2	84.5	28	FEB	2245	88	13.	.7	80
28	FEB	0630	23	0.	.0	80.0	28	FEB	1445	56	127.	14.9	84.4	28	FEB	2300	89	12.	.6	80
28	FEB	0645	24	0.	.0	80.0	28	FEB	1500	57	125.	14.0	84.2	28	FEB	2315	90	12.	.6	80.3
28	FEB	0700	25	0.	.0	80.0	28	FEB	1515	58	121.	12.9	84.0	28	FEB	2330	91	12.	.6	80.3
28	FEB	0715	26	0.	.0	80.0	28	FEB	1530	59	118.	11.5	83.8	28	FEB	2345	92	12.	.6	80.3
28	FEB	0730	27	0.	.0	80.0	28	FEB	1545	60	113.	10.2	83.5	1	MAR	0000	93	11.	.6	80.3
28	FEB	0745	28	0.	.0	80.0	28	FEB	1600	61	108.	8.8	83.2	1	MAR	0015	94	11.	.6	80.3

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28 FEB 0800  29      0.       .0    80.0 * 28 FEB 1615  62     102.      7.4    82.8 *  1 MAR 0030  95      11.       .6    80.3
28 FEB 0815  30      0.       .0    80.0 * 28 FEB 1630  63      95.      6.1    82.5 *  1 MAR 0045  96      11.       .6    80.2
28 FEB 0830  31      0.       .0    80.0 * 28 FEB 1645  64      89.      5.0    82.1 *  1 MAR 0100  97      11.       .5    80.2
28 FEB 0845  32      0.       .0    80.0 * 28 FEB 1700  65      78.      4.0    81.8 *
 ` FEB 0900  33      0.       .0    80.0 * 28 FEB 1715  66      64.      3.3    81.5 *
                                         *                                           *
-*****************************************************************************************************************************

 PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+  (CFS)       (HR)
                          (CFS)
+    128.     13.50                   85.         26.         26.          26.
                       (INCHES)     1.888       2.301       2.301        2.301
                        (AC-FT)      42.         52.         52.          52.

 PEAK STORAGE   TIME                         MAXIMUM AVERAGE STORAGE
                                     6-HR       24-HR       72-HR     24.00-HR
+  (AC-FT)      (HR)
      15.     13.50                    7.          2.          2.           2.

 PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                     6-HR       24-HR       72-HR     24.00-HR
+  (FEET)      (HR)
    84.48     13.50                 82.51       80.74       80.74        80.74

                        CUMULATIVE AREA =     .42 SQ MI


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


           **************
           *            *
 241 KK    *    SUB6C   *
           *            *
           **************

 242 KO          OUTPUT CONTROL VARIABLES
                       IPRNT           4  PRINT CONTROL
                       IPLOT           0  PLOT CONTROL
                       QSCAL          0.  HYDROGRAPH PLOT SCALE
                                SCS RUNOFF CALCULATION

               SUBBASIN RUNOFF DATA

 244 BA          SUBBASIN CHARACTERISTICS
                       TAREA         .23  SUBBASIN AREA

                 PRECIPITATION DATA

 245 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                 ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                 5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                   .50    1.10    2.10    2.70    3.00    3.60    4.50    5.20     .00     .00     .00     .00

                                                  STORM AREA =     .23

   ‹ LS          SCS LOSS RATE
                       STRTL         .78  INITIAL ABSTRACTION
                      CRVNBR       72.00  CURVE NUMBER
                       RTIMP         .00  PERCENT IMPERVIOUS AREA

 247 UD          SCS DIMENSIONLESS UNITGRAPH
```

```
                    TLAG        .30  LAG

                                                          ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                   UNIT HYDROGRAPH
                                              8 END-OF-PERIOD ORDINATES
            171.      253.      111.      43.      16.       6.       3.       1.


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


          **************
          *            *
251 KK    *     6CSWP  *
          *            *
          **************

252 KO         OUTPUT CONTROL VARIABLES
                     IPRNT           1  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                              STORAGE ROUTING THROUGH 6C

            HYDROGRAPH ROUTING DATA

254 RS         STORAGE ROUTING
                     NSTPS           1  NUMBER OF SUBREACHES
                      ITYP        ELEV  TYPE OF INITIAL CONDITION
                    RSVRIC       74.50  INITIAL CONDITION
                         X         .00 WORKING R AND D COEFFICIENT

255 SA              AREA          .0       2.3      12.6      24.4      33.5

256 SE         ELEVATION       74.50     76.00     78.00     80.00     82.00

257 SL         LOW-LEVEL OUTLET
                     ELEVL       74.50  ELEVATION AT CENTER OF OUTLET
                     CAREA       19.64  CROSS-SECTIONAL AREA
                      COQL         .60  COEFFICIENT
                      EXPL         .50  EXPONENT OF HEAD

258 SS         SPILLWAY
                      CREL       81.90  SPILLWAY CREST ELEVATION
                     SPWID         .00  SPILLWAY WIDTH
                      COQW         .00  WEIR COEFFICIENT
                      EXPW        1.50  EXPONENT OF HEAD

                                                          ***

                                          COMPUTED STORAGE-ELEVATION DATA

          STORAGE        .00      1.16     14.69     50.99    108.68
        ELEVATION      74.50     76.00     78.00     80.00     82.00

                                          COMPUTED OUTFLOW-ELEVATION DATA

          OUTFLOW        .00    144.90    153.26    162.65    173.25    185.34    199.24    215.40    234.40    257.09
        ELEVATION      74.50     76.85     77.13     77.46     77.86     78.35     78.94     79.69     80.65     81.90

                                     COMPUTED STORAGE-OUTFLOW-ELEVATION DATA
```

STORAGE	.00	1.16	4.47	6.25	8.92	13.01	14.69	19.34	28.89	43.85
OUTFLOW	.00	115.75	144.90	153.26	162.65	173.25	176.81	185.34	199.24	215.40
ELEVATION	74.50	76.00	76.85	77.13	77.46	77.86	78.00	78.35	78.94	79.69

STORAGE	50.99	67.80	105.35	108.68
OUTFLOW	221.64	234.40	257.09	258.82
ELEVATION	80.00	80.65	81.90	82.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 0. TO 116.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

****

HYDROGRAPH AT STATION 6CSWP

****

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
28	FEB	0100	1	0.	.0	74.5	28	FEB	0915	34	0.	.0	74.5	28	FEB	1730	67	129.	2.6	76.4
28	FEB	0115	2	0.	.0	74.5	28	FEB	0930	35	0.	.0	74.5	28	FEB	1745	68	119.	1.5	76.1
28	FEB	0130	3	0.	.0	74.5	28	FEB	0945	36	0.	.0	74.5	28	FEB	1800	69	75.	.8	75.5
28	FEB	0145	4	0.	.0	74.5	28	FEB	1000	37	0.	.0	74.5	28	FEB	1815	70	56.	.6	75.2
28	FEB	0200	5	0.	.0	74.5	28	FEB	1015	38	0.	.0	74.5	28	FEB	1830	71	52.	.5	75.2
28	FEB	0215	6	0.	.0	74.5	28	FEB	1030	39	0.	.0	74.5	28	FEB	1845	72	49.	.5	75.1
28	FEB	0230	7	0.	.0	74.5	28	FEB	1045	40	1.	.0	74.5	28	FEB	1900	73	47.	.5	75.1
28	FEB	0245	8	0.	.0	74.5	28	FEB	1100	41	2.	.0	74.5	28	FEB	1915	74	44.	.4	75.1
28	FEB	0300	9	0.	.0	74.5	28	FEB	1115	42	3.	.0	74.5	28	FEB	1930	75	40.	.4	75.0
28	FEB	0315	10	0.	.0	74.5	28	FEB	1130	43	5.	.0	74.6	28	FEB	1945	76	36.	.4	75.0
28	FEB	0330	11	0.	.0	74.5	28	FEB	1145	44	7.	.1	74.6	28	FEB	2000	77	33.	.3	74.9
28	FEB	0345	12	0.	.0	74.5	28	FEB	1200	45	9.	.1	74.6	28	FEB	2015	78	31.	.3	74.9
[illegible]	FEB	0400	13	0.	.0	74.5	28	FEB	1215	46	14.	.1	74.7	28	FEB	2030	79	28.	.3	74.9
	FEB	0415	14	0.	.0	74.5	28	FEB	1230	47	22.	.2	74.8	28	FEB	2045	80	27.	.3	74.9
[illegible]	FEB	0430	15	0.	.0	74.5	28	FEB	1245	48	35.	.4	75.0	28	FEB	2100	81	26.	.3	74.8
28	FEB	0445	16	0.	.0	74.5	28	FEB	1300	49	65.	.7	75.3	28	FEB	2115	82	25.	.3	74.8
28	FEB	0500	17	0.	.0	74.5	28	FEB	1315	50	122.	1.9	76.2	28	FEB	2130	83	24.	.2	74.8
28	FEB	0515	18	0.	.0	74.5	28	FEB	1330	51	146.	4.6	76.9	28	FEB	2145	84	24.	.2	74.8
28	FEB	0530	19	0.	.0	74.5	28	FEB	1345	52	157.	7.3	77.3	28	FEB	2200	85	23.	.2	74.8
28	FEB	0545	20	0.	.0	74.5	28	FEB	1400	53	163.	8.9	77.5	28	FEB	2215	86	23.	.2	74.8
28	FEB	0600	21	0.	.0	74.5	28	FEB	1415	54	165.	9.8	77.6	28	FEB	2230	87	23.	.2	74.8
28	FEB	0615	22	0.	.0	74.5	28	FEB	1430	55	166.	10.2	77.6	28	FEB	2245	88	22.	.2	74.8
28	FEB	0630	23	0.	.0	74.5	28	FEB	1445	56	166.	10.3	77.6	28	FEB	2300	89	22.	.2	74.8
28	FEB	0645	24	0.	.0	74.5	28	FEB	1500	57	166.	10.1	77.6	28	FEB	2315	90	22.	.2	74.8
28	FEB	0700	25	0.	.0	74.5	28	FEB	1515	58	165.	9.8	77.5	28	FEB	2330	91	22.	.2	74.8
28	FEB	0715	26	0.	.0	74.5	28	FEB	1530	59	164.	9.4	77.5	28	FEB	2345	92	21.	.2	74.8
28	FEB	0730	27	0.	.0	74.5	28	FEB	1545	60	162.	8.9	77.5	1	MAR	0000	93	21.	.2	74.8
28	FEB	0745	28	0.	.0	74.5	28	FEB	1600	61	160.	8.2	77.4	1	MAR	0015	94	21.	.2	74.8
28	FEB	0800	29	0.	.0	74.5	28	FEB	1615	62	158.	7.5	77.3	1	MAR	0030	95	21.	.2	74.8
28	FEB	0815	30	0.	.0	74.5	28	FEB	1630	63	155.	6.7	77.2	1	MAR	0045	96	21.	.2	74.8
28	FEB	0830	31	0.	.0	74.5	28	FEB	1645	64	152.	5.9	77.1	1	MAR	0100	97	21.	.2	74.8
28	FEB	0845	32	0.	.0	74.5	28	FEB	1700	65	147.	4.9	76.9							
28	FEB	0900	33	0.	.0	74.5	28	FEB	1715	66	139.	3.8	76.7							

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PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.00-HR
		(CFS)				
166.	13.75		133.	41.	41.	41.
		(INCHES)	1.333	1.652	1.652	1.652
		(AC-FT)	66.	82.	82.	82.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE 6-HR	24-HR	72-HR	24.00-HR

+ (AC-FT)	(HR)				
10.	13.75	6.	1.	1.	1.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.00-HR
+ (FEET)	(HR)				
77.59	13.75	76.74	75.16	75.16	75.16

CUMULATIVE AREA = .93 SQ MI

1

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+										
	HYDROGRAPH AT									
+		SUB7A	145.	12.50	32.	10.	10.	.13		
	ROUTED TO									
+		7ASWP	28.	13.50	26.	10.	10.	.13		
+									112.63	13.50
	HYDROGRAPH AT									
+		SUB7B	99.	12.75	28.	9.	9.	.12		
	2 COMBINED AT									
+		7AB	126.	12.75	53.	18.	18.	.25		
	ROUTED TO									
+		7BSWP	25.	19.25	25.	17.	17.	.25		
+									109.51	19.25
	HYDROGRAPH AT									
+		SUB7C	58.	12.50	13.	4.	4.	.05		
	2 COMBINED AT									
+		7BC	77.	12.50	35.	21.	21.	.30		
	ROUTED TO									
+		7CHNL	78.	12.50	35.	21.	21.	.30		
+									96.86	12.50
	HYDROGRAPH AT									
+		SUB7D	102.	12.50	25.	8.	8.	.10		
	ROUTED TO									
+		7DSWP	41.	13.25	21.	6.	6.	.10		
+									92.45	13.25
	HYDROGRAPH AT									
+		SUB7E	68.	12.25	11.	3.	3.	.05		
	3 COMBINED AT									
+		7CDE	138.	12.25	67.	31.	31.	.45		
	ROUTED TO									
+		7ECHN	101.	13.00	65.	30.	30.	.45		
+									90.70	13.00
	HYDROGRAPH AT									
+		SUB7F	224.	12.50	50.	15.	15.	.21		

	2 COMBINED AT								
+		7EF	311.	12.50	114.	45.	45.	.66	
	ROUTED TO								
		7FCHN	312.	12.50	114.	45.	45.	.66	
								90.24	12.50
	HYDROGRAPH AT								
+		SUB7G	69.	12.50	15.	5.	5.	.06	
	2 COMBINED AT								
+		7FG	380.	12.50	129.	50.	50.	.72	
	ROUTED TO								
+		7GSWP	168.	13.50	128.	50.	50.	.72	
+								89.95	13.50
	HYDROGRAPH AT								
+		SUB7H	202.	12.50	45.	14.	14.	.19	
	2 COMBINED AT								
+		7GH	330.	12.50	172.	64.	64.	.91	
	ROUTED TO								
+		7HSWP	199.	13.75	167.	63.	63.	.91	
+								87.52	13.75
	HYDROGRAPH AT								
+		SUB8A	75.	12.25	17.	5.	5.	.08	
	2 COMBINED AT								
+		7H8A	223.	12.50	182.	68.	68.	.98	
	ROUTED TO								
		8ASWP	204.	14.25	181.	68.	68.	.98	
+								81.16	14.25
	HYDROGRAPH AT								
+		SUB8B	292.	12.50	73.	22.	22.	.33	
	2 COMBINED AT								
+		8AB	453.	12.50	253.	90.	90.	1.31	
	ROUTED TO								
+		8BSWP	445.	12.75	252.	90.	90.	1.31	
+								80.82	12.75
	HYDROGRAPH AT								
+		SUB8C	115.	12.50	26.	8.	8.	.12	
	2 COMBINED AT								
+		8BC	555.	12.50	277.	98.	98.	1.43	
	ROUTED TO								
+		8CSWP	445.	13.00	274.	97.	97.	1.43	
+								69.35	13.00
	HYDROGRAPH AT								
+		SUB6A	69.	12.75	20.	6.	6.	.10	
	ROUTED TO								
		6ASWP	12.	14.50	10.	4.	4.	.10	
								85.56	14.50
	HYDROGRAPH AT								
+		SUB6B	179.	12.25	37.	11.	11.	.18	

2 COMBINED AT									
+	6AB	179.	12.25	45.	15.	15.	.27		
ROUTED TO									
+	6BSWP	4.	24.00	2.	1.	1.	.27		
+								80.69	24.00
HYDROGRAPH AT									
+	SUB6D	303.	12.75	87.	26.	26.	.42		
ROUTED TO									
+	6DSWP	128.	13.50	85.	26.	26.	.42		
+								84.48	13.50
HYDROGRAPH AT									
+	SUB6C	214.	12.50	48.	15.	15.	.23		
3 COMBINED AT									
+	6BCD	308.	12.50	133.	41.	41.	.93		
ROUTED TO									
+	6CSWP	166.	13.75	133.	41.	41.	.93		
+								77.59	13.75

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

HEC-1

50 Year, 24 Hour Storm

(Routing Watershed 7 Through 8)

1

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FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985

U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616

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THIS HEC-1 VERSION CONTAINS ALL OPTIONS EXCEPT ECONOMICS, AND THE NUMBER OF PLANS ARE REDUCED TO 3

1 HEC-1 INPUT PAGE 1

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

  1           ID        READING SUBWATERSHEDS
  2           ID        DETAILED STORAGE AND STREAM NETWORK
  3           ID        EXISTING CONDITIONS - 50 YR, 24 HR STORM
              *DIAGRAM
  4           IT      15 28FEB91     100      97
  5           IO       5

  6           KK   SUB7A
  7           KO       4
  8           KM        SCS RUNOFF CALCULATION
  9           BA   0.133
 10           PH              0     0.6     1.3     2.4     3.0     3.4     4.2     5.2     6.0
 11           LS             77
 12           UD     0.3

 13           KK   7ASWP
 14           KO       1
 15           KM        STORAGE ROUTING THROUGH 7A
 16           RS       1    ELEV     110
 17           SA    0.80    1.94    4.34   11.31   18.24
 18           SE     110     111     112     113     114
 19           SL   110.0    3.53     0.6     0.5
 20           SS   113.9       0       0     1.5

 21           KK   SUB7B
 22           KO       4
 23           KM        SCS RUNOFF CALCULATION
 24           BA   0.116
 25           PH              0     0.6     1.3     2.4     3.0     3.4     4.2     5.2     6.0
 26           LS             77
 27           UD     0.5

 28           KK     7AB
 29           KM        COMBINE HYDROGRAPHS FOR 7A & 7B
 30           HC       2

 31           KK   7BSWP
 32           KO       1
 33           KM        STORAGE ROUTING THROUGH 7B
 34           RS       1    ELEV     103
 35           SA    0.26    0.65    2.16    3.58    5.77
 36           SE     103     104     106     108     109
 37           SL     101    1.77     0.6     0.5
 38           SS   105.9       0       0     1.5

 39           KK   SUB7C
 40           KO       4
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 41          KM        SCS RUNOFF CALCULATION
 42          BA   0.053
 43          PH              0     0.6     1.3     2.4     3.0     3.4     4.2     5.2     6.0
 44          LS             77
 45          UD    0.25
1                                        HEC-1 INPUT                                          PAGE  2

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


 46          KK     7BC
 47          KM        COMBINE HYDROGRAPHS FOR 7B & 7C
 48          HC       2

 49          KK   7CHNL
 50          KO       1
 51          KM        STORAGE ROUTING THROUGH 7C
 52          RS       1    STOR       0
 53          RC   0.080   0.030   0.080     400  0.0285      98
 54          RX       0      10      20      30      40      50      60      70
 55          RY      99    98.5      98      96      96      98    98.5      99

 56          KK   SUB7D
 57          KO       4
 58          KM        SCS RUNOFF CALCULATION
 59          BA   0.104
 60          PH              0     0.6     1.3     2.4     3.0     3.4     4.2     5.2     6.0
 61          LS             77
 62          UD     0.4

 63          KK   7DSWP
 64          KO       1
 65          KM        STORAGE ROUTING THROUGH 7D
 66          RS       1    ELEV    88.8
 67          SA    0.57    1.42    2.49    3.86
 68          SE      88      90      92      94
 69          SL    90.6    4.91     0.6     0.5
 70          SS      92      10     3.0     1.5

 71          KK   SUB7E
 72          KO       4
 73          KM        SCS RUNOFF CALCULATION
 74          BA   0.046
 75          PH              0     0.6     1.3     2.4     3.0     3.4     4.2     5.2     6.0
 76          LS             77
 77          UD    0.14

 78          KK    7CDE
 79          KM        COMBINE HYDROGRAPHS FOR 7C, 7D, & 7E
 80          HC       3

 81          KK   7ECHN
 82          KO       1
 83          KM        STORAGE ROUTING THROUGH 7CDE
 84          RS       1    STOR       0
 85          RC    0.08    0.03    0.08    7600   0.002      93
 86          RX       0       5      10      16      24      30      35      40
 87          RY      94    93.5      93      88      88      93    93.5      94
1                                        HEC-1 INPUT                                          PAGE  3

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


 88          KK   SUB7F
 89          KO       4
 90          KM        SCS RUNOFF CALCULATION
```

```
 91          BA   0.206
 92          PH              0     0.6     1.3     2.4     3.0     3.4     4.2     5.2     6.0
 93          LS             77
 94          UD     0.3

 95          KK    7EF
 96          KM        COMBINE HYDROGRAPHS FOR 7E & 7F
 97          HC       2

 98          KK  7FCHNL
 99          KO       1
100          KM        STORAGE ROUTING THROUGH 7F
101          RS       1    STOR       0
102          RC    0.08    0.03    0.08     500   0.003      90
103          RX       0       5      10      16      24      30      35      40
104          RY      90    90.5      90      86      86      90    90.5      91

105          KK   SUB7G
106          KO       4
107          KM        SCS RUNOFF CALCULATION
108          BA   0.063
109          PH              0     0.6     1.3     2.4     3.0     3.4     4.2     5.2     6.0
110          LS             77
111          UD     0.3

112          KK     7FG
113          KM        COMBINE HYDROGRAPHS FOR 7F & 7G
114          HC       2

115          KK   7GSWP
116          KO       1
117          KM        STORAGE ROUTING THROUGH 7G
118          RS       1    ELEV      85
119          SA    0.00    0.57    2.53    5.15
120          SE      85      86      87      88
121          SL    85.8   16.25     0.6     0.5
122          SS      88       0       0     1.5

123          KK   SUB7H
124          KO       4
125          KM        SCS RUNOFF CALCULATION
126          BA   0.186
127          PH              0     0.6     1.3     2.4     3.0     3.4     4.2     5.2     6.0
128          LS             77
129          UD     0.3
```



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


130          KK     7GH
131          KM        COMBINE HYDROGRAPHS FOR 7G & 7H
132          HC       2

133          KK   7HSWP
134          KO       1
135          KM        STORAGE ROUTING THROUGH 7H
136          RS       1    ELEV      84
137          SA    0.39    3.08    9.24   15.26
138          SE      84      86      87      88
139          SS      84      10     3.0     1.5

140          KK   SUB8A
141          KO       4
142          KM        SCS RUNOFF CALCULATION
143          BA   0.076
```

```
144          PH              0     0.6     1.3     2.4     3.0     3.4     4.2     5.2     6.0
145          LS             74
146          UD    0.23

147          KK    7H8A
148          KM        COMBINE HYDROGRAPHS FOR 7H & 8A
149          HC       2

150          KK   8ASWP
151          KO       1
152          KM        STORAGE ROUTING THROUGH 8A SWAMP
153          RS       1    ELEV      78
154          SA       0    2.42    5.19    9.82
155          SE      78      80      82      84
156          SL   78.85    28.3     0.6     0.5
157          SS    83.9       0       0     1.5

158          KK   SUB8B
159          KO       4
160          KM        SCS RUNOFF CALCULATION
161          BA   0.332
162          PH              0     0.6     1.3     2.4     3.0     3.4     4.2     5.2     6.0
163          LS             74
164          UD     0.4

165          KK     8AB
166          KM        COMBINE HYDROGRAPHS FOR 8A & 8B
167          HC       2

168          KK   8BSWP
169          KO       1
170          KM        STORAGE ROUTING THROUGH 8B
171          RS       1    STOR       0
172          RC    0.08    0.03    0.08    1200   0.003      82
173          RX       0       5      10      20      25      35      40      45
174          RY      84      83      82      75      75      82      83      84
```



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

175          KK   SUB8C
176          KO       4
177          KM        SCS RUNOFF CALCULATION
178          BA   0.116
179          PH              0     0.6     1.3     2.4     3.0     3.4     4.2     5.2     6.0
180          LS             74
181          UD    0.26

182          KK     8BC
183          KM        COMBINE HYDROGRAPHS FOR 8B & 8C
184          HC       2

185          KK   8CSWP
186          KO       1
187          KM        STORAGE ROUTING THROUGH 8C
188          RS       1    ELEV      64
189          SA    1.12    1.91    3.28    5.70    8.79   11.08
190          SE      64      66      68      70      72      74
191          SS      64      12     3.0     1.5

192          KK   SUB6A
193          KO       4
194          KM        SCS RUNOFF CALCULATION
195          BA   0.096
196          PH              0     0.6     1.3     2.4     3.0     3.4     4.2     5.2     6.0
```

```
197          LS              72
198          UD     0.5

199          KK   6ASWP
200          KO       1
201          KM        STORAGE ROUTING THROUGH 6A
202          RS       1    ELEV      82
203          SA    0.10    1.16    3.98    7.54
204          SE      82      84      85      86
205          SL      85     4.5     0.6     0.5
206          SS    85.9       0       0     1.5

207          KK   SUB6B
208          KO       4
209          KM        SCS RUNOFF CALCULATION
210          BA   0.176
211          PH               0     0.6     1.3     2.4     3.0     3.4     4.2     5.2     6.0
212          LS              72
213          UD     0.2

214          KK     6AB
215          KM        COMBINE HYDROGRAPHS FOR 6A & 6B
216          HC       2
1                                        HEC-1 INPUT                                        PAGE  6

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


217          KK   6BSWP
218          KO       1
219          KM        STORAGE ROUTING THROUGH 6B
220          RS       1    ELEV    79.5
221          SA    9.64   23.83   37.42
222          SE      79      80      82
223          SL    79.5    0.79     0.6     0.5
224          SL    80.6    11.3     0.6     0.5
225          SS    81.9       0     3.0     1.5

226          KK   SUB6D
227          KO       4
228          KM        SCS RUNOFF CALCULATION
229          BA   0.421
230          PH               0     0.6     1.3     2.4     3.0     3.4     4.2     5.2     6.0
231          LS              72
232          UD    0.50

233          KK   6DSWP
234          KO       1
235          KM        STORAGE ROUTING THROUGH 6D
236          RS       1    ELEV      80
237          SA    1.54    14.4
238          SE      80      90
239          SL      80   12.57     0.6     0.5
240          SS      90       0     3.0     1.5

241          KK   SUB6C
242          KO       4
243          KM        SCS RUNOFF CALCULATION
244          BA   0.234
245          PH               0     0.6     1.3     2.4     3.0     3.4     4.2     5.2     6.0
246          LS              72
247          UD     0.3

248          KK    6BCD
249          KM        COMBINE HYDROGRAPHS FOR 6B,6C & 6D
250          HC       3
```

```
251          KK   6CSWP
252          KO       1
253          KM        STORAGE ROUTING THROUGH 6C
254          RS       1    ELEV    74.5
255          SA       0    2.33   12.55   24.40   33.53
256          SE    74.5      76      78      80      82
257          SL    74.5   19.64     0.6     0.5
258          SS    81.9       0       0     1.5
259          ZZ
```

1

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

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

    6       SUB7A
                V
                V
   13       7ASWP
                .
                .
   21           .       SUB7B
                .           .
                .           .
   28         7AB............
                V
                V
   31       7BSWP
                .
                .
   39           .       SUB7C
                .           .
                .           .
   46         7BC............
                V
                V
   49       7CHNL
                .
                .
   56           .       SUB7D
                .           V
                .           V
   63           .       7DSWP
                .           .
                .           .
   71           .           .       SUB7E
                .           .           .
                .           .           .
   78        7CDE........................
                V
                V
   81       7ECHN
                .
                .
   88           .       SUB7F
                .           .
                .           .
   95        7EF ............
                V
                V
   98      7FCHNL
                .
                .
  105           .       SUB7G
```

```
                .          .
                .          .
112           7FG............
                V
                V
 5          7GSWP
                .
                .
123             .       SUB7H
                .          .
                .          .
130           7GH............
                V
                V
133          7HSWP
                .
                .
140             .       SUB8A
                .          .
                .          .
147          7H8A............
                V
                V
150         8ASWP
                .
                .
158             .       SUB8B
                .          .
                .          .
165           8AB............
                V
                V
168         8BSWP
                .
                .
175             .       SUB8C
                .          .
                .          .
182           8BC............
                V
                V
185         8CSWP
                .
                .
192             .       SUB6A
                .          V
                .          V
199             .       6ASWP
                .          .
                .          .
207             .          .       SUB6B
                .          .          .
                .          .          .
214             .        6AB............
                .          V
                .          V
217             .       6BSWP
                .          .
                .          .
226             .          .       SUB6D
                .          .          V
                .          .          V
 3              .          .       6DSWP
                .          .          .
                .          .          .
241             .          .          .       SUB6C
```

```
              .          .          .          .
              .          .          .          .
  248         .        6BCD.......................
              .           V
              .           V
  251         .        6CSWP

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1                                                                    ****
                              FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985
              U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616
                                                                    ****



                              READING SUBWATERSHEDS
                              DETAILED STORAGE AND STREAM NETWORK
                              EXISTING CONDITIONS - 50 YR, 24 HR STORM

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

     IT          HYDROGRAPH TIME DATA
                       NMIN          15  MINUTES IN COMPUTATION INTERVAL
                      IDATE     28FEB91  STARTING DATE
                      ITIME        0100  STARTING TIME
                         NQ          97  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      1MAR91  ENDING DATE
                     NDTIME        0100  ENDING TIME

                  COMPUTATION INTERVAL     .25 HOURS
                       TOTAL TIME BASE   24.00 HOURS

         ENGLISH UNITS


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


          **************
          *            *
   6 KK   *     SUB7A  *
          *            *
          **************

   7 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           4  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                              SCS RUNOFF CALCULATION

              SUBBASIN RUNOFF DATA

   9 BA          SUBBASIN CHARACTERISTICS
                      TAREA         .13  SUBBASIN AREA

                 PRECIPITATION DATA

  10 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                 ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                 5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                   .60    1.30    2.40    3.00    3.40    4.20    5.20    6.00     .00     .00     .00     .00
```

```
                                        STORM AREA =     .13

 11 LS          SCS LOSS RATE
                      STRTL         .60  INITIAL ABSTRACTION
                     CRVNBR       77.00  CURVE NUMBER
                      RTIMP         .00  PERCENT IMPERVIOUS AREA

 12 UD          SCS DIMENSIONLESS UNITGRAPH
                       TLAG         .30  LAG

                                                    ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                UNIT HYDROGRAPH
                                            8 END-OF-PERIOD ORDINATES
              97.      144.      63.      25.       9.       4.       1.       0.


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


          **************
          *            *
 13 KK    *     7ASWP  *
          *            *
          **************

 14 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           1  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                              STORAGE ROUTING THROUGH 7A

             HYDROGRAPH ROUTING DATA

 16 RS          STORAGE ROUTING
                      NSTPS           1  NUMBER OF SUBREACHES
                       ITYP        ELEV  TYPE OF INITIAL CONDITION
                     RSVRIC      110.00  INITIAL CONDITION
                          X         .00 WORKING R AND D COEFFICIENT

 17 SA               AREA          .8       1.9       4.3      11.3      18.2

 18 SE          ELEVATION      110.00    111.00    112.00    113.00    114.00

 19 SL          LOW-LEVEL OUTLET
                      ELEVL      110.00  ELEVATION AT CENTER OF OUTLET
                      CAREA        3.53  CROSS-SECTIONAL AREA
                       COQL         .60  COEFFICIENT
                       EXPL         .50  EXPONENT OF HEAD

 20 SS          SPILLWAY
                       CREL      113.90  SPILLWAY CREST ELEVATION
                      SPWID         .00  SPILLWAY WIDTH
                       COQW         .00  WEIR COEFFICIENT
                       EXPW        1.50  EXPONENT OF HEAD

                                                    ***

                                        COMPUTED STORAGE-ELEVATION DATA

          STORAGE        .00      1.33      4.39     11.94     26.58
        ELEVATION     110.00    111.00    112.00    113.00    114.00
```

COMPUTED OUTFLOW-ELEVATION DATA

OUTFLOW	.00	17.07	18.18	19.46	20.92	22.62	24.63	27.02	29.93	33.55
ELEVATION	110.00	111.01	111.15	111.31	111.52	111.77	112.10	112.53	113.11	113.90

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	1.33	1.63	2.03	2.61	3.48	4.39	4.86	7.53	11.94
OUTFLOW	.00	16.99	18.18	19.46	20.92	22.62	24.02	24.63	27.02	29.42
ELEVATION	110.00	111.00	111.15	111.31	111.52	111.77	112.00	112.10	112.53	113.00
STORAGE	13.17	24.79	26.58							
OUTFLOW	29.93	33.55	33.97							
ELEVATION	113.11	113.90	114.00							

****

HYDROGRAPH AT STATION 7ASWP

****

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
28	FEB	0100	1	0.	.0	110.0	28	FEB	0915	34	0.	.0	110.0	28	FEB	1730	67	28.	8.7	112.7
28	FEB	0115	2	0.	.0	110.0	28	FEB	0930	35	0.	.0	110.0	28	FEB	1745	68	28.	8.4	112.6
28	FEB	0130	3	0.	.0	110.0	28	FEB	0945	36	1.	.0	110.0	28	FEB	1800	69	27.	8.1	112.6
28	FEB	0145	4	0.	.0	110.0	28	FEB	1000	37	1.	.1	110.1	28	FEB	1815	70	27.	7.8	112.6
28	FEB	0200	5	0.	.0	110.0	28	FEB	1015	38	1.	.1	110.1	28	FEB	1830	71	27.	7.5	112.5
28	FEB	0215	6	0.	.0	110.0	28	FEB	1030	39	2.	.1	110.1	28	FEB	1845	72	27.	7.1	112.5
28	FEB	0230	7	0.	.0	110.0	28	FEB	1045	40	2.	.2	110.1	28	FEB	1900	73	26.	6.8	112.4
28	FEB	0245	8	0.	.0	110.0	28	FEB	1100	41	3.	.2	110.2	28	FEB	1915	74	26.	6.5	112.4
28	FEB	0300	9	0.	.0	110.0	28	FEB	1115	42	3.	.3	110.2	28	FEB	1930	75	26.	6.1	112
28	FEB	0315	10	0.	.0	110.0	28	FEB	1130	43	4.	.3	110.2	28	FEB	1945	76	25.	5.7	112
28	FEB	0330	11	0.	.0	110.0	28	FEB	1145	44	5.	.4	110.3	28	FEB	2000	77	25.	5.3	112.2
28	FEB	0345	12	0.	.0	110.0	28	FEB	1200	45	6.	.5	110.4	28	FEB	2015	78	25.	5.0	112.1
28	FEB	0400	13	0.	.0	110.0	28	FEB	1215	46	8.	.6	110.4	28	FEB	2030	79	24.	4.6	112.0
28	FEB	0415	14	0.	.0	110.0	28	FEB	1230	47	10.	.7	110.6	28	FEB	2045	80	24.	4.2	112.0
28	FEB	0430	15	0.	.0	110.0	28	FEB	1245	48	13.	1.0	110.7	28	FEB	2100	81	23.	3.8	111.9
28	FEB	0445	16	0.	.0	110.0	28	FEB	1300	49	18.	1.5	111.1	28	FEB	2115	82	23.	3.5	111.8
28	FEB	0500	17	0.	.0	110.0	28	FEB	1315	50	22.	3.2	111.7	28	FEB	2130	83	22.	3.1	111.7
28	FEB	0515	18	0.	.0	110.0	28	FEB	1330	51	26.	6.1	112.3	28	FEB	2145	84	21.	2.8	111.6
28	FEB	0530	19	0.	.0	110.0	28	FEB	1345	52	28.	8.6	112.6	28	FEB	2200	85	21.	2.5	111.5
28	FEB	0545	20	0.	.0	110.0	28	FEB	1400	53	28.	10.0	112.8	28	FEB	2215	86	20.	2.1	111.4
28	FEB	0600	21	0.	.0	110.0	28	FEB	1415	54	29.	10.6	112.9	28	FEB	2230	87	19.	1.8	111.2
28	FEB	0615	22	0.	.0	110.0	28	FEB	1430	55	29.	11.0	112.9	28	FEB	2245	88	18.	1.6	111.1
28	FEB	0630	23	0.	.0	110.0	28	FEB	1445	56	29.	11.1	112.9	28	FEB	2300	89	17.	1.3	111.0
28	FEB	0645	24	0.	.0	110.0	28	FEB	1500	57	29.	11.0	112.9	28	FEB	2315	90	14.	1.1	110.8
28	FEB	0700	25	0.	.0	110.0	28	FEB	1515	58	29.	10.9	112.9	28	FEB	2330	91	12.	.9	110.7
28	FEB	0715	26	0.	.0	110.0	28	FEB	1530	59	29.	10.8	112.9	28	FEB	2345	92	10.	.8	110.6
28	FEB	0730	27	0.	.0	110.0	28	FEB	1545	60	29.	10.6	112.9	1	MAR	0000	93	9.	.7	110.5
28	FEB	0745	28	0.	.0	110.0	28	FEB	1600	61	29.	10.4	112.8	1	MAR	0015	94	8.	.6	110.4
28	FEB	0800	29	0.	.0	110.0	28	FEB	1615	62	28.	10.1	112.8	1	MAR	0030	95	7.	.5	110.4
28	FEB	0815	30	0.	.0	110.0	28	FEB	1630	63	28.	9.9	112.8	1	MAR	0045	96	6.	.5	110.4
28	FEB	0830	31	0.	.0	110.0	28	FEB	1645	64	28.	9.6	112.8	1	MAR	0100	97	6.	.4	110.3
28	FEB	0845	32	0.	.0	110.0	28	FEB	1700	65	28.	9.3	112.7							
28	FEB	0900	33	0.	.0	110.0	28	FEB	1715	66	28.	9.0	112.7							

****

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW (CFS) 6-HR	24-HR	72-HR	24.00-HR
+ 29.	13.75	28.	12.	12.	12.

```
                    (INCHES)     1.947       3.396       3.396       3.396
                     (AC-FT)      14.         24.         24.         24.

 PEAK STORAGE   TIME                        MAXIMUM AVERAGE STORAGE
                                     6-HR       24-HR       72-HR     24.00-HR
+  (AC-FT)      (HR)
      11.      13.75                   9.          3.          3.          3.

 PEAK STAGE     TIME                        MAXIMUM AVERAGE STAGE
                                     6-HR       24-HR       72-HR     24.00-HR
+   (FEET)      (HR)
    112.91     13.75                112.70      111.05      111.05      111.05

                     CUMULATIVE AREA =     .13 SQ MI


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


          **************
          *            *
  21 KK   *     SUB7B  *
          *            *
          **************

  22 KO         OUTPUT CONTROL VARIABLES
                      IPRNT          4  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE
                               SCS RUNOFF CALCULATION

             SUBBASIN RUNOFF DATA

     BA         SUBBASIN CHARACTERISTICS
                      TAREA        .12  SUBBASIN AREA

                PRECIPITATION DATA

  25 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                  .60    1.30    2.40    3.00    3.40    4.20    5.20    6.00     .00     .00     .00     .00

                                                   STORM AREA =     .12

  26 LS         SCS LOSS RATE
                      STRTL        .60  INITIAL ABSTRACTION
                     CRVNBR      77.00  CURVE NUMBER
                      RTIMP        .00  PERCENT IMPERVIOUS AREA

  27 UD         SCS DIMENSIONLESS UNITGRAPH
                       TLAG        .50  LAG

                                                        ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                   UNIT HYDROGRAPH
                                              12 END-OF-PERIOD ORDINATES
             28.       84.       84.       51.       25.       13.        7.        4.        2.        1.
              1.        0.
```

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

          **************
          *            *
 31 KK    *     7BSWP  *
          *            *
          **************

 32 KO         OUTPUT CONTROL VARIABLES
                     IPRNT           1  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                              STORAGE ROUTING THROUGH 7B

            HYDROGRAPH ROUTING DATA

 34 RS         STORAGE ROUTING
                     NSTPS           1  NUMBER OF SUBREACHES
                      ITYP        ELEV  TYPE OF INITIAL CONDITION
                    RSVRIC      103.00  INITIAL CONDITION
                         X         .00 WORKING R AND D COEFFICIENT

 35 SA              AREA          .3       .6      2.2      3.6      5.8

 36 SE         ELEVATION      103.00   104.00   106.00   108.00   109.00

 37 SL         LOW-LEVEL OUTLET
                     ELEVL      101.00  ELEVATION AT CENTER OF OUTLET
                     CAREA        1.77  CROSS-SECTIONAL AREA
                      COQL         .60  COEFFICIENT
                      EXPL         .50  EXPONENT OF HEAD

 38 SS         SPILLWAY
                      CREL      105.90  SPILLWAY CREST ELEVATION
                     SPWID         .00  SPILLWAY WIDTH
                      COQW         .00  WEIR COEFFICIENT
                      EXPW        1.50  EXPONENT OF HEAD

                                                   ***

                                        COMPUTED STORAGE-ELEVATION DATA

          STORAGE        .00       .44      3.10      8.78     13.42
        ELEVATION     103.00    104.00    106.00    108.00    109.00

                                        COMPUTED OUTFLOW-ELEVATION DATA

          OUTFLOW        .00     12.55     13.10     13.69     14.35     15.07     15.86     16.75     17.74     18.85
        ELEVATION     103.00    103.17    103.36    103.58    103.84    104.13    104.47    104.87    105.34    105.90


                                       COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE        .00       .05       .12       .21       .34       .44       .53       .81      1.23      1.88
          OUTFLOW      12.05     12.55     13.10     13.69     14.35     14.75     15.07     15.86     16.75     17.74
        ELEVATION     103.00    103.17    103.36    103.58    103.84    104.00    104.13    104.47    104.87    105.34

          STORAGE       2.89      3.10      8.78     13.42
          OUTFLOW      18.85     19.05     22.53     24.09
        ELEVATION     105.90    106.00    108.00    109.00
*************************************************************************************************************************************

                                        HYDROGRAPH AT STATION    7BSWP
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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
28	FEB	0100	1	12.	.0	103.0	28	FEB	0915	34	11.	-.1	103.0	28	FEB	1730	67	26.	18.0	110.0
	FEB	0115	2	11.	-.1	103.0	28	FEB	0930	35	11.	-.1	103.0	28	FEB	1745	68	26.	18.3	110.1
	FEB	0130	3	11.	-.1	103.0	28	FEB	0945	36	11.	-.1	103.0	28	FEB	1800	69	26.	18.6	110.1
28	FEB	0145	4	11.	-.1	103.0	28	FEB	1000	37	11.	-.1	103.0	28	FEB	1815	70	26.	18.8	110.2
28	FEB	0200	5	11.	-.1	103.0	28	FEB	1015	38	11.	-.1	103.0	28	FEB	1830	71	26.	19.1	110.2
28	FEB	0215	6	11.	-.1	103.0	28	FEB	1030	39	11.	-.1	103.0	28	FEB	1845	72	26.	19.3	110.3
28	FEB	0230	7	11.	-.1	103.0	28	FEB	1045	40	11.	-.1	103.0	28	FEB	1900	73	26.	19.5	110.3
28	FEB	0245	8	11.	-.1	103.0	28	FEB	1100	41	11.	-.1	103.0	28	FEB	1915	74	26.	19.7	110.4
28	FEB	0300	9	11.	-.1	103.0	28	FEB	1115	42	11.	-.1	103.0	28	FEB	1930	75	26.	19.9	110.4
28	FEB	0315	10	11.	-.1	103.0	28	FEB	1130	43	11.	-.1	103.0	28	FEB	1945	76	26.	20.0	110.4
28	FEB	0330	11	11.	-.1	103.0	28	FEB	1145	44	11.	-.1	103.0	28	FEB	2000	77	26.	20.1	110.4
28	FEB	0345	12	11.	-.1	103.0	28	FEB	1200	45	11.	-.1	103.0	28	FEB	2015	78	26.	20.2	110.5
28	FEB	0400	13	11.	-.1	103.0	28	FEB	1215	46	12.	.0	103.0	28	FEB	2030	79	26.	20.3	110.5
28	FEB	0415	14	11.	-.1	103.0	28	FEB	1230	47	13.	.2	103.4	28	FEB	2045	80	26.	20.3	110.5
28	FEB	0430	15	11.	-.1	103.0	28	FEB	1245	48	15.	.4	103.9	28	FEB	2100	81	26.	20.4	110.5
28	FEB	0445	16	11.	-.1	103.0	28	FEB	1300	49	16.	.9	104.6	28	FEB	2115	82	26.	20.4	110.5
28	FEB	0500	17	11.	-.1	103.0	28	FEB	1315	50	18.	2.0	105.4	28	FEB	2130	83	26.	20.4	110.5
28	FEB	0515	18	11.	-.1	103.0	28	FEB	1330	51	20.	4.1	106.3	28	FEB	2145	84	26.	20.4	110.5
28	FEB	0530	19	11.	-.1	103.0	28	FEB	1345	52	21.	6.7	107.3	28	FEB	2200	85	26.	20.4	110.5
28	FEB	0545	20	11.	-.1	103.0	28	FEB	1400	53	23.	9.0	108.1	28	FEB	2215	86	26.	20.4	110.5
28	FEB	0600	21	11.	-.1	103.0	28	FEB	1415	54	23.	10.8	108.4	28	FEB	2230	87	26.	20.3	110.5
28	FEB	0615	22	11.	-.1	103.0	28	FEB	1430	55	24.	12.1	108.7	28	FEB	2245	88	26.	20.2	110.5
28	FEB	0630	23	11.	-.1	103.0	28	FEB	1445	56	24.	13.0	108.9	28	FEB	2300	89	26.	20.1	110.4
28	FEB	0645	24	11.	-.1	103.0	28	FEB	1500	57	24.	13.8	109.1	28	FEB	2315	90	26.	20.0	110.4
28	FEB	0700	25	11.	-.1	103.0	28	FEB	1515	58	24.	14.5	109.2	28	FEB	2330	91	26.	19.8	110.4
28	FEB	0715	26	11.	-.1	103.0	28	FEB	1530	59	25.	15.0	109.3	28	FEB	2345	92	26.	19.5	110.3
28	FEB	0730	27	11.	-.1	103.0	28	FEB	1545	60	25.	15.5	109.5	1	MAR	0000	93	26.	19.3	110.3
28	FEB	0745	28	11.	-.1	103.0	28	FEB	1600	61	25.	16.0	109.6	1	MAR	0015	94	26.	19.0	110.2
28	FEB	0800	29	11.	-.1	103.0	28	FEB	1615	62	25.	16.4	109.6	1	MAR	0030	95	26.	18.7	110.1
	FEB	0815	30	11.	-.1	103.0	28	FEB	1630	63	25.	16.8	109.7	1	MAR	0045	96	26.	18.3	110.1
	FEB	0830	31	11.	-.1	103.0	28	FEB	1645	64	25.	17.1	109.8	1	MAR	0100	97	26.	18.0	110.0
28	FEB	0845	32	11.	-.1	103.0	28	FEB	1700	65	25.	17.4	109.9							
28	FEB	0900	33	11.	-.1	103.0	28	FEB	1715	66	26.	17.8	109.9							

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.00-HR
		(CFS)				
26.	20.50		26.	18.	18.	18.
		(INCHES)	.981	2.710	2.710	2.710
		(AC-FT)	13.	36.	36.	36.

PEAK STORAGE (AC-FT)	TIME (HR)	MAXIMUM AVERAGE STORAGE 6-HR	24-HR	72-HR	24.00-HR
20.	20.50	20.	8.	8.	8.

PEAK STAGE (FEET)	TIME (HR)	MAXIMUM AVERAGE STAGE 6-HR	24-HR	72-HR	24.00-HR
110.51	20.50	110.41	106.38	106.38	106.38

CUMULATIVE AREA = .25 SQ MI

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          **************
          *            *
 39 KK    *    SUB7C   *
          *            *
          **************

 40 KO        OUTPUT CONTROL VARIABLES
                    IPRNT          4  PRINT CONTROL
                    IPLOT          0  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE
                             SCS RUNOFF CALCULATION

            SUBBASIN RUNOFF DATA

 42 BA        SUBBASIN CHARACTERISTICS
                    TAREA        .05  SUBBASIN AREA

              PRECIPITATION DATA

 43 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
              ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
              5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                .60    1.30    2.40    3.00    3.40    4.20    5.20    6.00     .00     .00     .00     .00

                                                   STORM AREA =     .05

 44 LS        SCS LOSS RATE
                    STRTL        .60  INITIAL ABSTRACTION
                   CRVNBR      77.00  CURVE NUMBER
                    RTIMP        .00  PERCENT IMPERVIOUS AREA

 45 UD        SCS DIMENSIONLESS UNITGRAPH
                     TLAG        .25  LAG

                                                        ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                   UNIT HYDROGRAPH
                                              7 END-OF-PERIOD ORDINATES
            52.       56.       19.        7.        2.        1.        0.


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


          **************
          *            *
 49 KK    *    7CHNL   *
          *            *
          **************

 50 KO        OUTPUT CONTROL VARIABLES
                    IPRNT          1  PRINT CONTROL
                    IPLOT          0  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE
                             STORAGE ROUTING THROUGH 7C

            HYDROGRAPH ROUTING DATA

 52 RS        STORAGE ROUTING
                    NSTPS          1  NUMBER OF SUBREACHES
                     ITYP       STOR  TYPE OF INITIAL CONDITION
                   RSVRIC        .00  INITIAL CONDITION
                        X        .00 WORKING R AND D COEFFICIENT
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53 RC          NORMAL DEPTH CHANNEL ROUTING
                     ANL        .080  LEFT OVERBANK N-VALUE
                    ANCH        .030  MAIN CHANNEL N-VALUE
                     ANR        .080  RIGHT OVERBANK N-VALUE
                   RLNTH        400.  REACH LENGTH
                     SEL       .0285  ENERGY SLOPE
                   ELMAX        98.0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION
```

CROSS-SECTION DATA

		--- LEFT OVERBANK ---			+ ------ MAIN CHANNEL		------- +	--- RIGHT OVERBANK ---	
55 RY	ELEVATION	99.00	98.50	98.00	96.00	96.00	98.00	98.50	99.00
54 RX	DISTANCE	.00	10.00	20.00	30.00	40.00	50.00	60.00	70.00

***

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	.01	.02	.03	.05	.06	.08	.09	.11	.13
OUTFLOW	.00	2.00	6.48	13.01	21.49	31.89	44.21	58.51	74.81	93.17
ELEVATION	96.00	96.11	96.21	96.32	96.42	96.53	96.63	96.74	96.84	96.95
STORAGE	.15	.17	.19	.21	.24	.26	.28	.31	.34	.37
OUTFLOW	113.65	136.29	161.16	188.33	217.84	249.76	284.15	321.07	360.59	402.75
ELEVATION	97.05	97.16	97.26	97.37	97.47	97.58	97.68	97.79	97.89	98.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 0. TO 403.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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HYDROGRAPH AT STATION 7CHNL

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DA MON HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA MON HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA MON HRMN	ORD	OUTFLOW	STORAGE	STAGE
28 FEB 0100	1	0.	.0	96.0	*	28 FEB 0915	34	11.	.0	96.3	*	28 FEB 1730	67	31.	.1	96.5
28 FEB 0115	2	19.	.0	96.4	*	28 FEB 0930	35	11.	.0	96.3	*	28 FEB 1745	68	31.	.1	96.5
28 FEB 0130	3	5.	.0	96.2	*	28 FEB 0945	36	12.	.0	96.3	*	28 FEB 1800	69	31.	.1	96.5
28 FEB 0145	4	15.	.0	96.3	*	28 FEB 1000	37	12.	.0	96.3	*	28 FEB 1815	70	30.	.1	96.5
28 FEB 0200	5	8.	.0	96.2	*	28 FEB 1015	38	12.	.0	96.3	*	28 FEB 1830	71	30.	.1	96.5
28 FEB 0215	6	13.	.0	96.3	*	28 FEB 1030	39	12.	.0	96.3	*	28 FEB 1845	72	30.	.1	96.5
28 FEB 0230	7	10.	.0	96.3	*	28 FEB 1045	40	13.	.0	96.3	*	28 FEB 1900	73	30.	.1	96.5
28 FEB 0245	8	12.	.0	96.3	*	28 FEB 1100	41	13.	.0	96.3	*	28 FEB 1915	74	30.	.1	96.5
28 FEB 0300	9	10.	.0	96.3	*	28 FEB 1115	42	13.	.0	96.3	*	28 FEB 1930	75	29.	.1	96.5
28 FEB 0315	10	11.	.0	96.3	*	28 FEB 1130	43	14.	.0	96.3	*	28 FEB 1945	76	29.	.1	96.5
28 FEB 0330	11	11.	.0	96.3	*	28 FEB 1145	44	15.	.0	96.3	*	28 FEB 2000	77	29.	.1	96.5
28 FEB 0345	12	11.	.0	96.3	*	28 FEB 1200	45	16.	.0	96.3	*	28 FEB 2015	78	29.	.1	96.5
28 FEB 0400	13	11.	.0	96.3	*	28 FEB 1215	46	18.	.0	96.4	*	28 FEB 2030	79	29.	.1	96.5
28 FEB 0415	14	11.	.0	96.3	*	28 FEB 1230	47	21.	.0	96.4	*	28 FEB 2045	80	29.	.1	96.5
28 FEB 0430	15	11.	.0	96.3	*	28 FEB 1245	48	26.	.1	96.5	*	28 FEB 2100	81	29.	.1	96.5
28 FEB 0445	16	11.	.0	96.3	*	28 FEB 1300	49	40.	.1	96.6	*	28 FEB 2115	82	29.	.1	96.5
28 FEB 0500	17	11.	.0	96.3	*	28 FEB 1315	50	83.	.1	96.9	*	28 FEB 2130	83	29.	.1	96.5
28 FEB 0515	18	11.	.0	96.3	*	28 FEB 1330	51	94.	.1	96.9	*	28 FEB 2145	84	28.	.1	96.5
28 FEB 0530	19	11.	.0	96.3	*	28 FEB 1345	52	63.	.1	96.8	*	28 FEB 2200	85	28.	.1	96.5
28 FEB 0545	20	11.	.0	96.3	*	28 FEB 1400	53	49.	.1	96.7	*	28 FEB 2215	86	28.	.1	96.5
28 FEB 0600	21	11.	.0	96.3	*	28 FEB 1415	54	41.	.1	96.6	*	28 FEB 2230	87	28.	.1	96.5
FEB 0615	22	11.	.0	96.3	*	28 FEB 1430	55	37.	.1	96.6	*	28 FEB 2245	88	28.	.1	96.5
FEB 0630	23	11.	.0	96.3	*	28 FEB 1445	56	35.	.1	96.6	*	28 FEB 2300	89	28.	.1	96.5
28 FEB 0645	24	11.	.0	96.3	*	28 FEB 1500	57	34.	.1	96.5	*	28 FEB 2315	90	28.	.1	96.5
28 FEB 0700	25	11.	.0	96.3	*	28 FEB 1515	58	33.	.1	96.5	*	28 FEB 2330	91	28.	.1	96.5
28 FEB 0715	26	11.	.0	96.3	*	28 FEB 1530	59	33.	.1	96.5	*	28 FEB 2345	92	28.	.1	96.5
28 FEB 0730	27	11.	.0	96.3	*	28 FEB 1545	60	32.	.1	96.5	*	1 MAR 0000	93	28.	.1	96.5

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 28 FEB 0745  28      11.       .0    96.3 * 28 FEB 1600  61      32.       .1    96.5 *  1 MAR 0015  94      28.       .1    96.5
 28 FEB 0800  29      11.       .0    96.3 * 28 FEB 1615  62      32.       .1    96.5 *  1 MAR 0030  95      28.       .1    96.5
 28 FEB 0815  30      11.       .0    96.3 * 28 FEB 1630  63      31.       .1    96.5 *  1 MAR 0045  96      27.       .1    96.5
 28 FEB 0830  31      11.       .0    96.3 * 28 FEB 1645  64      31.       .1    96.5 *  1 MAR 0100  97      27.       .1    96.5
 28 FEB 0845  32      11.       .0    96.3 * 28 FEB 1700  65      31.       .1    96.5 *
 28 FEB 0900  33      11.       .0    96.3 * 28 FEB 1715  66      31.       .1    96.5 *
                                          *                                            *
*****************************************************************************************************************************

 PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+  (CFS)       (HR)
                          (CFS)
+     94.     12.50                  39.         23.         23.         23.
                       (INCHES)    1.209       2.838       2.838       2.838
                        (AC-FT)      19.         46.         46.         46.

 PEAK STORAGE   TIME                          MAXIMUM AVERAGE STORAGE
                                     6-HR       24-HR       72-HR     24.00-HR
+  (AC-FT)      (HR)
       0.     12.50                   0.          0.          0.          0.

 PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                     6-HR       24-HR       72-HR     24.00-HR
+  (FEET)      (HR)
    96.95     12.50                 96.58       96.42       96.42       96.42

                        CUMULATIVE AREA =     .30 SQ MI


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


          **************
          *            *
  56 KK   *     SUB7D  *
          *            *
          **************

  57 KO         OUTPUT CONTROL VARIABLES
                      IPRNT           4  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                               SCS RUNOFF CALCULATION

              SUBBASIN RUNOFF DATA

  59 BA         SUBBASIN CHARACTERISTICS
                      TAREA         .10  SUBBASIN AREA

                PRECIPITATION DATA

  60 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                  .60    1.30    2.40    3.00    3.40    4.20    5.20    6.00     .00     .00     .00     .00

                                                  STORM AREA =     .10

  61 LS         SCS LOSS RATE
                      STRTL         .60  INITIAL ABSTRACTION
                     CRVNBR       77.00  CURVE NUMBER
                      RTIMP         .00  PERCENT IMPERVIOUS AREA
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62 UD          SCS DIMENSIONLESS UNITGRAPH
                     TLAG          .40  LAG

                                                        ***

 .ING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                   UNIT HYDROGRAPH
                                              10 END-OF-PERIOD ORDINATES
              42.       96.       72.       32.       15.        7.        3.        1.        1.        0.


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          **************
          *            *
63 KK     *     7DSWP  *
          *            *
          **************

64 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           1  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                              STORAGE ROUTING THROUGH 7D

             HYDROGRAPH ROUTING DATA

66 RS          STORAGE ROUTING
                     NSTPS           1  NUMBER OF SUBREACHES
                      ITYP        ELEV  TYPE OF INITIAL CONDITION
                    RSVRIC       88.80  INITIAL CONDITION
                         X         .00 WORKING R AND D COEFFICIENT

67 SA              AREA          .6       1.4       2.5       3.9

68 SE          ELEVATION       88.00     90.00     92.00     94.00

69 SL          LOW-LEVEL OUTLET
                     ELEVL       90.60  ELEVATION AT CENTER OF OUTLET
                     CAREA        4.91  CROSS-SECTIONAL AREA
                      COQL         .60  COEFFICIENT
                      EXPL         .50  EXPONENT OF HEAD

70 SS          SPILLWAY
                      CREL       92.00  SPILLWAY CREST ELEVATION
                     SPWID       10.00  SPILLWAY WIDTH
                      COQW        3.00  WEIR COEFFICIENT
                      EXPW        1.50  EXPONENT OF HEAD

                                                        ***

                                        COMPUTED STORAGE-ELEVATION DATA

          STORAGE        .00      1.93      5.79     12.09
        ELEVATION      88.00     90.00     92.00     94.00

                                        COMPUTED OUTFLOW-ELEVATION DATA

          OUTFLOW        .00       .00     24.70     25.11     25.55     25.99     26.46     26.94     27.44     27.96
        ELEVATION      88.00     90.60     91.69     91.73     91.77     91.81     91.85     91.90     91.95     92.00

          OUTFLOW      30.29     32.92     36.97     42.70     50.41     60.37     72.86     88.17    106.59    128.42
        ELEVATION      92.12     92.21     92.34     92.49     92.67     92.88     93.12     93.38     93.68     94.00
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COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	1.93	2.86	5.05	5.14	5.23	5.33	5.43	5.54	5.66
OUTFLOW	.00	.00	.00	24.70	25.11	25.55	25.99	26.46	26.94	27.44
ELEVATION	88.00	90.00	90.60	91.69	91.73	91.77	91.81	91.85	91.90	91.95
STORAGE	5.79	6.08	6.33	6.66	7.08	7.59	8.22	8.96	9.84	10.88
OUTFLOW	27.96	30.29	32.92	36.97	42.70	50.41	60.37	72.86	88.17	106.59
ELEVATION	92.00	92.12	92.21	92.34	92.49	92.67	92.88	93.12	93.38	93.68
STORAGE	12.09									
OUTFLOW	128.42									
ELEVATION	94.00									

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HYDROGRAPH AT STATION 7DSWP

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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
28	FEB	0100	1	0.	.6	88.6	28	FEB	0915	34	0.	.6	88.6	28	FEB	1730	67	17.	4.4	91.4
28	FEB	0115	2	0.	.6	88.6	28	FEB	0930	35	0.	.6	88.6	28	FEB	1745	68	16.	4.2	91.3
28	FEB	0130	3	0.	.6	88.6	28	FEB	0945	36	0.	.6	88.6	28	FEB	1800	69	14.	4.1	91.2
28	FEB	0145	4	0.	.6	88.6	28	FEB	1000	37	0.	.6	88.7	28	FEB	1815	70	13.	4.0	91.2
28	FEB	0200	5	0.	.6	88.6	28	FEB	1015	38	0.	.7	88.7	28	FEB	1830	71	12.	4.0	91.1
28	FEB	0215	6	0.	.6	88.6	28	FEB	1030	39	0.	.7	88.7	28	FEB	1845	72	12.	3.9	91.1
28	FEB	0230	7	0.	.6	88.6	28	FEB	1045	40	0.	.8	88.8	28	FEB	1900	73	11.	3.8	91.1
28	FEB	0245	8	0.	.6	88.6	28	FEB	1100	41	0.	.8	88.9	28	FEB	1915	74	10.	3.8	91.1
28	FEB	0300	9	0.	.6	88.6	28	FEB	1115	42	0.	.9	89.0	28	FEB	1930	75	10.	3.7	91
28	FEB	0315	10	0.	.6	88.6	28	FEB	1130	43	0.	1.0	89.1	28	FEB	1945	76	9.	3.7	9
28	FEB	0330	11	0.	.6	88.6	28	FEB	1145	44	0.	1.1	89.2	28	FEB	2000	77	8.	3.6	91.0
28	FEB	0345	12	0.	.6	88.6	28	FEB	1200	45	0.	1.3	89.3	28	FEB	2015	78	8.	3.5	90.9
28	FEB	0400	13	0.	.6	88.6	28	FEB	1215	46	0.	1.5	89.5	28	FEB	2030	79	7.	3.5	90.9
28	FEB	0415	14	0.	.6	88.6	28	FEB	1230	47	0.	1.7	89.8	28	FEB	2045	80	6.	3.4	90.9
28	FEB	0430	15	0.	.6	88.6	28	FEB	1245	48	0.	2.0	90.0	28	FEB	2100	81	6.	3.4	90.9
28	FEB	0445	16	0.	.6	88.6	28	FEB	1300	49	0.	2.5	90.4	28	FEB	2115	82	6.	3.4	90.9
28	FEB	0500	17	0.	.6	88.6	28	FEB	1315	50	9.	3.6	91.0	28	FEB	2130	83	5.	3.3	90.8
28	FEB	0515	18	0.	.6	88.6	28	FEB	1330	51	26.	5.4	91.9	28	FEB	2145	84	5.	3.3	90.8
28	FEB	0530	19	0.	.6	88.6	28	FEB	1345	52	44.	7.1	92.5	28	FEB	2200	85	5.	3.3	90.8
28	FEB	0545	20	0.	.6	88.6	28	FEB	1400	53	56.	8.0	92.8	28	FEB	2215	86	5.	3.3	90.8
28	FEB	0600	21	0.	.6	88.6	28	FEB	1415	54	57.	8.0	92.8	28	FEB	2230	87	5.	3.3	90.8
28	FEB	0615	22	0.	.6	88.6	28	FEB	1430	55	53.	7.8	92.7	28	FEB	2245	88	4.	3.3	90.8
28	FEB	0630	23	0.	.6	88.6	28	FEB	1445	56	47.	7.4	92.6	28	FEB	2300	89	4.	3.2	90.8
28	FEB	0645	24	0.	.6	88.6	28	FEB	1500	57	41.	7.0	92.5	28	FEB	2315	90	4.	3.2	90.8
28	FEB	0700	25	0.	.6	88.6	28	FEB	1515	58	36.	6.6	92.3	28	FEB	2330	91	4.	3.2	90.8
28	FEB	0715	26	0.	.6	88.6	28	FEB	1530	59	32.	6.3	92.2	28	FEB	2345	92	4.	3.2	90.8
28	FEB	0730	27	0.	.6	88.6	28	FEB	1545	60	29.	6.0	92.1	1	MAR	0000	93	4.	3.2	90.8
28	FEB	0745	28	0.	.6	88.6	28	FEB	1600	61	28.	5.7	92.0	1	MAR	0015	94	4.	3.2	90.8
28	FEB	0800	29	0.	.6	88.6	28	FEB	1615	62	26.	5.4	91.9	1	MAR	0030	95	4.	3.2	90.8
28	FEB	0815	30	0.	.6	88.6	28	FEB	1630	63	25.	5.2	91.7	1	MAR	0045	96	4.	3.2	90.8
28	FEB	0830	31	0.	.6	88.6	28	FEB	1645	64	23.	4.9	91.6	1	MAR	0100	97	3.	3.2	90.8
28	FEB	0845	32	0.	.6	88.6	28	FEB	1700	65	21.	4.7	91.5							
28	FEB	0900	33	0.	.6	88.6	28	FEB	1715	66	19.	4.5	91.4							

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 57.	13.25		28.	8.	8.	8.
		(INCHES)	2.497	2.984	2.984	2.984

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                    (AC-FT)       14.         17.         17.         17.

PEAK STORAGE   TIME                        MAXIMUM AVERAGE STORAGE
                                   6-HR       24-HR       72-HR     24.00-HR
   C-FT)      (HR)
      8.     13.25                  6.          3.          3.          3.

 PEAK STAGE    TIME                        MAXIMUM AVERAGE STAGE
                                   6-HR       24-HR       72-HR     24.00-HR
+  (FEET)      (HR)
    92.81     13.25               91.83       90.04       90.04       90.04

                    CUMULATIVE AREA =     .10 SQ MI


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          *            *
  71 KK   *     SUB7E  *
          *            *
          **************

  72 KO         OUTPUT CONTROL VARIABLES
                      IPRNT           4  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                               SCS RUNOFF CALCULATION

             SUBBASIN RUNOFF DATA

  74 BA         SUBBASIN CHARACTERISTICS
                      TAREA         .05  SUBBASIN AREA

               PRECIPITATION DATA

  75 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
               ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
               5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                 .60    1.30    2.40    3.00    3.40    4.20    5.20    6.00     .00     .00     .00     .00

                                                  STORM AREA =     .05

  76 LS         SCS LOSS RATE
                      STRTL         .60  INITIAL ABSTRACTION
                     CRVNBR       77.00  CURVE NUMBER
                      RTIMP         .00  PERCENT IMPERVIOUS AREA

  77 UD         SCS DIMENSIONLESS UNITGRAPH
                       TLAG         .14  LAG

                                                          ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                     UNIT HYDROGRAPH
                                                  5 END-OF-PERIOD ORDINATES
              83.       28.        6.        1.        0.


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          *            *
81 KK     *    7ECHN   *
          *            *
          **************

82 [illegible]      OUTPUT CONTROL VARIABLES
                     IPRNT          1  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                              STORAGE ROUTING THROUGH 7CDE

             HYDROGRAPH ROUTING DATA

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

85 RC          NORMAL DEPTH CHANNEL ROUTING
                       ANL       .080  LEFT OVERBANK N-VALUE
                      ANCH       .030  MAIN CHANNEL N-VALUE
                       ANR       .080  RIGHT OVERBANK N-VALUE
                     RLNTH      7600.  REACH LENGTH
                       SEL      .0020  ENERGY SLOPE
                     ELMAX       93.0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                   CROSS-SECTION DATA
                      --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
87 RY        ELEVATION   94.00    93.50    93.00    88.00    88.00    93.00    93.50    94.00
86 RX        DISTANCE      .00     5.00    10.00    16.00    24.00    30.00    35.00    40.00

                                                   ***

                                   COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE      .00      .38      .79     1.23     1.70     2.20     2.73     3.28     3.87     4.48
          OUTFLOW      .00     1.92     6.11    12.07    19.64    28.75    39.36    51.47    65.08    80.21
        ELEVATION    88.00    88.26    88.53    88.79    89.05    89.32    89.58    89.84    90.11    90.37

          STORAGE     5.12     5.79     6.50     7.23     7.98     8.77     9.59    10.43    11.31    12.21
          OUTFLOW    96.87   115.10   134.92   156.35   179.44   204.21   230.70   258.94   288.96   320.80
        ELEVATION    90.63    90.89    91.16    91.42    91.68    91.95    92.21    92.47    92.74    93.00

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                                                HYDROGRAPH AT STATION    7ECHN

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                                                *                                                *
DA MON HRMN ORD  OUTFLOW  STORAGE   STAGE  * DA MON HRMN ORD  OUTFLOW  STORAGE   STAGE  * DA MON HRMN ORD  OUTFLOW  STORAGE   STAGE
                                                *                                                *
28 FEB 0100   1      0.       .0    88.0  * 28 FEB 0915  34     11.      1.2    88.7  * 28 FEB 1730  67     57.      3.5    89.9
28 FEB 0115   2      1.       .2    88.1  * 28 FEB 0930  35     11.      1.2    88.8  * 28 FEB 1745  68     55.      3.4    89.9
28 FEB 0130   3      2.       .4    88.3  * 28 FEB 0945  36     11.      1.2    88.8  * 28 FEB 1800  69     53.      3.3    89.9
28 FEB 0145   4      4.       .5    88.4  * 28 FEB 1000  37     12.      1.2    88.8  * 28 FEB 1815  70     51.      3.3    89.8
28 FEB 0200   5      5.       .7    88.5  * 28 FEB 1015  38     12.      1.2    88.8  * 28 FEB 1830  71     50.      3.2    89.8
28 FEB 0215   6      6.       .8    88.5  * 28 FEB 1030  39     12.      1.3    88.8  * 28 FEB 1845  72     48.      3.1    89.8
28 FEB 0230   7      7.       .9    88.6  * 28 FEB 1045  40     13.      1.3    88.8  * 28 FEB 1900  73     47.      3.1    89.7
28 FEB 0245   8      8.       .9    88.6  * 28 FEB 1100  41     13.      1.3    88.8  * 28 FEB 1915  74     46.      3.0    89
28 FEB 0300   9      9.      1.0    88.6  * 28 FEB 1115  42     14.      1.3    88.9  * 28 FEB 1930  75     44.      3.0    89..
28 FEB 0315  10      9.      1.0    88.7  * 28 FEB 1130  43     15.      1.4    88.9  * 28 FEB 1945  76     43.      2.9    89.7
28 FEB 0330  11     10.      1.1    88.7  * 28 FEB 1145  44     15.      1.4    88.9  * 28 FEB 2000  77     42.      2.8    89.6
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28	FEB	0345	12	10.	1.1	88.7	*	28	FEB	1200	45	16.	1.5	88.9	*	28	FEB	2015	78	41.	2.8	89.6
28	FEB	0400	13	10.	1.1	88.7	*	28	FEB	1215	46	18.	1.6	89.0	*	28	FEB	2030	79	40.	2.7	89.6
28	FEB	0415	14	10.	1.1	88.7	*	28	FEB	1230	47	20.	1.7	89.1	*	28	FEB	2045	80	39.	2.7	89.6
28	FEB	0430	15	11.	1.1	88.7	*	28	FEB	1245	48	25.	2.0	89.2	*	28	FEB	2100	81	38.	2.7	89.5
	FEB	0445	16	11.	1.1	88.7	*	28	FEB	1300	49	35.	2.5	89.5	*	28	FEB	2115	82	38.	2.6	89.5
	FEB	0500	17	11.	1.1	88.7	*	28	FEB	1315	50	68.	4.0	90.2	*	28	FEB	2130	83	37.	2.6	89.5
28	FEB	0515	18	11.	1.1	88.7	*	28	FEB	1330	51	113.	5.7	90.9	*	28	FEB	2145	84	36.	2.6	89.5
28	FEB	0530	19	11.	1.1	88.7	*	28	FEB	1345	52	129.	6.3	91.1	*	28	FEB	2200	85	36.	2.6	89.5
28	FEB	0545	20	11.	1.1	88.7	*	28	FEB	1400	53	128.	6.3	91.1	*	28	FEB	2215	86	36.	2.5	89.5
28	FEB	0600	21	11.	1.1	88.7	*	28	FEB	1415	54	122.	6.1	91.0	*	28	FEB	2230	87	35.	2.5	89.5
28	FEB	0615	22	11.	1.1	88.7	*	28	FEB	1430	55	115.	5.8	90.9	*	28	FEB	2245	88	35.	2.5	89.5
28	FEB	0630	23	11.	1.1	88.7	*	28	FEB	1445	56	106.	5.5	90.8	*	28	FEB	2300	89	35.	2.5	89.5
28	FEB	0645	24	11.	1.1	88.7	*	28	FEB	1500	57	98.	5.2	90.6	*	28	FEB	2315	90	34.	2.5	89.5
28	FEB	0700	25	11.	1.1	88.7	*	28	FEB	1515	58	90.	4.9	90.5	*	28	FEB	2330	91	34.	2.5	89.4
28	FEB	0715	26	11.	1.1	88.7	*	28	FEB	1530	59	83.	4.6	90.4	*	28	FEB	2345	92	34.	2.5	89.4
28	FEB	0730	27	11.	1.1	88.7	*	28	FEB	1545	60	78.	4.4	90.3	*	1	MAR	0000	93	34.	2.4	89.4
28	FEB	0745	28	11.	1.1	88.7	*	28	FEB	1600	61	73.	4.2	90.2	*	1	MAR	0015	94	33.	2.4	89.4
28	FEB	0800	29	11.	1.1	88.7	*	28	FEB	1615	62	70.	4.0	90.2	*	1	MAR	0030	95	33.	2.4	89.4
28	FEB	0815	30	11.	1.1	88.7	*	28	FEB	1630	63	67.	3.9	90.1	*	1	MAR	0045	96	33.	2.4	89.4
28	FEB	0830	31	11.	1.1	88.7	*	28	FEB	1645	64	64.	3.8	90.1	*	1	MAR	0100	97	33.	2.4	89.4
28	FEB	0845	32	11.	1.1	88.7	*	28	FEB	1700	65	62.	3.7	90.0	*							
28	FEB	0900	33	11.	1.2	88.7	*	28	FEB	1715	66	59.	3.6	90.0	*							
							*								*							

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 129.	12.75		78.	34.	34.	34.
		(INCHES)	1.611	2.837	2.837	2.837
		(AC-FT)	39.	68.	68.	68.

K STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.00-HR
+ (AC-FT)	(HR)				
6.	12.75	4.	2.	2.	2.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.00-HR
+ (FEET)	(HR)				
91.09	12.75	90.30	89.32	89.32	89.32

CUMULATIVE AREA = .45 SQ MI

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          *            *
  88 KK   *     SUB7F  *
          *            *
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  89 KO        OUTPUT CONTROL VARIABLES
                     IPRNT          4  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                            SCS RUNOFF CALCULATION

             SUBBASIN RUNOFF DATA

  91 BA        SUBBASIN CHARACTERISTICS
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                TAREA          .21  SUBBASIN AREA

            PRECIPITATION DATA

 92 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
            ..... HYDRO-35 .......   ................ TP-40 ................   ........... TP-49 ...........
            5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
              .60    1.30    2.40    3.00    3.40    4.20    5.20    6.00     .00     .00     .00     .00

                                                STORM AREA =     .21

 93 LS      SCS LOSS RATE
                STRTL          .60  INITIAL ABSTRACTION
               CRVNBR        77.00  CURVE NUMBER
                RTIMP          .00  PERCENT IMPERVIOUS AREA

 94 UD      SCS DIMENSIONLESS UNITGRAPH
                 TLAG          .30  LAG

                                                    ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                UNIT HYDROGRAPH
                                            8 END-OF-PERIOD ORDINATES
          150.      223.      98.      38.      14.       6.       2.       1.


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        *            *
 98 KK  *    7FCHNL  *
        *            *
        **************

 99 KO      OUTPUT CONTROL VARIABLES
                IPRNT           1  PRINT CONTROL
                IPLOT           0  PLOT CONTROL
                QSCAL          0.  HYDROGRAPH PLOT SCALE
                         STORAGE ROUTING THROUGH 7F

          HYDROGRAPH ROUTING DATA

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

102 RC      NORMAL DEPTH CHANNEL ROUTING
                  ANL        .080  LEFT OVERBANK N-VALUE
                 ANCH        .030  MAIN CHANNEL N-VALUE
                  ANR        .080  RIGHT OVERBANK N-VALUE
                RLNTH        500.  REACH LENGTH
                  SEL       .0030  ENERGY SLOPE
                ELMAX        90.0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                      CROSS-SECTION DATA
                         --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
104 RY     ELEVATION     90.00    90.50    90.00    86.00    86.00    90.00    90.50    91.00
103 RX     DISTANCE        .00     5.00    10.00    16.00    24.00    30.00    35.00    40.00

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COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	.02	.04	.06	.09	.12	.14	.17	.20	.24
OUTFLOW	.00	1.63	5.20	10.32	16.84	24.71	33.90	44.41	56.26	69.44
ELEVATION	86.00	86.21	86.42	86.63	86.84	87.05	87.26	87.47	87.68	87.89
STORAGE	.27	.30	.34	.38	.42	.46	.50	.55	.60	.64
OUTFLOW	83.98	99.91	117.25	136.02	156.26	177.99	201.24	226.04	252.43	280.43
ELEVATION	88.11	88.32	88.53	88.74	88.95	89.16	89.37	89.58	89.79	90.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 2. TO 280.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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HYDROGRAPH AT STATION 7FCHNL

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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
28	FEB	0100	1	0.	.0	86.0	28	FEB	0915	34	12.	.1	86.7	28	FEB	1730	67	77.	.3	88.0
28	FEB	0115	2	0.	.0	86.1	28	FEB	0930	35	13.	.1	86.7	28	FEB	1745	68	74.	.2	88.0
28	FEB	0130	3	1.	.0	86.2	28	FEB	0945	36	14.	.1	86.7	28	FEB	1800	69	71.	.2	87.9
28	FEB	0145	4	3.	.0	86.3	28	FEB	1000	37	15.	.1	86.8	28	FEB	1815	70	69.	.2	87.9
28	FEB	0200	5	5.	.0	86.4	28	FEB	1015	38	16.	.1	86.8	28	FEB	1830	71	67.	.2	87.9
28	FEB	0215	6	6.	.0	86.5	28	FEB	1030	39	17.	.1	86.9	28	FEB	1845	72	65.	.2	87.8
28	FEB	0230	7	7.	.1	86.5	28	FEB	1045	40	19.	.1	86.9	28	FEB	1900	73	63.	.2	87.8
28	FEB	0245	8	8.	.1	86.5	28	FEB	1100	41	21.	.1	86.9	28	FEB	1915	74	61.	.2	87.8
28	FEB	0300	9	9.	.1	86.6	28	FEB	1115	42	23.	.1	87.0	28	FEB	1930	75	57.	.2	87.7
	FEB	0315	10	9.	.1	86.6	28	FEB	1130	43	25.	.1	87.1	28	FEB	1945	76	54.	.2	87.6
	FEB	0330	11	10.	.1	86.6	28	FEB	1145	44	28.	.1	87.1	28	FEB	2000	77	52.	.2	87.6
28	FEB	0345	12	10.	.1	86.6	28	FEB	1200	45	33.	.1	87.2	28	FEB	2015	78	50.	.2	87.6
28	FEB	0400	13	10.	.1	86.6	28	FEB	1215	46	38.	.2	87.4	28	FEB	2030	79	49.	.2	87.6
28	FEB	0415	14	10.	.1	86.6	28	FEB	1230	47	47.	.2	87.5	28	FEB	2045	80	48.	.2	87.5
28	FEB	0430	15	10.	.1	86.6	28	FEB	1245	48	65.	.2	87.8	28	FEB	2100	81	47.	.2	87.5
28	FEB	0445	16	11.	.1	86.6	28	FEB	1300	49	113.	.3	88.5	28	FEB	2115	82	46.	.2	87.5
28	FEB	0500	17	11.	.1	86.6	28	FEB	1315	50	273.	.6	89.9	28	FEB	2130	83	45.	.2	87.5
28	FEB	0515	18	11.	.1	86.6	28	FEB	1330	51	393.	.8	90.8	28	FEB	2145	84	45.	.2	87.5
28	FEB	0530	19	11.	.1	86.6	28	FEB	1345	52	320.	.7	90.3	28	FEB	2200	85	44.	.2	87.5
28	FEB	0545	20	11.	.1	86.6	28	FEB	1400	53	243.	.6	89.7	28	FEB	2215	86	43.	.2	87.5
28	FEB	0600	21	11.	.1	86.6	28	FEB	1415	54	204.	.5	89.4	28	FEB	2230	87	43.	.2	87.4
28	FEB	0615	22	11.	.1	86.6	28	FEB	1430	55	173.	.5	89.1	28	FEB	2245	88	42.	.2	87.4
28	FEB	0630	23	11.	.1	86.6	28	FEB	1445	56	156.	.4	88.9	28	FEB	2300	89	42.	.2	87.4
28	FEB	0645	24	11.	.1	86.6	28	FEB	1500	57	138.	.4	88.8	28	FEB	2315	90	41.	.2	87.4
28	FEB	0700	25	11.	.1	86.6	28	FEB	1515	58	127.	.4	88.6	28	FEB	2330	91	41.	.2	87.4
28	FEB	0715	26	11.	.1	86.6	28	FEB	1530	59	116.	.3	88.5	28	FEB	2345	92	41.	.2	87.4
28	FEB	0730	27	11.	.1	86.6	28	FEB	1545	60	108.	.3	88.4	1	MAR	0000	93	40.	.2	87.4
28	FEB	0745	28	11.	.1	86.6	28	FEB	1600	61	101.	.3	88.3	1	MAR	0015	94	40.	.2	87.4
28	FEB	0800	29	11.	.1	86.6	28	FEB	1615	62	96.	.3	88.3	1	MAR	0030	95	40.	.2	87.4
28	FEB	0815	30	11.	.1	86.6	28	FEB	1630	63	91.	.3	88.2	1	MAR	0045	96	39.	.2	87.4
28	FEB	0830	31	11.	.1	86.7	28	FEB	1645	64	88.	.3	88.2	1	MAR	0100	97	39.	.2	87.4
28	FEB	0845	32	11.	.1	86.7	28	FEB	1700	65	84.	.3	88.1							
28	FEB	0900	33	11.	.1	86.7	28	FEB	1715	66	80.	.3	88.1							

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.00-HR
CFS)	(HR)					
		(CFS)				
+ 393.	12.50		139.	54.	54.	54.
		(INCHES)	1.959	3.027	3.027	3.027

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                    (AC-FT)      69.       106.       106.       106.

 PEAK STORAGE   TIME                      MAXIMUM AVERAGE STORAGE
                                    6-HR       24-HR       72-HR     24.00-HR
+  (AC-FT)      (HR)
       1.      12.50                 0.          0.          0.          0.

  PEAK STAGE    TIME                      MAXIMUM AVERAGE STAGE
                                    6-HR       24-HR       72-HR     24.00-HR
+   (FEET)      (HR)
    90.85      12.50                88.65       87.40       87.40       87.40

                    CUMULATIVE AREA =     .66 SQ MI


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          *            *
 105 KK   *     SUB7G  *
          *            *
          **************

 106 KO         OUTPUT CONTROL VARIABLES
                      IPRNT           4  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                               SCS RUNOFF CALCULATION

             SUBBASIN RUNOFF DATA

 108 BA         SUBBASIN CHARACTERISTICS
                      TAREA         .06  SUBBASIN AREA

                PRECIPITATION DATA

 109 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                  .60    1.30    2.40    3.00    3.40    4.20    5.20    6.00     .00     .00     .00     .00

                                                   STORM AREA =     .06

 110 LS         SCS LOSS RATE
                      STRTL         .60  INITIAL ABSTRACTION
                     CRVNBR       77.00  CURVE NUMBER
                      RTIMP         .00  PERCENT IMPERVIOUS AREA

 111 UD         SCS DIMENSIONLESS UNITGRAPH
                       TLAG         .30  LAG

                                                          ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                   UNIT HYDROGRAPH
                                              8 END-OF-PERIOD ORDINATES
             46.       68.       30.       12.        4.        2.        1.        0.


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          *            *
115 KK    *    7GSWP   *
          *            *
          **************

116 KO        OUTPUT CONTROL VARIABLES
                    IPRNT          1  PRINT CONTROL
                    IPLOT          0  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE
                            STORAGE ROUTING THROUGH 7G

            HYDROGRAPH ROUTING DATA

118 RS        STORAGE ROUTING
                    NSTPS          1  NUMBER OF SUBREACHES
                     ITYP       ELEV  TYPE OF INITIAL CONDITION
                   RSVRIC      85.00  INITIAL CONDITION
                        X        .00 WORKING R AND D COEFFICIENT

119 SA             AREA          .0        .6       2.5       5.2

120 SE        ELEVATION       85.00     86.00     87.00     88.00

121 SL        LOW-LEVEL OUTLET
                    ELEVL      85.80  ELEVATION AT CENTER OF OUTLET
                    CAREA      16.25  CROSS-SECTIONAL AREA
                     COQL        .60  COEFFICIENT
                     EXPL        .50  EXPONENT OF HEAD

122 SS        SPILLWAY
                     CREL      88.00  SPILLWAY CREST ELEVATION
                    SPWID        .00  SPILLWAY WIDTH
                     COQW        .00  WEIR COEFFICIENT
                     EXPW       1.50  EXPONENT OF HEAD

                                                    ***

                                        COMPUTED STORAGE-ELEVATION DATA

          STORAGE       .00       .19      1.62      5.39
        ELEVATION     85.00     86.00     87.00     88.00

                                        COMPUTED OUTFLOW-ELEVATION DATA

          OUTFLOW       .00       .00    109.32    110.22    111.14    112.08    113.03    114.00    114.98    115.98
        ELEVATION     85.00     85.80     87.75     87.79     87.82     87.85     87.89     87.93     87.96     88.00


                                      COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE       .00       .10       .19      1.62      4.21      4.36      4.51      4.67      4.84      5.01
          OUTFLOW       .00       .00     34.97     85.66    109.32    110.22    111.14    112.08    113.03    114.00
        ELEVATION     85.00     85.80     86.00     87.00     87.75     87.79     87.82     87.85     87.89     87.93

          STORAGE      5.19      5.39
          OUTFLOW    114.98    115.98
        ELEVATION     87.96     88.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN        0. TO       35.
               THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
               THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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HYDROGRAPH AT STATION 7GSWP

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	ST/
28	FEB	0100	1	0.	.0	85.0	28	FEB	0915	34	12.	.1	85.9	28	FEB	1730	67	133.	8.6	88.6
28	FEB	0115	2	0.	.0	85.0	28	FEB	0930	35	13.	.1	85.9	28	FEB	1745	68	127.	7.6	88.4
28	FEB	0130	3	0.	.0	85.2	28	FEB	0945	36	14.	.1	85.9	28	FEB	1800	69	122.	6.6	88.2
28	FEB	0145	4	0.	.1	85.6	28	FEB	1000	37	16.	.1	85.9	28	FEB	1815	70	118.	5.7	88.1
28	FEB	0200	5	4.	.1	85.8	28	FEB	1015	38	17.	.1	85.9	28	FEB	1830	71	113.	4.8	87.9
28	FEB	0215	6	6.	.1	85.8	28	FEB	1030	39	19.	.1	85.9	28	FEB	1845	72	108.	4.0	87.7
28	FEB	0230	7	7.	.1	85.8	28	FEB	1045	40	21.	.2	85.9	28	FEB	1900	73	101.	3.3	87.5
28	FEB	0245	8	8.	.1	85.8	28	FEB	1100	41	23.	.2	85.9	28	FEB	1915	74	95.	2.7	87.3
28	FEB	0300	9	9.	.1	85.8	28	FEB	1115	42	25.	.2	85.9	28	FEB	1930	75	90.	2.0	87.1
28	FEB	0315	10	9.	.1	85.9	28	FEB	1130	43	28.	.2	86.0	28	FEB	1945	76	81.	1.5	86.9
28	FEB	0330	11	10.	.1	85.9	28	FEB	1145	44	32.	.2	86.0	28	FEB	2000	77	68.	1.1	86.6
28	FEB	0345	12	10.	.1	85.9	28	FEB	1200	45	36.	.2	86.0	28	FEB	2015	78	60.	.9	86.5
28	FEB	0400	13	10.	.1	85.9	28	FEB	1215	46	39.	.3	86.1	28	FEB	2030	79	56.	.8	86.4
28	FEB	0415	14	10.	.1	85.9	28	FEB	1230	47	45.	.5	86.2	28	FEB	2045	80	53.	.7	86.4
28	FEB	0430	15	10.	.1	85.9	28	FEB	1245	48	57.	.8	86.4	28	FEB	2100	81	52.	.7	86.3
28	FEB	0445	16	11.	.1	85.9	28	FEB	1300	49	84.	1.6	87.0	28	FEB	2115	82	50.	.6	86.3
28	FEB	0500	17	11.	.1	85.9	28	FEB	1315	50	111.	4.5	87.8	28	FEB	2130	83	49.	.6	86.3
28	FEB	0515	18	11.	.1	85.9	28	FEB	1330	51	142.	10.4	89.0	28	FEB	2145	84	48.	.6	86.3
28	FEB	0530	19	11.	.1	85.9	28	FEB	1345	52	171.	16.0	90.1	28	FEB	2200	85	47.	.5	86.2
28	FEB	0545	20	11.	.1	85.9	28	FEB	1400	53	187.	19.0	90.7	28	FEB	2215	86	47.	.5	86.2
28	FEB	0600	21	11.	.1	85.9	28	FEB	1415	54	194.	20.3	90.9	28	FEB	2230	87	46.	.5	86.2
28	FEB	0615	22	11.	.1	85.9	28	FEB	1430	55	195.	20.6	91.0	28	FEB	2245	88	45.	.5	86.2
28	FEB	0630	23	11.	.1	85.9	28	FEB	1445	56	194.	20.3	90.9	28	FEB	2300	89	45.	.5	86.2
28	FEB	0645	24	11.	.1	85.9	28	FEB	1500	57	190.	19.7	90.8	28	FEB	2315	90	44.	.5	86.2
28	FEB	0700	25	11.	.1	85.9	28	FEB	1515	58	186.	18.8	90.6	28	FEB	2330	91	44.	.4	86.2
28	FEB	0715	26	11.	.1	85.9	28	FEB	1530	59	180.	17.7	90.4	28	FEB	2345	92	43.	.4	86.2
28	FEB	0730	27	11.	.1	85.9	28	FEB	1545	60	174.	16.6	90.2	1	MAR	0000	93	43.	.4	86
28	FEB	0745	28	11.	.1	85.9	28	FEB	1600	61	168.	15.4	90.0	1	MAR	0015	94	43.	.4	8
28	FEB	0800	29	11.	.1	85.9	28	FEB	1615	62	162.	14.1	89.7	1	MAR	0030	95	42.	.4	86.
28	FEB	0815	30	11.	.1	85.9	28	FEB	1630	63	155.	13.0	89.5	1	MAR	0045	96	42.	.4	86.1
28	FEB	0830	31	11.	.1	85.9	28	FEB	1645	64	149.	11.8	89.3	1	MAR	0100	97	41.	.4	86.1
28	FEB	0845	32	11.	.1	85.9	28	FEB	1700	65	144.	10.7	89.0							
28	FEB	0900	33	12.	.1	85.9	28	FEB	1715	66	138.	9.6	88.8							

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.00-HR
		(CFS)				
195.	13.50		152.	59.	59.	59.
		(INCHES)	1.963	3.055	3.055	3.055
		(AC-FT)	75.	117.	117.	117.

PEAK STORAGE (AC-FT)	TIME (HR)	MAXIMUM AVERAGE STORAGE 6-HR	24-HR	72-HR	24.00-HR
21.	13.50	12.	3.	3.	3.

PEAK STAGE (FEET)	TIME (HR)	MAXIMUM AVERAGE STAGE 6-HR	24-HR	72-HR	24.00-HR
90.99	13.50	89.37	86.87	86.87	86.87

CUMULATIVE AREA = .72 SQ MI

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          *            *
123 KK    *     SUB7H  *
          *            *
          **************

124 KO         OUTPUT CONTROL VARIABLES
                     IPRNT           4  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                              SCS RUNOFF CALCULATION

             SUBBASIN RUNOFF DATA

126 BA         SUBBASIN CHARACTERISTICS
                     TAREA         .19  SUBBASIN AREA

               PRECIPITATION DATA

127 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
               ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
               5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                 .60    1.30    2.40    3.00    3.40    4.20    5.20    6.00     .00     .00     .00     .00

                                                   STORM AREA =     .19

128 LS         SCS LOSS RATE
                     STRTL         .60  INITIAL ABSTRACTION
                    CRVNBR       77.00  CURVE NUMBER
                     RTIMP         .00  PERCENT IMPERVIOUS AREA

129 UD         SCS DIMENSIONLESS UNITGRAPH
                      TLAG         .30  LAG

                                                          ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                     UNIT HYDROGRAPH
                                                 8 END-OF-PERIOD ORDINATES
             136.      201.      88.      34.      13.       5.       2.       1.


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          **************
          *            *
133 KK    *     7HSWP  *
          *            *
          **************

134 KO         OUTPUT CONTROL VARIABLES
                     IPRNT           1  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                              STORAGE ROUTING THROUGH 7H

             HYDROGRAPH ROUTING DATA

136 RS         STORAGE ROUTING
                     NSTPS           1  NUMBER OF SUBREACHES
                      ITYP        ELEV  TYPE OF INITIAL CONDITION
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                RSVRIC      84.00  INITIAL CONDITION
                     X        .00 WORKING R AND D COEFFICIENT

137 SA          AREA          .4       3.1       9.2      15.3

138 SE     ELEVATION       84.00     86.00     87.00     88.00

139 SS     SPILLWAY
                  CREL      84.00  SPILLWAY CREST ELEVATION
                 SPWID      10.00  SPILLWAY WIDTH
                  COQW       3.00  WEIR COEFFICIENT
                  EXPW       1.50  EXPONENT OF HEAD
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COMPUTED STORAGE-ELEVATION DATA

STORAGE	.00	3.04	8.93	21.05
ELEVATION	84.00	86.00	87.00	88.00

COMPUTED OUTFLOW-ELEVATION DATA

OUTFLOW	.00	.00	.04	.33	1.11	2.63	5.14	8.89	14.12	21.07
ELEVATION	84.00	84.00	84.01	84.05	84.11	84.20	84.31	84.44	84.60	84.79
OUTFLOW	30.00	41.15	54.77	71.11	90.41	112.92	138.89	168.56	202.18	240.00
ELEVATION	85.00	85.23	85.49	85.78	86.09	86.42	86.78	87.16	87.57	88.00

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	.00	.02	.05	.09	.16	.25	.39	.58	.85
OUTFLOW	.00	.04	.33	1.11	2.63	5.14	8.89	14.12	21.07	30.00
ELEVATION	84.00	84.01	84.05	84.11	84.20	84.31	84.44	84.60	84.79	85.00
STORAGE	1.22	1.73	2.41	3.04	3.33	4.77	7.06	8.93	10.48	15.07
OUTFLOW	41.15	54.77	71.11	84.85	90.41	112.92	138.89	155.88	168.56	202.18
ELEVATION	85.23	85.49	85.78	86.00	86.09	86.42	86.78	87.00	87.16	87.57
STORAGE	21.05									
OUTFLOW	240.00									
ELEVATION	88.00									

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HYDROGRAPH AT STATION 7HSWP

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DA MON HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA MON HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA MON HRMN	ORD	OUTFLOW	STORAGE	STAGE
28 FEB 0100	1	0.	.0	84.0	*	28 FEB 0915	34	12.	.3	84.5	*	28 FEB 1730	67	189.	13.3	87.4
28 FEB 0115	2	0.	.0	84.0	*	28 FEB 0930	35	13.	.4	84.6	*	28 FEB 1745	68	183.	12.5	87.3
28 FEB 0130	3	0.	.0	84.0	*	28 FEB 0945	36	15.	.4	84.6	*	28 FEB 1800	69	178.	11.7	87.3
28 FEB 0145	4	0.	.0	84.0	*	28 FEB 1000	37	16.	.4	84.7	*	28 FEB 1815	70	172.	10.9	87.2
28 FEB 0200	5	1.	.0	84.1	*	28 FEB 1015	38	18.	.5	84.7	*	28 FEB 1830	71	166.	10.1	87.1
28 FEB 0215	6	3.	.1	84.2	*	28 FEB 1030	39	20.	.6	84.8	*	28 FEB 1845	72	160.	9.4	87.0
28 FEB 0230	7	5.	.2	84.3	*	28 FEB 1045	40	23.	.6	84.8	*	28 FEB 1900	73	153.	8.6	87.0
28 FEB 0245	8	6.	.2	84.4	*	28 FEB 1100	41	25.	.7	84.9	*	28 FEB 1915	74	146.	7.8	86.9
28 FEB 0300	9	7.	.2	84.4	*	28 FEB 1115	42	29.	.8	85.0	*	28 FEB 1930	75	139.	7.0	86.8
28 FEB 0315	10	8.	.2	84.4	*	28 FEB 1130	43	32.	.9	85.0	*	28 FEB 1945	76	130.	6.2	86
28 FEB 0330	11	9.	.3	84.4	*	28 FEB 1145	44	37.	1.1	85.1	*	28 FEB 2000	77	120.	5.4	86
28 FEB 0345	12	9.	.3	84.5	*	28 FEB 1200	45	42.	1.2	85.2	*	28 FEB 2015	78	109.	4.5	86.4
28 FEB 0400	13	10.	.3	84.5	*	28 FEB 1215	46	47.	1.4	85.4	*	28 FEB 2030	79	97.	3.8	86.2
28 FEB 0415	14	10.	.3	84.5	*	28 FEB 1230	47	55.	1.7	85.5	*	28 FEB 2045	80	87.	3.2	86.0
28 FEB 0430	15	10.	.3	84.5	*	28 FEB 1245	48	66.	2.2	85.7	*	28 FEB 2100	81	78.	2.7	85.9

28	FEB	0445	16	10.	.3	84.5	*	28	FEB	1300	49	89.	3.3	86.1	*	28	FEB	2115	82	71.	2.4	85.8
28	FEB	0500	17	11.	.3	84.5	*	28	FEB	1315	50	126.	6.0	86.6	*	28	FEB	2130	83	65.	2.2	85.7
28	FEB	0515	18	11.	.3	84.5	*	28	FEB	1330	51	167.	10.3	87.1	*	28	FEB	2145	84	62.	2.0	85.6
28	FEB	0530	19	11.	.3	84.5	*	28	FEB	1345	52	195.	14.0	87.5	*	28	FEB	2200	85	59.	1.9	85.6
28	FEB	0545	20	11.	.3	84.5	*	28	FEB	1400	53	210.	16.3	87.7	*	28	FEB	2215	86	57.	1.8	85.5
	FEB	0600	21	11.	.3	84.5	*	28	FEB	1415	54	218.	17.6	87.7	*	28	FEB	2230	87	55.	1.8	85.5
	FEB	0615	22	11.	.3	84.5	*	28	FEB	1430	55	223.	18.3	87.8	*	28	FEB	2245	88	54.	1.7	85.5
28	FEB	0630	23	11.	.3	84.5	*	28	FEB	1445	56	225.	18.7	87.8	*	28	FEB	2300	89	53.	1.7	85.5
28	FEB	0645	24	11.	.3	84.5	*	28	FEB	1500	57	226.	18.8	87.8	*	28	FEB	2315	90	52.	1.6	85.4
28	FEB	0700	25	11.	.3	84.5	*	28	FEB	1515	58	225.	18.7	87.8	*	28	FEB	2330	91	51.	1.6	85.4
28	FEB	0715	26	11.	.3	84.5	*	28	FEB	1530	59	224.	18.5	87.8	*	28	FEB	2345	92	51.	1.6	85.4
28	FEB	0730	27	11.	.3	84.5	*	28	FEB	1545	60	221.	18.1	87.8	*	1	MAR	0000	93	50.	1.6	85.4
28	FEB	0745	28	11.	.3	84.5	*	28	FEB	1600	61	218.	17.6	87.8	*	1	MAR	0015	94	49.	1.5	85.4
28	FEB	0800	29	11.	.3	84.5	*	28	FEB	1615	62	215.	17.0	87.7	*	1	MAR	0030	95	49.	1.5	85.4
28	FEB	0815	30	11.	.3	84.5	*	28	FEB	1630	63	210.	16.4	87.7	*	1	MAR	0045	96	48.	1.5	85.4
28	FEB	0830	31	11.	.3	84.5	*	28	FEB	1645	64	206.	15.7	87.6	*	1	MAR	0100	97	48.	1.5	85.4
28	FEB	0845	32	11.	.3	84.5	*	28	FEB	1700	65	201.	14.9	87.6	*							
28	FEB	0900	33	11.	.3	84.5	*	28	FEB	1715	66	195.	14.1	87.5	*							
							*								*							

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 PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+     226.     14.00                196.         76.         76.          76.
                         (INCHES)  2.014       3.107       3.107        3.107
                          (AC-FT)   97.         150.        150.         150.

 PEAK STORAGE  TIME                          MAXIMUM AVERAGE STORAGE
                                     6-HR       24-HR       72-HR     24.00-HR
+  (AC-FT)      (HR)
      19.      14.00                 15.          5.          5.           5.

 PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                     6-HR       24-HR       72-HR     24.00-HR
+   (FEET)      (HR)
    87.84      14.00                87.49       85.62       85.62        85.62

                         CUMULATIVE AREA =     .91 SQ MI
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            *            *
 140 KK     *    SUB8A   *
            *            *
            **************

 141 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          4  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE
                               SCS RUNOFF CALCULATION

                SUBBASIN RUNOFF DATA

   BA            SUBBASIN CHARACTERISTICS
                      TAREA        .08  SUBBASIN AREA

                 PRECIPITATION DATA
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144 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
              ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
              5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                .60    1.30    2.40    3.00    3.40    4.20    5.20    6.00     .00     .00     .00     .00

                                                  STORM AREA =      .08

145 LS        SCS LOSS RATE
                    STRTL         .70  INITIAL ABSTRACTION
                   CRVNBR       74.00  CURVE NUMBER
                    RTIMP         .00  PERCENT IMPERVIOUS AREA

146 UD        SCS DIMENSIONLESS UNITGRAPH
                     TLAG         .23  LAG

                                                          ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                      UNIT HYDROGRAPH
                                                  7 END-OF-PERIOD ORDINATES
              83.       78.       24.        8.        2.        1.        0.


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


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          *            *
150 KK    *     8ASWP  *
          *            *
          **************

151 KO        OUTPUT CONTROL VARIABLES
                    IPRNT           1  PRINT CONTROL
                    IPLOT           0  PLOT CONTROL
                    QSCAL          0.  HYDROGRAPH PLOT SCALE
                             STORAGE ROUTING THROUGH 8A SWAMP

             HYDROGRAPH ROUTING DATA

153 RS        STORAGE ROUTING
                    NSTPS           1  NUMBER OF SUBREACHES
                     ITYP        ELEV  TYPE OF INITIAL CONDITION
                   RSVRIC       78.00  INITIAL CONDITION
                        X         .00 WORKING R AND D COEFFICIENT

154 SA            AREA          .0       2.4       5.2       9.8

155 SE        ELEVATION       78.00     80.00     82.00     84.00

156 SL        LOW-LEVEL OUTLET
                    ELEVL       78.85  ELEVATION AT CENTER OF OUTLET
                    CAREA       28.30  CROSS-SECTIONAL AREA
                     COQL         .60  COEFFICIENT
                     EXPL         .50  EXPONENT OF HEAD

157 SS        SPILLWAY
                     CREL       83.90  SPILLWAY CREST ELEVATION
                    SPWID         .00  SPILLWAY WIDTH
                     COQW         .00  WEIR COEFFICIENT
                     EXPW        1.50  EXPONENT OF HEAD

                                                          ***
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COMPUTED STORAGE-ELEVATION DATA

STORAGE	.00	1.61	9.05	23.82
ELEVATION	78.00	80.00	82.00	84.00

COMPUTED OUTFLOW-ELEVATION DATA

OUTFLOW	.00	.00	225.12	233.96	243.52	253.89	265.18	277.53	291.08	306.03
ELEVATION	78.00	78.85	81.58	81.80	82.05	82.33	82.64	83.00	83.42	83.90

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	.12	1.61	7.02	8.05	9.05	9.30	10.85	12.80	15.30
OUTFLOW	.00	.00	146.04	225.12	233.96	241.69	243.52	253.89	265.18	277.53
ELEVATION	78.00	78.85	80.00	81.58	81.80	82.00	82.05	82.33	82.64	83.00

STORAGE	18.55	22.85	23.82
OUTFLOW	291.08	306.03	309.04
ELEVATION	83.42	83.90	84.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 0. TO 146.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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HYDROGRAPH AT STATION BASWP

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DA MON HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA MON HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA MON HRMN	ORD	OUTFLOW	STORAGE	STAGE
FEB 0100	1	0.	.0	78.0	28 FEB 0915	34	12.	.2	78.9	28 FEB 1730	67	214.	6.2	81.4
28 FEB 0115	2	0.	.0	78.0	28 FEB 0930	35	13.	.3	79.0	28 FEB 1745	68	208.	5.9	81.2
28 FEB 0130	3	0.	.0	78.0	28 FEB 0945	36	14.	.3	79.0	28 FEB 1800	69	203.	5.5	81.1
28 FEB 0145	4	0.	.0	78.0	28 FEB 1000	37	16.	.3	79.0	28 FEB 1815	70	197.	5.1	81.0
28 FEB 0200	5	0.	.0	78.1	28 FEB 1015	38	18.	.3	79.0	28 FEB 1830	71	191.	4.7	80.9
28 FEB 0215	6	0.	.0	78.3	28 FEB 1030	39	20.	.3	79.0	28 FEB 1845	72	185.	4.3	80.8
28 FEB 0230	7	0.	.1	78.9	28 FEB 1045	40	23.	.4	79.0	28 FEB 1900	73	179.	3.9	80.7
28 FEB 0245	8	6.	.2	78.9	28 FEB 1100	41	26.	.4	79.1	28 FEB 1915	74	173.	3.4	80.5
28 FEB 0300	9	7.	.2	78.9	28 FEB 1115	42	29.	.4	79.1	28 FEB 1930	75	166.	3.0	80.4
28 FEB 0315	10	8.	.2	78.9	28 FEB 1130	43	33.	.5	79.1	28 FEB 1945	76	159.	2.5	80.3
28 FEB 0330	11	9.	.2	78.9	28 FEB 1145	44	38.	.5	79.2	28 FEB 2000	77	151.	1.9	80.1
28 FEB 0345	12	9.	.2	78.9	28 FEB 1200	45	44.	.6	79.2	28 FEB 2015	78	131.	1.5	79.9
28 FEB 0400	13	10.	.2	78.9	28 FEB 1215	46	51.	.6	79.2	28 FEB 2030	79	106.	1.2	79.7
28 FEB 0415	14	10.	.2	78.9	28 FEB 1230	47	59.	.7	79.3	28 FEB 2045	80	95.	1.1	79.6
28 FEB 0430	15	10.	.2	78.9	28 FEB 1245	48	73.	.9	79.4	28 FEB 2100	81	85.	1.0	79.5
28 FEB 0445	16	10.	.2	78.9	28 FEB 1300	49	102.	1.2	79.7	28 FEB 2115	82	77.	.9	79.5
28 FEB 0500	17	10.	.2	78.9	28 FEB 1315	50	153.	2.1	80.1	28 FEB 2130	83	71.	.8	79.4
28 FEB 0515	18	11.	.2	78.9	28 FEB 1330	51	176.	3.7	80.6	28 FEB 2145	84	66.	.8	79.4
28 FEB 0530	19	11.	.2	78.9	28 FEB 1345	52	196.	5.1	81.0	28 FEB 2200	85	63.	.8	79.3
28 FEB 0545	20	11.	.2	78.9	28 FEB 1400	53	209.	5.9	81.3	28 FEB 2215	86	61.	.7	79.3
28 FEB 0600	21	11.	.2	78.9	28 FEB 1415	54	217.	6.5	81.4	28 FEB 2230	87	59.	.7	79.3
28 FEB 0615	22	11.	.2	78.9	28 FEB 1430	55	223.	6.9	81.5	28 FEB 2245	88	57.	.7	79.3
28 FEB 0630	23	11.	.2	78.9	28 FEB 1445	56	227.	7.2	81.6	28 FEB 2300	89	56.	.7	79.3
28 FEB 0645	24	11.	.2	78.9	28 FEB 1500	57	229.	7.5	81.7	28 FEB 2315	90	55.	.7	79.3
28 FEB 0700	25	11.	.2	78.9	28 FEB 1515	58	230.	7.6	81.7	28 FEB 2330	91	54.	.7	79.3
28 FEB 0715	26	11.	.2	78.9	28 FEB 1530	59	231.	7.7	81.7	28 FEB 2345	92	53.	.7	79.3
28 FEB 0730	27	11.	.2	78.9	28 FEB 1545	60	231.	7.8	81.7	1 MAR 0000	93	53.	.7	79.3
FEB 0745	28	11.	.2	78.9	28 FEB 1600	61	231.	7.7	81.7	1 MAR 0015	94	52.	.7	79.3
FEB 0800	29	11.	.2	78.9	28 FEB 1615	62	230.	7.6	81.7	1 MAR 0030	95	51.	.6	79.3
28 FEB 0815	30	11.	.2	78.9	28 FEB 1630	63	229.	7.4	81.7	1 MAR 0045	96	51.	.6	79.3
28 FEB 0830	31	11.	.2	78.9	28 FEB 1645	64	227.	7.2	81.6	1 MAR 0100	97	50.	.6	79.2
28 FEB 0845	32	11.	.2	78.9	28 FEB 1700	65	223.	6.9	81.6					
28 FEB 0900	33	11.	.2	78.9	28 FEB 1715	66	219.	6.6	81.5					

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 PEAK FLOW     TIME                                  MAXIMUM AVERAGE FLOW
                                          6-HR        24-HR        72-HR      24.00-HR
+  (CFS)       (HR)
                              (CFS)
+     231.     14.75                      211.          82.          82.          82.
                           (INCHES)     2.000        3.100        3.100        3.100
                            (AC-FT)      105.         163.         163.         163.

 PEAK STORAGE   TIME                                 MAXIMUM AVERAGE STORAGE
                                          6-HR        24-HR        72-HR      24.00-HR
+  (AC-FT)      (HR)
        8.     14.75                        6.           2.           2.           2.

 PEAK STAGE    TIME                                  MAXIMUM AVERAGE STAGE
                                          6-HR        24-HR        72-HR      24.00-HR
+  (FEET)      (HR)
    81.74     14.75                     81.32        79.66        79.66        79.66

                          CUMULATIVE AREA =     .98 SQ MI


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            *            *
 158 KK     *    SUB8B   *
            *            *
            **************

 159 KO          OUTPUT CONTROL VARIABLES
                       IPRNT           4  PRINT CONTROL
                       IPLOT           0  PLOT CONTROL
                       QSCAL          0.  HYDROGRAPH PLOT SCALE
                                SCS RUNOFF CALCULATION

               SUBBASIN RUNOFF DATA

 161 BA          SUBBASIN CHARACTERISTICS
                       TAREA         .33  SUBBASIN AREA

                 PRECIPITATION DATA

 162 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                 ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                 5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                   .60    1.30    2.40    3.00    3.40    4.20    5.20    6.00     .00     .00     .00     .00

                                                  STORM AREA =     .33

 163 LS          SCS LOSS RATE
                       STRTL         .70  INITIAL ABSTRACTION
                      CRVNBR       74.00  CURVE NUMBER
                       RTIMP         .00  PERCENT IMPERVIOUS AREA

 164 UD          SCS DIMENSIONLESS UNITGRAPH
                        TLAG         .40  LAG

                                                                  ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG
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                                                    UNIT HYDROGRAPH
                                                 10 END-OF-PERIOD ORDINATES
          133.      306.      231.      101.       47.       22.       10.        5.        2.        1.


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          **************
          *            *
168 KK    *     8BSWP  *
          *            *
          **************

169 KO         OUTPUT CONTROL VARIABLES
                     IPRNT           1  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                              STORAGE ROUTING THROUGH 8B

            HYDROGRAPH ROUTING DATA

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

172 RC         NORMAL DEPTH CHANNEL ROUTING
                       ANL        .080  LEFT OVERBANK N-VALUE
                      ANCH        .030  MAIN CHANNEL N-VALUE
                       ANR        .080  RIGHT OVERBANK N-VALUE
                     RLNTH       1200.  REACH LENGTH
                       SEL       .0030  ENERGY SLOPE
                     ELMAX        82.0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                      CROSS-SECTION DATA
                        --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
174 RY       ELEVATION    84.00     83.00     82.00     75.00     75.00     82.00     83.00     84.00
173 RX       DISTANCE       .00      5.00     10.00     20.00     25.00     35.00     40.00     45.00

                                                          ***

                                      COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE       .00       .06       .12       .20       .29       .39       .50       .62       .75       .89
          OUTFLOW       .00      2.61      8.53     17.35     29.10     43.92     61.94     83.36    108.33    137.04
        ELEVATION     75.00     75.37     75.74     76.11     76.47     76.84     77.21     77.58     77.95     78.32

          STORAGE      1.04      1.20      1.38      1.56      1.76      1.96      2.18      2.41      2.64      2.89
          OUTFLOW    169.67    206.38    247.34    292.73    342.72    397.46    457.12    521.86    591.83    667.20
        ELEVATION     78.68     79.05     79.42     79.79     80.16     80.53     80.89     81.26     81.63     82.00


*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN        9. TO      667.
               THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
               THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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                                                HYDROGRAPH AT STATION    8BSWP

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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
28	FEB	0100	1	0.	.0	75.0	28	FEB	0915	34	12.	.1	75.9	28	FEB	1730	67	246.	1.4	79.4
28	FEB	0115	2	0.	.0	75.0	28	FEB	0930	35	13.	.2	75.9	28	FEB	1745	68	240.	1.3	79.4
28	FEB	0130	3	0.	.0	75.0	28	FEB	0945	36	14.	.2	76.0	28	FEB	1800	69	233.	1.3	79.3
28	FEB	0145	4	0.	.0	75.0	28	FEB	1000	37	17.	.2	76.1	28	FEB	1815	70	226.	1.3	[illegible]
28	FEB	0200	5	0.	.0	75.0	28	FEB	1015	38	20.	.2	76.2	28	FEB	1830	71	220.	1.3	[illegible]
28	FEB	0215	6	0.	.0	75.0	28	FEB	1030	39	23.	.2	76.3	28	FEB	1845	72	213.	1.2	79.1
28	FEB	0230	7	0.	.0	75.0	28	FEB	1045	40	27.	.3	76.4	28	FEB	1900	73	206.	1.2	79.0
28	FEB	0245	8	2.	.0	75.3	28	FEB	1100	41	32.	.3	76.5	28	FEB	1915	74	198.	1.2	79.0
28	FEB	0300	9	6.	.1	75.6	28	FEB	1115	42	37.	.3	76.7	28	FEB	1930	75	188.	1.1	78.9
28	FEB	0315	10	7.	.1	75.7	28	FEB	1130	43	43.	.4	76.8	28	FEB	1945	76	178.	1.1	78.8
28	FEB	0330	11	8.	.1	75.7	28	FEB	1145	44	51.	.4	77.0	28	FEB	2000	77	169.	1.0	78.7
28	FEB	0345	12	9.	.1	75.8	28	FEB	1200	45	60.	.5	77.2	28	FEB	2015	78	151.	1.0	78.5
28	FEB	0400	13	9.	.1	75.8	28	FEB	1215	46	72.	.6	77.4	28	FEB	2030	79	127.	.8	78.2
28	FEB	0415	14	10.	.1	75.8	28	FEB	1230	47	87.	.6	77.6	28	FEB	2045	80	111.	.8	78.0
28	FEB	0430	15	10.	.1	75.8	28	FEB	1245	48	113.	.8	78.0	28	FEB	2100	81	102.	.7	77.9
28	FEB	0445	16	10.	.1	75.8	28	FEB	1300	49	174.	1.1	78.7	28	FEB	2115	82	92.	.7	77.7
28	FEB	0500	17	10.	.1	75.8	28	FEB	1315	50	340.	1.7	80.1	28	FEB	2130	83	85.	.6	77.6
28	FEB	0515	18	11.	.1	75.8	28	FEB	1330	51	527.	2.4	81.3	28	FEB	2145	84	80.	.6	77.5
28	FEB	0530	19	11.	.1	75.8	28	FEB	1345	52	533.	2.4	81.3	28	FEB	2200	85	76.	.6	77.5
28	FEB	0545	20	11.	.1	75.8	28	FEB	1400	53	435.	2.1	80.8	28	FEB	2215	86	73.	.6	77.4
28	FEB	0600	21	11.	.1	75.8	28	FEB	1415	54	370.	1.9	80.3	28	FEB	2230	87	71.	.5	77.4
28	FEB	0615	22	11.	.1	75.8	28	FEB	1430	55	336.	1.7	80.1	28	FEB	2245	88	69.	.5	77.3
28	FEB	0630	23	11.	.1	75.8	28	FEB	1445	56	313.	1.6	79.9	28	FEB	2300	89	68.	.5	77.3
28	FEB	0645	24	11.	.1	75.8	28	FEB	1500	57	300.	1.6	79.8	28	FEB	2315	90	67.	.5	77.3
28	FEB	0700	25	11.	.1	75.8	28	FEB	1515	58	291.	1.6	79.8	28	FEB	2330	91	65.	.5	77.3
28	FEB	0715	26	11.	.1	75.8	28	FEB	1530	59	284.	1.5	79.7	28	FEB	2345	92	64.	.5	77.3
28	FEB	0730	27	11.	.1	75.8	28	FEB	1545	60	279.	1.5	79.7	1	MAR	0000	93	63.	.5	77.2
28	FEB	0745	28	11.	.1	75.8	28	FEB	1600	61	275.	1.5	79.6	1	MAR	0015	94	63.	.5	77.2
28	FEB	0800	29	11.	.1	75.8	28	FEB	1615	62	271.	1.5	79.6	1	MAR	0030	95	62.	.5	77.2
28	FEB	0815	30	11.	.1	75.8	28	FEB	1630	63	268.	1.5	79.6	1	MAR	0045	96	61.	.5	77.2
28	FEB	0830	31	11.	.1	75.8	28	FEB	1645	64	264.	1.4	79.6	1	MAR	0100	97	60.	.5	77.2
28	FEB	0845	32	11.	.1	75.8	28	FEB	1700	65	259.	1.4	79.5							
28	FEB	0900	33	11.	.1	75.8	28	FEB	1715	66	253.	1.4	79.5							

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 533.	12.75		299.	110.	110.	110.
		(INCHES)	2.111	3.108	3.108	3.108
		(AC-FT)	148.	218.	218.	218.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.00-HR
+ (AC-FT)	(HR)				
2.	12.75	2.	1.	1.	1.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.00-HR
+ (FEET)	(HR)				
81.32	12.75	79.78	77.38	77.38	77.38

CUMULATIVE AREA = 1.31 SQ MI

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175 KK     *     SUB8C  *
           *            *
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    KO          OUTPUT CONTROL VARIABLES
                      IPRNT           4  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                               SCS RUNOFF CALCULATION

              SUBBASIN RUNOFF DATA

178 BA          SUBBASIN CHARACTERISTICS
                      TAREA         .12  SUBBASIN AREA

                PRECIPITATION DATA

179 PH                                 DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                  .60    1.30    2.40    3.00    3.40    4.20    5.20    6.00     .00     .00     .00     .00

                                                     STORM AREA =     .12

180 LS          SCS LOSS RATE
                      STRTL         .70  INITIAL ABSTRACTION
                     CRVNBR       74.00  CURVE NUMBER
                      RTIMP         .00  PERCENT IMPERVIOUS AREA

181 UD          SCS DIMENSIONLESS UNITGRAPH
                       TLAG         .26  LAG

                                                          ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                     UNIT HYDROGRAPH
                                                 7 END-OF-PERIOD ORDINATES
              107.      125.       44.       16.        5.        2.        1.


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           *            *
185 KK     *     8CSWP  *
           *            *
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186 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           1  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                               STORAGE ROUTING THROUGH 8C

              HYDROGRAPH ROUTING DATA

188 RS          STORAGE ROUTING
                      NSTPS           1  NUMBER OF SUBREACHES
                       ITYP        ELEV  TYPE OF INITIAL CONDITION
                     RSVRIC       64.00  INITIAL CONDITION
                          X         .00 WORKING R AND D COEFFICIENT

189 SA              AREA         1.1       1.9       3.3       5.7       8.8      11.1
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190 SE          ELEVATION       64.00     66.00     68.00     70.00     72.00     74.00

191 SS          SPILLWAY
                      CREL       64.00  SPILLWAY CREST ELEVATION
                     SPWID       12.00  SPILLWAY WIDTH
                      COQW        3.00  WEIR COEFFICIENT
                      EXPW        1.50  EXPONENT OF HEAD

                                                  ***

                                   COMPUTED STORAGE-ELEVATION DATA

          STORAGE        .00      3.00      8.12     16.99     31.37     51.20
        ELEVATION      64.00     66.00     68.00     70.00     72.00     74.00

                                   COMPUTED OUTFLOW-ELEVATION DATA

          OUTFLOW        .00       .00       .20      1.56      5.27     12.49     24.40     42.16     66.95     99.94
        ELEVATION      64.00     64.00     64.03     64.12     64.28     64.49     64.77     65.11     65.51     65.98

          OUTFLOW     142.30    195.20    259.81    337.31    428.86    535.64    658.81    799.55    959.03   1138.42
        ELEVATION      66.50     67.09     67.73     68.44     69.22     70.05     70.94     71.90     72.92     74.00

                                   COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE        .00       .03       .14       .32       .60       .97      1.47      2.12      2.95      3.00
          OUTFLOW        .00       .20      1.56      5.27     12.49     24.40     42.16     66.95     99.94    101.82
        ELEVATION      64.00     64.03     64.12     64.28     64.49     64.77     65.11     65.51     65.98     66.00

          STORAGE       4.03      5.44      7.28      8.12      9.69     12.93     16.99     17.28     23.01     30.51
          OUTFLOW     142.30    195.20    259.81    288.00    337.31    428.86    529.09    535.64    658.81    799.55
        ELEVATION      66.50     67.09     67.73     68.00     68.44     69.22     70.00     70.05     70.94     71.90

          STORAGE      31.37     39.92     51.20
          OUTFLOW     814.59    959.03   1138.42
        ELEVATION      72.00     72.92     74.00
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HYDROGRAPH AT STATION 8CSWP

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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
28	FEB	0100	1	0.	.0	64.0	*	28	FEB	0915	34	11.	.5	64.5	*	28	FEB	1730	67	267.	7.5	67.8
28	FEB	0115	2	0.	.0	64.0	*	28	FEB	0930	35	12.	.6	64.5	*	28	FEB	1745	68	260.	7.3	67.7
28	FEB	0130	3	0.	.0	64.0	*	28	FEB	0945	36	13.	.6	64.5	*	28	FEB	1800	69	253.	7.1	67.7
28	FEB	0145	4	0.	.0	64.0	*	28	FEB	1000	37	14.	.7	64.5	*	28	FEB	1815	70	246.	6.9	67.6
28	FEB	0200	5	0.	.0	64.0	*	28	FEB	1015	38	17.	.7	64.6	*	28	FEB	1830	71	239.	6.7	67.5
28	FEB	0215	6	0.	.0	64.0	*	28	FEB	1030	39	20.	.8	64.7	*	28	FEB	1845	72	232.	6.5	67.5
28	FEB	0230	7	0.	.0	64.0	*	28	FEB	1045	40	24.	1.0	64.8	*	28	FEB	1900	73	225.	6.3	67.4
28	FEB	0245	8	0.	.0	64.0	*	28	FEB	1100	41	28.	1.1	64.8	*	28	FEB	1915	74	217.	6.1	67.3
28	FEB	0300	9	1.	.1	64.1	*	28	FEB	1115	42	34.	1.2	64.9	*	28	FEB	1930	75	208.	5.8	67.2
28	FEB	0315	10	3.	.2	64.2	*	28	FEB	1130	43	40.	1.4	65.1	*	28	FEB	1945	76	198.	5.5	67.1
28	FEB	0330	11	4.	.3	64.2	*	28	FEB	1145	44	47.	1.6	65.2	*	28	FEB	2000	77	187.	5.2	67.0
28	FEB	0345	12	6.	.4	64.3	*	28	FEB	1200	45	56.	1.8	65.3	*	28	FEB	2015	78	175.	4.9	66.9
28	FEB	0400	13	7.	.4	64.3	*	28	FEB	1215	46	67.	2.1	65.5	*	28	FEB	2030	79	158.	4.4	66.7
28	FEB	0415	14	8.	.4	64.4	*	28	FEB	1230	47	81.	2.5	65.7	*	28	FEB	2045	80	139.	3.9	66.5
28	FEB	0430	15	9.	.5	64.4	*	28	FEB	1245	48	103.	3.0	66.0	*	28	FEB	2100	81	123.	3.5	66
28	FEB	0445	16	10.	.5	64.4	*	28	FEB	1300	49	146.	4.1	66.5	*	28	FEB	2115	82	111.	3.2	66.
28	FEB	0500	17	10.	.5	64.4	*	28	FEB	1315	50	255.	7.2	67.7	*	28	FEB	2130	83	101.	3.0	66.0
28	FEB	0515	18	10.	.5	64.4	*	28	FEB	1330	51	406.	12.1	69.0	*	28	FEB	2145	84	93.	2.8	65.9
28	FEB	0530	19	10.	.5	64.4	*	28	FEB	1345	52	506.	16.0	69.8	*	28	FEB	2200	85	87.	2.6	65.8

28 FEB 0545	20	10.	.5	64.4	*	28 FEB 1400	53	525.	16.8	70.0	*	28 FEB 2215	86	82.	2.5	65.7
28 FEB 0600	21	11.	.5	64.4	*	28 FEB 1415	54	493.	15.5	69.7	*	28 FEB 2230	87	79.	2.4	65.7
28 FEB 0615	22	11.	.5	64.4	*	28 FEB 1430	55	450.	13.8	69.4	*	28 FEB 2245	88	76.	2.3	65.6
28 FEB 0630	23	11.	.5	64.4	*	28 FEB 1445	56	407.	12.2	69.0	*	28 FEB 2300	89	74.	2.3	65.6
FEB 0645	24	11.	.5	64.4	*	28 FEB 1500	57	372.	10.9	68.7	*	28 FEB 2315	90	72.	2.3	65.6
FEB 0700	25	11.	.5	64.4	*	28 FEB 1515	58	346.	10.0	68.5	*	28 FEB 2330	91	71.	2.2	65.6
FEB 0715	26	11.	.5	64.4	*	28 FEB 1530	59	326.	9.3	68.3	*	28 FEB 2345	92	69.	2.2	65.5
28 FEB 0730	27	11.	.5	64.4	*	28 FEB 1545	60	312.	8.9	68.2	*	1 MAR 0000	93	68.	2.1	65.5
28 FEB 0745	28	11.	.5	64.4	*	28 FEB 1600	61	302.	8.6	68.1	*	1 MAR 0015	94	67.	2.1	65.5
28 FEB 0800	29	11.	.5	64.4	*	28 FEB 1615	62	295.	8.3	68.1	*	1 MAR 0030	95	66.	2.1	65.5
28 FEB 0815	30	11.	.5	64.4	*	28 FEB 1630	63	289.	8.2	68.0	*	1 MAR 0045	96	65.	2.1	65.5
28 FEB 0830	31	11.	.5	64.4	*	28 FEB 1645	64	283.	8.0	68.0	*	1 MAR 0100	97	65.	2.1	65.5
28 FEB 0845	32	11.	.5	64.4	*	28 FEB 1700	65	278.	7.8	67.9	*					
28 FEB 0900	33	11.	.5	64.4	*	28 FEB 1715	66	273.	7.7	67.9	*					
					*						*					

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 525.	13.00		326.	119.	119.	119.
		(INCHES)	2.117	3.086	3.086	3.086
		(AC-FT)	162.	235.	235.	235.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.00-HR
+ (AC-FT)	(HR)				
17.	13.00	10.	4.	4.	4.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.00-HR
(FEET)	(HR)				
69.97	13.00	68.31	65.87	65.87	65.87

CUMULATIVE AREA = 1.43 SQ MI

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          *            *
192 KK    *    SUB6A   *
          *            *
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193 KO OUTPUT CONTROL VARIABLES

IPRNT	4	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

SCS RUNOFF CALCULATION

SUBBASIN RUNOFF DATA

195 BA SUBBASIN CHARACTERISTICS

TAREA .10 SUBBASIN AREA

PRECIPITATION DATA

.6 PH DEPTHS FOR 0-PERCENT HYPOTHETICAL STORM

..... HYDRO-35			..... TP-40					..... TP-49			
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
.60	1.30	2.40	3.00	3.40	4.20	5.20	6.00	.00	.00	.00	.00

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                                        STORM AREA =     .10

 197 LS          SCS LOSS RATE
                      STRTL         .78  INITIAL ABSTRACTION
                     CRVNBR       72.00  CURVE NUMBER
                      RTIMP         .00  PERCENT IMPERVIOUS AREA

 198 UD          SCS DIMENSIONLESS UNITGRAPH
                       TLAG         .50  LAG

                                                        ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                  UNIT HYDROGRAPH
                                             12 END-OF-PERIOD ORDINATES
               23.       70.       70.       42.       21.       11.        6.        3.        2.        1.
                0.        0.


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           **************
           *            *
 199 KK    *     6ASWP  *
           *            *
           **************

 200 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           1  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                               STORAGE ROUTING THROUGH 6A

              HYDROGRAPH ROUTING DATA

 202 RS          STORAGE ROUTING
                      NSTPS           1  NUMBER OF SUBREACHES
                       ITYP        ELEV  TYPE OF INITIAL CONDITION
                     RSVRIC       82.00  INITIAL CONDITION
                          X         .00 WORKING R AND D COEFFICIENT

 203 SA              AREA          .1       1.2       4.0       7.5

 204 SE          ELEVATION       82.00     84.00     85.00     86.00

 205 SL          LOW-LEVEL OUTLET
                      ELEVL       85.00  ELEVATION AT CENTER OF OUTLET
                      CAREA        4.50  CROSS-SECTIONAL AREA
                       COQL         .60  COEFFICIENT
                       EXPL         .50  EXPONENT OF HEAD

 206 SS          SPILLWAY
                       CREL       85.90  SPILLWAY CREST ELEVATION
                      SPWID         .00  SPILLWAY WIDTH
                       COQW         .00  WEIR COEFFICIENT
                       EXPW        1.50  EXPONENT OF HEAD

                                                        ***

                                          COMPUTED STORAGE-ELEVATION DATA

           STORAGE        .00      1.07      3.50      9.16
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ELEVATION	82.00	84.00	85.00	86.00

COMPUTED OUTFLOW-ELEVATION DATA

OUTFLOW	.00	.00	21.62	21.46	21.30	21.14	20.99	20.84	20.69	20.54
ELEVATION	82.00	85.00	86.00	85.98	85.97	85.95	85.94	85.93	85.91	85.90

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	1.07	3.50	9.14
OUTFLOW	.00	.00	.00	21.62
ELEVATION	82.00	84.00	85.00	86.00

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HYDROGRAPH AT STATION 6ASWP

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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
28	FEB	0100	1	0.	.0	82.0	28	FEB	0915	34	0.	.0	82.0	28	FEB	1730	67	15.	7.3	85.7
28	FEB	0115	2	0.	.0	82.0	28	FEB	0930	35	0.	.0	82.0	28	FEB	1745	68	14.	7.2	85.7
28	FEB	0130	3	0.	.0	82.0	28	FEB	0945	36	0.	.0	82.0	28	FEB	1800	69	14.	7.1	85.6
28	FEB	0145	4	0.	.0	82.0	28	FEB	1000	37	0.	.0	82.0	28	FEB	1815	70	13.	7.0	85.6
28	FEB	0200	5	0.	.0	82.0	28	FEB	1015	38	0.	.0	82.0	28	FEB	1830	71	13.	6.9	85.6
28	FEB	0215	6	0.	.0	82.0	28	FEB	1030	39	0.	.0	82.0	28	FEB	1845	72	13.	6.8	85.6
28	FEB	0230	7	0.	.0	82.0	28	FEB	1045	40	0.	.0	82.1	28	FEB	1900	73	12.	6.7	85.6
28	FEB	0245	8	0.	.0	82.0	28	FEB	1100	41	0.	.1	82.1	28	FEB	1915	74	12.	6.6	85.5
28	FEB	0300	9	0.	.0	82.0	28	FEB	1115	42	0.	.1	82.2	28	FEB	1930	75	11.	6.5	85.5
28	FEB	0315	10	0.	.0	82.0	28	FEB	1130	43	0.	.1	82.2	28	FEB	1945	76	11.	6.4	85.5
[illegible]	FEB	0330	11	0.	.0	82.0	28	FEB	1145	44	0.	.2	82.4	28	FEB	2000	77	10.	6.2	85.5
[illegible]	FEB	0345	12	0.	.0	82.0	28	FEB	1200	45	0.	.3	82.5	28	FEB	2015	78	10.	6.1	85.5
28	FEB	0400	13	0.	.0	82.0	28	FEB	1215	46	0.	.4	82.7	28	FEB	2030	79	10.	6.0	85.4
28	FEB	0415	14	0.	.0	82.0	28	FEB	1230	47	0.	.5	82.9	28	FEB	2045	80	9.	5.9	85.4
28	FEB	0430	15	0.	.0	82.0	28	FEB	1245	48	0.	.7	83.3	28	FEB	2100	81	9.	5.8	85.4
28	FEB	0445	16	0.	.0	82.0	28	FEB	1300	49	0.	1.0	83.8	28	FEB	2115	82	8.	5.7	85.4
28	FEB	0500	17	0.	.0	82.0	28	FEB	1315	50	0.	1.7	84.2	28	FEB	2130	83	8.	5.6	85.4
28	FEB	0515	18	0.	.0	82.0	28	FEB	1330	51	0.	3.0	84.8	28	FEB	2145	84	8.	5.5	85.4
28	FEB	0530	19	0.	.0	82.0	28	FEB	1345	52	5.	4.7	85.2	28	FEB	2200	85	7.	5.4	85.3
28	FEB	0545	20	0.	.0	82.0	28	FEB	1400	53	10.	6.2	85.5	28	FEB	2215	86	7.	5.3	85.3
28	FEB	0600	21	0.	.0	82.0	28	FEB	1415	54	14.	7.1	85.6	28	FEB	2230	87	7.	5.3	85.3
28	FEB	0615	22	0.	.0	82.0	28	FEB	1430	55	16.	7.7	85.7	28	FEB	2245	88	7.	5.2	85.3
28	FEB	0630	23	0.	.0	82.0	28	FEB	1445	56	17.	8.0	85.8	28	FEB	2300	89	6.	5.1	85.3
28	FEB	0645	24	0.	.0	82.0	28	FEB	1500	57	18.	8.1	85.8	28	FEB	2315	90	6.	5.1	85.3
28	FEB	0700	25	0.	.0	82.0	28	FEB	1515	58	18.	8.2	85.8	28	FEB	2330	91	6.	5.0	85.3
28	FEB	0715	26	0.	.0	82.0	28	FEB	1530	59	18.	8.1	85.8	28	FEB	2345	92	6.	5.0	85.3
28	FEB	0730	27	0.	.0	82.0	28	FEB	1545	60	18.	8.1	85.8	1	MAR	0000	93	5.	4.9	85.2
28	FEB	0745	28	0.	.0	82.0	28	FEB	1600	61	17.	8.0	85.8	1	MAR	0015	94	5.	4.9	85.2
28	FEB	0800	29	0.	.0	82.0	28	FEB	1615	62	17.	7.9	85.8	1	MAR	0030	95	5.	4.8	85.2
28	FEB	0815	30	0.	.0	82.0	28	FEB	1630	63	17.	7.8	85.8	1	MAR	0045	96	5.	4.8	85.2
28	FEB	0830	31	0.	.0	82.0	28	FEB	1645	64	16.	7.7	85.7	1	MAR	0100	97	5.	4.7	85.2
28	FEB	0845	32	0.	.0	82.0	28	FEB	1700	65	16.	7.6	85.7							
28	FEB	0900	33	0.	.0	82.0	28	FEB	1715	66	15.	7.5	85.7							

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.00-HR
(CFS)	(HR)					
		(CFS)				
+ 18.	14.25		15.	5.	5.	5.
		(INCHES)	1.428	2.039	2.039	2.039
		(AC-FT)	7.	10.	10.	10.

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 PEAK STORAGE   TIME                          MAXIMUM AVERAGE STORAGE
                                        6-HR       24-HR       72-HR     24.00-HR
+  (AC-FT)      (HR)
        8.     14.25                     7.          3.          3.           3.

  PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                        6-HR       24-HR       72-HR     24.00-HR
+   (FEET)      (HR)
     85.82     14.25                   85.68       83.78       83.78        83.78

                        CUMULATIVE AREA =     .10 SQ MI


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            *            *
 207 KK     *     SUB68  *
            *            *
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 208 KO          OUTPUT CONTROL VARIABLES
                       IPRNT           4  PRINT CONTROL
                       IPLOT           0  PLOT CONTROL
                       QSCAL          0.  HYDROGRAPH PLOT SCALE
                                SCS RUNOFF CALCULATION

               SUBBASIN RUNOFF DATA

 210 BA          SUBBASIN CHARACTERISTICS
                       TAREA         .18  SUBBASIN AREA

                 PRECIPITATION DATA

 211 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                 ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                 5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                   .60    1.30    2.40    3.00    3.40    4.20    5.20    6.00     .00     .00     .00     .00

                                                  STORM AREA =     .18

 212 LS          SCS LOSS RATE
                       STRTL         .78  INITIAL ABSTRACTION
                      CRVNBR       72.00  CURVE NUMBER
                       RTIMP         .00  PERCENT IMPERVIOUS AREA

 213 UD          SCS DIMENSIONLESS UNITGRAPH
                        TLAG         .20  LAG

                                                                  ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                          UNIT HYDROGRAPH
                                                      6 END-OF-PERIOD ORDINATES
               230.      163.       45.       13.        4.        1.


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217 KK    *     6BSWP  *
          *            *
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218 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           1  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                              STORAGE ROUTING THROUGH 6B

              HYDROGRAPH ROUTING DATA

220 RS          STORAGE ROUTING
                      NSTPS           1  NUMBER OF SUBREACHES
                       ITYP        ELEV  TYPE OF INITIAL CONDITION
                     RSVRIC       79.50  INITIAL CONDITION
                          X         .00 WORKING R AND D COEFFICIENT

221 SA              AREA         9.6      23.8      37.4

222 SE          ELEVATION       79.00     80.00     82.00

224 SL          LOW-LEVEL OUTLET
                      ELEVL       80.60  ELEVATION AT CENTER OF OUTLET
                      CAREA       11.30  CROSS-SECTIONAL AREA
                       COQL         .60  COEFFICIENT
                       EXPL         .50  EXPONENT OF HEAD

225 SS          SPILLWAY
                       CREL       81.90  SPILLWAY CREST ELEVATION
                      SPWID         .00  SPILLWAY WIDTH
                       COQW         .00  WEIR COEFFICIENT
                       EXPW        1.50  EXPONENT OF HEAD

                                                    ***

                                        COMPUTED STORAGE-ELEVATION DATA

          STORAGE        .00     16.21     76.95
        ELEVATION      79.00     80.00     82.00

                                        COMPUTED OUTFLOW-ELEVATION DATA

          OUTFLOW        .00       .00     67.92     67.00     66.11     65.25     64.40     63.58     62.78     62.00
        ELEVATION      79.00     80.60     82.16     82.12     82.08     82.04     82.00     81.97     81.93     81.90


                                      COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE        .00     16.21     31.62     76.95     83.04
          OUTFLOW        .00       .00       .00     64.34     67.92
        ELEVATION      79.00     80.00     80.60     82.00     82.16

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

                                        HYDROGRAPH AT STATION    6BSWP

*****************************************************************************************************************************
                                                *                                                *
 DA MON HRMN ORD  OUTFLOW  STORAGE   STAGE * DA MON HRMN ORD  OUTFLOW  STORAGE   STAGE * DA MON HRMN ORD  OUTFLOW  STORAGE   STAGE
                                                *                                                *
    FEB 0100   1       0.      6.3    79.4 * 28 FEB 0915  34       0.      6.3    79.4 * 28 FEB 1730  67       4.     34.1    80.7
    FEB 0115   2       0.      6.3    79.4 * 28 FEB 0930  35       0.      6.3    79.4 * 28 FEB 1745  68       4.     34.6    80.7
 28 FEB 0130   3       0.      6.3    79.4 * 28 FEB 0945  36       0.      6.3    79.4 * 28 FEB 1800  69       5.     35.1    80.7
 28 FEB 0145   4       0.      6.3    79.4 * 28 FEB 1000  37       0.      6.3    79.4 * 28 FEB 1815  70       6.     35.6    80.7
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28 FEB 0200	5	0.	6.3	79.4 *	28 FEB 1015	38	0.	6.4	79.4 *	28 FEB 1830	71	6.	36.0	80.7
28 FEB 0215	6	0.	6.3	79.4 *	28 FEB 1030	39	0.	6.4	79.4 *	28 FEB 1845	72	7.	36.4	80.7
28 FEB 0230	7	0.	6.3	79.4 *	28 FEB 1045	40	0.	6.4	79.4 *	28 FEB 1900	73	7.	36.8	80.8
28 FEB 0245	8	0.	6.3	79.4 *	28 FEB 1100	41	0.	6.5	79.4 *	28 FEB 1915	74	8.	37.1	80.8
28 FEB 0300	9	0.	6.3	79.4 *	28 FEB 1115	42	0.	6.6	79.4 *	28 FEB 1930	75	8.	37.4	80.[illegible]
28 FEB 0315	10	0.	6.3	79.4 *	28 FEB 1130	43	0.	6.7	79.4 *	28 FEB 1945	76	9.	37.6	8[illegible]
28 FEB 0330	11	0.	6.3	79.4 *	28 FEB 1145	44	0.	6.9	79.4 *	28 FEB 2000	77	9.	37.8	8[illegible]
28 FEB 0345	12	0.	6.3	79.4 *	28 FEB 1200	45	0.	7.1	79.4 *	28 FEB 2015	78	9.	38.0	80.8
28 FEB 0400	13	0.	6.3	79.4 *	28 FEB 1215	46	0.	7.3	79.5 *	28 FEB 2030	79	9.	38.2	80.8
28 FEB 0415	14	0.	6.3	79.4 *	28 FEB 1230	47	0.	7.7	79.5 *	28 FEB 2045	80	9.	38.3	80.8
28 FEB 0430	15	0.	6.3	79.4 *	28 FEB 1245	48	0.	8.2	79.5 *	28 FEB 2100	81	10.	38.4	80.8
28 FEB 0445	16	0.	6.3	79.4 *	28 FEB 1300	49	0.	9.4	79.6 *	28 FEB 2115	82	10.	38.6	80.8
28 FEB 0500	17	0.	6.3	79.4 *	28 FEB 1315	50	0.	12.6	79.8 *	28 FEB 2130	83	10.	38.7	80.8
28 FEB 0515	18	0.	6.3	79.4 *	28 FEB 1330	51	0.	17.0	80.0 *	28 FEB 2145	84	10.	38.7	80.8
28 FEB 0530	19	0.	6.3	79.4 *	28 FEB 1345	52	0.	20.1	80.2 *	28 FEB 2200	85	10.	38.8	80.8
28 FEB 0545	20	0.	6.3	79.4 *	28 FEB 1400	53	0.	22.0	80.2 *	28 FEB 2215	86	10.	38.9	80.8
28 FEB 0600	21	0.	6.3	79.4 *	28 FEB 1415	54	0.	23.4	80.3 *	28 FEB 2230	87	10.	38.9	80.8
28 FEB 0615	22	0.	6.3	79.4 *	28 FEB 1430	55	0.	24.6	80.3 *	28 FEB 2245	88	10.	39.0	80.8
28 FEB 0630	23	0.	6.3	79.4 *	28 FEB 1445	56	0.	25.6	80.4 *	28 FEB 2300	89	10.	39.0	80.8
28 FEB 0645	24	0.	6.3	79.4 *	28 FEB 1500	57	0.	26.6	80.4 *	28 FEB 2315	90	11.	39.0	80.8
28 FEB 0700	25	0.	6.3	79.4 *	28 FEB 1515	58	0.	27.5	80.4 *	28 FEB 2330	91	11.	39.1	80.8
28 FEB 0715	26	0.	6.3	79.4 *	28 FEB 1530	59	0.	28.4	80.5 *	28 FEB 2345	92	11.	39.1	80.8
28 FEB 0730	27	0.	6.3	79.4 *	28 FEB 1545	60	0.	29.3	80.5 *	1 MAR 0000	93	11.	39.1	80.8
28 FEB 0745	28	0.	6.3	79.4 *	28 FEB 1600	61	0.	30.1	80.5 *	1 MAR 0015	94	11.	39.1	80.8
28 FEB 0800	29	0.	6.3	79.4 *	28 FEB 1615	62	0.	30.8	80.6 *	1 MAR 0030	95	11.	39.1	80.8
28 FEB 0815	30	0.	6.3	79.4 *	28 FEB 1630	63	0.	31.6	80.6 *	1 MAR 0045	96	11.	39.1	80.8
28 FEB 0830	31	0.	6.3	79.4 *	28 FEB 1645	64	1.	32.3	80.6 *	1 MAR 0100	97	11.	39.0	80.8
28 FEB 0845	32	0.	6.3	79.4 *	28 FEB 1700	65	2.	32.9	80.6 *					
28 FEB 0900	33	0.	6.3	79.4 *	28 FEB 1715	66	3.	33.5	80.7 *					
				*					*					

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 11.	23.00		10.	3.	3.	3.
		(INCHES)	.335	.393	.393	.393
		(AC-FT)	5.	6.	6.	6.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.00-HR
+ (AC-FT)	(HR)				
39.	23.00	39.	20.	20.	20.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.00-HR
+ (FEET)	(HR)				
80.83	23.00	80.81	80.02	80.02	80.02

CUMULATIVE AREA = .27 SQ MI

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              **************
              *            *
226 KK        *    SUB6D   *
              *            *
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227 KO OUTPUT CONTROL VARIABLES
IPRNT 4 PRINT CONTROL

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                    IPLOT          0  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE
                            SCS RUNOFF CALCULATION

            SUBBASIN RUNOFF DATA

229 BA        SUBBASIN CHARACTERISTICS
                    TAREA        .42  SUBBASIN AREA

              PRECIPITATION DATA

230 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
              ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
              5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                .60    1.30    2.40    3.00    3.40    4.20    5.20    6.00     .00     .00     .00     .00

                                                STORM AREA =     .42

231 LS        SCS LOSS RATE
                    STRTL        .78  INITIAL ABSTRACTION
                   CRVNBR      72.00  CURVE NUMBER
                    RTIMP        .00  PERCENT IMPERVIOUS AREA

232 UD        SCS DIMENSIONLESS UNITGRAPH
                     TLAG        .50  LAG

                                                        ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                UNIT HYDROGRAPH
                                            12 END-OF-PERIOD ORDINATES
            102.     305.     305.     184.      92.      48.      25.      13.       7.       4.
              2.       1.

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

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          *            *
233 KK    *     60SWP  *
          *            *
          **************

234 KO        OUTPUT CONTROL VARIABLES
                    IPRNT          1  PRINT CONTROL
                    IPLOT          0  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE
                            STORAGE ROUTING THROUGH 60

            HYDROGRAPH ROUTING DATA

236 RS        STORAGE ROUTING
                   NSTPS          1  NUMBER OF SUBREACHES
                    ITYP       ELEV  TYPE OF INITIAL CONDITION
                  RSVRIC      80.00  INITIAL CONDITION
                       X        .00 WORKING R AND D COEFFICIENT

    SA            AREA        1.5      14.4

238 SE        ELEVATION      80.00     90.00

239 SL        LOW-LEVEL OUTLET
                   ELEVL      80.00  ELEVATION AT CENTER OF OUTLET
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	CAREA	12.57	CROSS-SECTIONAL AREA
	COQL	.60	COEFFICIENT
	EXPL	.50	EXPONENT OF HEAD
240 SS	SPILLWAY		
	CREL	90.00	SPILLWAY CREST ELEVATION
	SPWID	.00	SPILLWAY WIDTH
	COQW	.00	WEIR COEFFICIENT
	EXPW	1.50	EXPONENT OF HEAD

***

COMPUTED STORAGE-ELEVATION DATA

STORAGE	.00	68.83
ELEVATION	80.00	90.00

COMPUTED OUTFLOW-ELEVATION DATA

OUTFLOW	.00	84.17	90.50	97.87	106.54	116.90	129.48	145.11	165.02	191.28
ELEVATION	80.00	81.94	82.24	82.62	83.10	83.73	84.58	85.76	87.44	90.00

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	4.33	5.28	6.59	8.48	11.30	15.80	23.50	37.99	68.83
OUTFLOW	.00	84.17	90.50	97.87	106.54	116.90	129.48	145.11	165.02	191.28
ELEVATION	80.00	81.94	82.24	82.62	83.10	83.73	84.58	85.76	87.44	90.00

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HYDROGRAPH AT STATION 6DSWP

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DA MON HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA MON HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA MON HRMN	ORD	OUTFLOW	STORAGE	STAGE
28 FEB 0100	1	0.	.0	80.0	*	28 FEB 0915	34	0.	.0	80.0	*	28 FEB 1730	67	99.	6.8	82.7
28 FEB 0115	2	0.	.0	80.0	*	28 FEB 0930	35	0.	.0	80.0	*	28 FEB 1745	68	92.	5.6	82.3
28 FEB 0130	3	0.	.0	80.0	*	28 FEB 0945	36	0.	.0	80.0	*	28 FEB 1800	69	85.	4.5	82.0
28 FEB 0145	4	0.	.0	80.0	*	28 FEB 1000	37	0.	.0	80.0	*	28 FEB 1815	70	71.	3.6	81.6
28 FEB 0200	5	0.	.0	80.0	*	28 FEB 1015	38	0.	.0	80.0	*	28 FEB 1830	71	59.	3.0	81.4
28 FEB 0215	6	0.	.0	80.0	*	28 FEB 1030	39	1.	.0	80.0	*	28 FEB 1845	72	50.	2.6	81.2
28 FEB 0230	7	0.	.0	80.0	*	28 FEB 1045	40	2.	.1	80.0	*	28 FEB 1900	73	44.	2.3	81.0
28 FEB 0245	8	0.	.0	80.0	*	28 FEB 1100	41	3.	.1	80.1	*	28 FEB 1915	74	40.	2.0	80.9
28 FEB 0300	9	0.	.0	80.0	*	28 FEB 1115	42	4.	.2	80.1	*	28 FEB 1930	75	36.	1.8	80.8
28 FEB 0315	10	0.	.0	80.0	*	28 FEB 1130	43	6.	.3	80.1	*	28 FEB 1945	76	32.	1.7	80.7
28 FEB 0330	11	0.	.0	80.0	*	28 FEB 1145	44	8.	.4	80.2	*	28 FEB 2000	77	29.	1.5	80.7
28 FEB 0345	12	0.	.0	80.0	*	28 FEB 1200	45	11.	.5	80.2	*	28 FEB 2015	78	26.	1.3	80.6
28 FEB 0400	13	0.	.0	80.0	*	28 FEB 1215	46	14.	.7	80.3	*	28 FEB 2030	79	23.	1.2	80.5
28 FEB 0415	14	0.	.0	80.0	*	28 FEB 1230	47	19.	1.0	80.4	*	28 FEB 2045	80	22.	1.1	80.5
28 FEB 0430	15	0.	.0	80.0	*	28 FEB 1245	48	25.	1.3	80.6	*	28 FEB 2100	81	20.	1.0	80.5
28 FEB 0445	16	0.	.0	80.0	*	28 FEB 1300	49	39.	2.0	80.9	*	28 FEB 2115	82	19.	1.0	80.4
28 FEB 0500	17	0.	.0	80.0	*	28 FEB 1315	50	74.	3.8	81.7	*	28 FEB 2130	83	18.	.9	80.4
28 FEB 0515	18	0.	.0	80.0	*	28 FEB 1330	51	104.	7.9	83.0	*	28 FEB 2145	84	17.	.9	80.4
28 FEB 0530	19	0.	.0	80.0	*	28 FEB 1345	52	123.	13.3	84.1	*	28 FEB 2200	85	17.	.9	80.4
28 FEB 0545	20	0.	.0	80.0	*	28 FEB 1400	53	133.	17.7	84.9	*	28 FEB 2215	86	16.	.8	80.4
28 FEB 0600	21	0.	.0	80.0	*	28 FEB 1415	54	138.	20.1	85.2	*	28 FEB 2230	87	16.	.8	80.4
28 FEB 0615	22	0.	.0	80.0	*	28 FEB 1430	55	140.	20.9	85.4	*	28 FEB 2245	88	15.	.8	80.4
28 FEB 0630	23	0.	.0	80.0	*	28 FEB 1445	56	140.	20.9	85.4	*	28 FEB 2300	89	15.	.8	80 [illegible]
28 FEB 0645	24	0.	.0	80.0	*	28 FEB 1500	57	138.	20.2	85.3	*	28 FEB 2315	90	15.	.7	8[illegible]
28 FEB 0700	25	0.	.0	80.0	*	28 FEB 1515	58	136.	19.2	85.1	*	28 FEB 2330	91	14.	.7	80.[illegible]
28 FEB 0715	26	0.	.0	80.0	*	28 FEB 1530	59	134.	18.0	84.9	*	28 FEB 2345	92	14.	.7	80.3
28 FEB 0730	27	0.	.0	80.0	*	28 FEB 1545	60	131.	16.6	84.7	*	1 MAR 0000	93	14.	.7	80.3
28 FEB 0745	28	0.	.0	80.0	*	28 FEB 1600	61	128.	15.1	84.5	*	1 MAR 0015	94	13.	.7	80.3

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28 FEB 0800  29      0.      .0    80.0 * 28 FEB 1615  62     124.     13.7    84.2 *  1 MAR 0030  95      13.      .7    80.3
28 FEB 0815  30      0.      .0    80.0 * 28 FEB 1630  63     119.     12.2    83.9 *  1 MAR 0045  96      13.      .7    80.3
28 FEB 0830  31      0.      .0    80.0 * 28 FEB 1645  64     115.     10.8    83.6 *  1 MAR 0100  97      13.      .6    80.3
28 FEB 0845  32      0.      .0    80.0 * 28 FEB 1700  65     110.      9.4    83.3 *
   FEB 0900  33      0.      .0    80.0 * 28 FEB 1715  66     104.      8.0    83.0 *
                                        *                                          *
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 PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+  (CFS)       (HR)
                          (CFS)
+    140.     13.50                  108.         33.         33.          33.
                       (INCHES)    2.382       2.932       2.932        2.932
                        (AC-FT)      53.         66.         66.          66.

PEAK STORAGE   TIME                         MAXIMUM AVERAGE STORAGE
                                     6-HR       24-HR       72-HR     24.00-HR
+ (AC-FT)      (HR)
      21.     13.50                   11.          3.          3.           3.

 PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                     6-HR       24-HR       72-HR     24.00-HR
+  (FEET)      (HR)
    85.36     13.50                 83.50       81.02       81.02        81.02

                        CUMULATIVE AREA =     .42 SQ MI


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          *            *
241 KK    *    SUB6C   *
          *            *
          **************

242 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           4  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                               SCS RUNOFF CALCULATION

              SUBBASIN RUNOFF DATA

244 BA          SUBBASIN CHARACTERISTICS
                      TAREA         .23  SUBBASIN AREA

                PRECIPITATION DATA

245 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                  .60    1.30    2.40    3.00    3.40    4.20    5.20    6.00     .00     .00     .00     .00

                                                  STORM AREA =     .23

    LS          SCS LOSS RATE
                      STRTL         .78  INITIAL ABSTRACTION
                     CRVNBR       72.00  CURVE NUMBER
                      RTIMP         .00  PERCENT IMPERVIOUS AREA

247 UD          SCS DIMENSIONLESS UNITGRAPH
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                    TLAG        .30  LAG

                                                    ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                  UNIT HYDROGRAPH
                                              8 END-OF-PERIOD ORDINATES
            171.      253.      111.       43.       16.        6.        3.        1.


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


          **************
          *            *
251 KK    *    6CSWP   *
          *            *
          **************

252 KO        OUTPUT CONTROL VARIABLES
                    IPRNT           1  PRINT CONTROL
                    IPLOT           0  PLOT CONTROL
                    QSCAL          0.  HYDROGRAPH PLOT SCALE
                            STORAGE ROUTING THROUGH 6C

            HYDROGRAPH ROUTING DATA

254 RS        STORAGE ROUTING
                    NSTPS           1  NUMBER OF SUBREACHES
                     ITYP        ELEV  TYPE OF INITIAL CONDITION
                   RSVRIC       74.50  INITIAL CONDITION
                        X         .00 WORKING R AND D COEFFICIENT

255 SA            AREA          .0       2.3      12.6      24.4      33.5

256 SE        ELEVATION       74.50     76.00     78.00     80.00     82.00

257 SL        LOW-LEVEL OUTLET
                    ELEVL       74.50  ELEVATION AT CENTER OF OUTLET
                    CAREA       19.64  CROSS-SECTIONAL AREA
                     COQL         .60  COEFFICIENT
                     EXPL         .50  EXPONENT OF HEAD

258 SS        SPILLWAY
                     CREL       81.90  SPILLWAY CREST ELEVATION
                    SPWID         .00  SPILLWAY WIDTH
                     COQW         .00  WEIR COEFFICIENT
                     EXPW        1.50  EXPONENT OF HEAD

                                                    ***

                                          COMPUTED STORAGE-ELEVATION DATA

          STORAGE        .00      1.16     14.69     50.99    108.68
        ELEVATION      74.50     76.00     78.00     80.00     82.00

                                          COMPUTED OUTFLOW-ELEVATION DATA

          OUTFLOW        .00    144.90    153.26    162.65    173.25    185.34    199.24    215.40    234.40    257.09
        ELEVATION      74.50     76.85     77.13     77.46     77.86     78.35     78.94     79.69     80.65     81.90


                                      COMPUTED STORAGE-OUTFLOW-ELEVATION DATA
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STORAGE	.00	1.16	4.47	6.25	8.92	13.01	14.69	19.34	28.89	43.85
OUTFLOW	.00	115.75	144.90	153.26	162.65	173.25	176.81	185.34	199.24	215.40
ELEVATION	74.50	76.00	76.85	77.13	77.46	77.86	78.00	78.35	78.94	79.69

STORAGE	50.99	67.80	105.35	108.68
OUTFLOW	221.64	234.40	257.09	258.82
ELEVATION	80.00	80.65	81.90	82.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 0. TO 116.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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HYDROGRAPH AT STATION 6CSWP

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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
28	FEB	0100	1	0.	.0	74.5	28	FEB	0915	34	0.	.0	74.5	28	FEB	1730	67	166.	10.2	77.6
28	FEB	0115	2	0.	.0	74.5	28	FEB	0930	35	0.	.0	74.5	28	FEB	1745	68	164.	9.3	77.5
28	FEB	0130	3	0.	.0	74.5	28	FEB	0945	36	0.	.0	74.5	28	FEB	1800	69	160.	8.3	77.4
28	FEB	0145	4	0.	.0	74.5	28	FEB	1000	37	0.	.0	74.5	28	FEB	1815	70	156.	7.1	77.2
28	FEB	0200	5	0.	.0	74.5	28	FEB	1015	38	1.	.0	74.5	28	FEB	1830	71	151.	5.8	77.1
28	FEB	0215	6	0.	.0	74.5	28	FEB	1030	39	2.	.0	74.5	28	FEB	1845	72	144.	4.4	76.8
28	FEB	0230	7	0.	.0	74.5	28	FEB	1045	40	4.	.0	74.6	28	FEB	1900	73	132.	3.0	76.5
28	FEB	0245	8	0.	.0	74.5	28	FEB	1100	41	6.	.1	74.6	28	FEB	1915	74	121.	1.7	76.2
28	FEB	0300	9	0.	.0	74.5	28	FEB	1115	42	9.	.1	74.6	28	FEB	1930	75	85.	.9	75.6
28	FEB	0315	10	0.	.0	74.5	28	FEB	1130	43	12.	.1	74.7	28	FEB	1945	76	54.	.5	75.2
28	FEB	0330	11	0.	.0	74.5	28	FEB	1145	44	16.	.2	74.7	28	FEB	2000	77	50.	.5	75.1
28	FEB	0345	12	0.	.0	74.5	28	FEB	1200	45	20.	.2	74.8	28	FEB	2015	78	46.	.5	75.1
	FEB	0400	13	0.	.0	74.5	28	FEB	1215	46	27.	.3	74.9	28	FEB	2030	79	44.	.4	75.1
	EB	0415	14	0.	.0	74.5	28	FEB	1230	47	36.	.4	75.0	28	FEB	2045	80	41.	.4	75.0
28	FEB	0430	15	0.	.0	74.5	28	FEB	1245	48	52.	.5	75.2	28	FEB	2100	81	40.	.4	75.0
28	FEB	0445	16	0.	.0	74.5	28	FEB	1300	49	89.	.9	75.7	28	FEB	2115	82	38.	.4	75.0
28	FEB	0500	17	0.	.0	74.5	28	FEB	1315	50	130.	2.8	76.4	28	FEB	2130	83	37.	.4	75.0
28	FEB	0515	18	0.	.0	74.5	28	FEB	1330	51	155.	6.8	77.2	28	FEB	2145	84	36.	.4	75.0
28	FEB	0530	19	0.	.0	74.5	28	FEB	1345	52	167.	10.5	77.6	28	FEB	2200	85	36.	.4	75.0
28	FEB	0545	20	0.	.0	74.5	28	FEB	1400	53	172.	12.6	77.8	28	FEB	2215	86	35.	.4	75.0
28	FEB	0600	21	0.	.0	74.5	28	FEB	1415	54	175.	13.8	77.9	28	FEB	2230	87	34.	.3	74.9
28	FEB	0615	22	0.	.0	74.5	28	FEB	1430	55	176.	14.5	78.0	28	FEB	2245	88	34.	.3	74.9
28	FEB	0630	23	0.	.0	74.5	28	FEB	1445	56	177.	14.8	78.0	28	FEB	2300	89	33.	.3	74.9
28	FEB	0645	24	0.	.0	74.5	28	FEB	1500	57	177.	15.0	78.0	28	FEB	2315	90	33.	.3	74.9
28	FEB	0700	25	0.	.0	74.5	28	FEB	1515	58	177.	14.9	78.0	28	FEB	2330	91	32.	.3	74.9
28	FEB	0715	26	0.	.0	74.5	28	FEB	1530	59	177.	14.8	78.0	28	FEB	2345	92	32.	.3	74.9
28	FEB	0730	27	0.	.0	74.5	28	FEB	1545	60	176.	14.5	78.0	1	MAR	0000	93	31.	.3	74.9
28	FEB	0745	28	0.	.0	74.5	28	FEB	1600	61	176.	14.2	78.0	1	MAR	0015	94	31.	.3	74.9
28	FEB	0800	29	0.	.0	74.5	28	FEB	1615	62	175.	13.7	77.9	1	MAR	0030	95	31.	.3	74.9
28	FEB	0815	30	0.	.0	74.5	28	FEB	1630	63	174.	13.2	77.9	1	MAR	0045	96	30.	.3	74.9
28	FEB	0830	31	0.	.0	74.5	28	FEB	1645	64	172.	12.5	77.8	1	MAR	0100	97	30.	.3	74.9
28	FEB	0845	32	0.	.0	74.5	28	FEB	1700	65	170.	11.8	77.7							
28	FEB	0900	33	0.	.0	74.5	28	FEB	1715	66	168.	11.1	77.7							

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.00-HR
+ (CFS)	(HR)					
		(CFS)				
177.	14.00		165.	55.	55.	55.
		(INCHES)	1.656	2.191	2.191	2.191
		(AC-FT)	82.	108.	108.	108.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.00-HR

+ (AC-FT)	(HR)				
15.	14.00	11.	3.	3.	3.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.00-HR
+ (FEET)	(HR)				
78.02	14.00	77.58	75.44	75.44	75.44

CUMULATIVE AREA = .93 SQ MI

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RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	SUB7A	180.	12.50	40.	12.	12.	.13		
+	ROUTED TO	7ASWP	29.	13.75	28.	12.	12.	.13		
+									112.91	13.75
+	HYDROGRAPH AT	SUB7B	123.	12.75	35.	11.	11.	.12		
+	2 COMBINED AT	7AB	150.	12.75	62.	23.	23.	.25		
+	ROUTED TO	7BSWP	26.	20.50	26.	18.	18.	.25		
+									110.51	20.50
+	HYDROGRAPH AT	SUB7C	72.	12.50	16.	5.	5.	.05		
+	2 COMBINED AT	7BC	91.	12.50	39.	23.	23.	.30		
+	ROUTED TO	7CHNL	94.	12.50	39.	23.	23.	.30		
+									96.95	12.50
+	HYDROGRAPH AT	SUB7D	127.	12.50	31.	10.	10.	.10		
+	ROUTED TO	7DSWP	57.	13.25	28.	8.	8.	.10		
+									92.81	13.25
+	HYDROGRAPH AT	SUB7E	86.	12.25	14.	4.	4.	.05		
+	3 COMBINED AT	7CDE	178.	12.25	80.	36.	36.	.45		
+	ROUTED TO	7ECHN	129.	12.75	78.	34.	34.	.45		
+									91.09	12.75
+	HYDROGRAPH AT	SUB7F	279.	12.50	62.	19.	19.	.21		

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        2 COMBINED AT
+                          7EF       392.   12.50        139.        54.        54.        .66

        ROUTED TO
                          7FCHNL     393.   12.50        139.        54.        54.        .66
+                                          5  26      11.       .5    64.4 * 28 FEB 1530  59     327.      9.4    68.3 * 28 FE
  28 FEB 0730  27      11.       .5    64.4 * 28 FEB 1545  60     313.      8.9    68.2 *  1 MAR 0000  93      68.      2.2    65.5
  28 FEB 0745  28      11.       .5    64.4 * 28 FEB 1600  61     303.      8.6    68.1 *  1 MAR 0015  94      67.      2.1    65.5
  28 FEB 0800  29      11.       .5    64.4 * 28 FEB 1615  62     295.      8.4    68.1 *  1 MAR 0030  95      66.      2.1

        HYDROGRAPH AT
+                          SUB7H      252.   12.50         56.        17.        17.        .19

        2 COMBINED AT
+                           7GH       394.   12.50        206.        77.        77.        .91

        ROUTED TO
+                          7HSWP      226.   14.00        196.        76.        76.        .91
+                                                                                                  87.84      14.00

        HYDROGRAPH AT
+                          SUB8A       96.   12.25         21.         6.         6.        .08

        2 COMBINED AT
+                           7H8A      260.   12.50        215.        82.        82.        .98

        ROUTED TO
+                          8ASWP      231.   14.75        211.        82.        82.        .98
+                                                                                                  81.74      14.75

        HYDROGRAPH AT
+                          SUB8B      370.   12.50         92.        28.        28.        .33

        2 COMBINED AT
+                           8AB       546.   12.50        299.       110.       110.       1.31

        ROUTED TO
+                          8BSWP      533.   12.75        299.       110.       110.       1.31
+                                                                                                  81.32      12.75

        HYDROGRAPH AT
+                          SUB8C      145.   12.50         32.        10.        10.        .12

        2 COMBINED AT
+                           8BC       672.   12.50        329.       120.       120.       1.43

        ROUTED TO
+                          8CSWP      525.   13.00        326.       119.       119.       1.43
+                                                                                                  69.97      13.00

        HYDROGRAPH AT
+                          SUB6A       88.   12.75         25.         8.         8.        .10

        ROUTED TO
+                          6ASWP       18.   14.25         15.         5.         5.        .10
+                                                                                                  85.82      14.25

        HYDROGRAPH AT
+                          SUB6B      231.   12.25         46.        14.        14.        .18

        2 COMBINED AT
+                           6AB       231.   12.25         58.        19.        19.        .27

        ROUTED TO
+                          6BSWP       11.   23.00         10.         3.         3.        .27
+                                                                                                  80.83      23.00
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	HYDROGRAPH AT								
+		SUB6D	383.	12.75	110.	34.	34.	.42		
	ROUTED TO								
+		6DSWP	140.	13.50	108.	33.	33.	.42		
+									85.36	13.50
	HYDROGRAPH AT								
+		SUB6C	273.	12.50	61.	19.	19.	.23		
	3 COMBINED AT								
+		6BCD	377.	12.50	169.	55.	55.	.93		
	ROUTED TO								
+		6CSWP	177.	14.00	165.	55.	55.	.93		
+									78.02	14.00

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