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**Flood Protection
Study**

**Martin County,
Texas**



September, 1990

HDR

HDR Engineering, Inc.

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MARTIN COUNTY
FLOOD PROTECTION STUDY**

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EXECUTIVE SUMMARY

Martin County has experienced extensive flood damage in recent years. The difficulties began in 1986 when heavy rainfalls in the spring and fall of that year washed out many county roads. The county has spent nearly \$2.5 million repairing flood damaged roads from the events in 1986 (and to some extent), 1987, and 1988. The flood damage that was experienced in 1987 and 1988 can be indirectly related to the 1986 events which filled area playa lakes, which are natural lakes that usually provide considerable storage for runoff. Without the floodwater storage capacity that the playa lakes normally provide, flood damage was experienced from the smaller rainfalls that occurred in these years. The Martin County Flood Protection Study was undertaken to develop a plan to reduce flooding impacts on the county road system.

The study was sponsored jointly by Martin County and the Texas Water Development Board (TWDB). The TWDB provided a 50% matching grant for the study. The scope of the study was to 1) identify and describe flood hazards in the county, 2) examine alternatives and propose a flood protection plan, and 3) develop an implementation plan and schedule. Most of the flooding occurred in a 130-square mile area in the north central and northeastern part of the county in areas identified as Ackerly-Knott, Brown, Three League, and Valley View Road in the report.

A conceptual plan was developed to reduce flood damages for each of these areas and for a flood control structure on Sulphur Springs Draw. Through the development of flood hydrograph models of each area, it was found that the floodwater storage capacity of existing playas could be increased by constructing low dams across the outlets. There are a sufficient number of these playas and other sites that can be used to provide inexpensive additional floodwater storage volume. The increased storage capacity would be used to temporarily detain floodwater. The detained floodwater would be discharged over a period of several months at a low rate of flow not exceeding the capacity of the existing road ditch drainage system. Each structure would reduce flood damages to roads and cropland immediately downstream, and there would be an accumulative damage reduction as structures are distributed throughout the drainage area.

Whether the storage is created on an existing playa, or a detention basin is used where no playa now exists, the dam would be provided with a small diameter drain to discharge the stored runoff back into the road ditch following the storm. If this is not done, there is a chance that additional rainfall could cause the playas and other basins to overflow with much less rainfall, and damage roads, as happened following the 1986 events. In some cases, however, a dam is not required, and all that is needed to enhance the storage of an existing playa is to provide a small diameter (24-inch) outlet pipe to drain the playa down to the existing high water elevation after each storm.

The basins would only temporarily detain water, and there would be very few years, perhaps one in five, in which a significant percentage (more than 50 percent) of the total volume of the basin would be utilized. Most years would require less than 10 percent of the storage; and in many years, the flood event would not occur during the growing season. For some of the proposed basins, providing an outlet would actually reclaim or improve productivity of land in the reservoir area. This applies to land bordering playas that is frequently flooded and has no outlet at the present time.

In all, a total of \$1.5 million of improvements are proposed for these areas. The \$1.5 million would purchase a protection level of about a 25-year return period on the average, but would provide substantial protection to the 50-year level at a number of locations and

even beyond this at some locations. The primary monetary benefit of this plan is the reduction in damage to roads and bridges.

Secondary benefits of the flood protection plan that are difficult to quantify monetarily relate to improved vehicular movement in the county and a reduction in damages to cropland and private property. There would be fewer incidences of flooded or flood damaged roads interfering with farming, ranching, and oil field operations. Some cropland in areas downstream of proposed storage facilities would be flooded less frequently, although with currently available mapping, it is not possible to accurately determine the areal extent of the benefits. Also, perhaps a dozen homes and several businesses would experience reduced flooding. Though not precisely quantifiable, these benefits are important.

In an attempt to quantify additional benefits that might be derived from the improvements, irrigation economics and the possibility of using runoff water from the modified playas and detention basins for irrigation were also investigated in the study. The results indicate that irrigation is a good possibility, but water would be available only every other year, on the average. The possibility of supplementing the irrigation supply with groundwater was also investigated. This was also found to be a good possibility, but would require further study.

A dam on Sulphur Springs Draw was also studied. The study showed that such a dam could not be economically justified. The dam would cost about \$3 million to construct, but would not significantly reduce flood damages in the downstream reach. The storage volume (40,000 acre-feet) which can be developed at the site will not significantly reduce peak discharge rates, and therefore, little benefit can be gained downstream. The project might have some potential benefit as a water supply source, but investigation of this possibility was outside the scope of this study.

The flood protection plan, as proposed, would not eliminate damage to roads, but it could reduce annual flood damages by \$90,000 per year, on the average. The present worth of these damages for the next 50 years at a seven percent interest rate is \$1.25 million, which is nominally less than the estimated cost of the plan of \$1.5 million. However, several of the expenditures in the proposed plan may be reduced through irrigation trade-offs for flood easements and by not considering as a cost certain improvements that have already been made along Valley View Road. The estimated total value of these potential reductions is about \$0.25 million. This, coupled with the other difficult-to-quantify benefits and the potential for irrigation, allows the project benefits to outweigh costs, in general.

Implementation of the plan was outlined for the project. The plan considers possible sources of funds, institutional arrangements, schedules, and constraints. The primary source of funds is expected to be an allocation of existing general and road tax revenues to the project, or a new tax levy in the amount of approximately 4¢ per \$100 evaluation.

The project could be financed by general obligation bonds sold on the open market or to the Texas Water Development Board. Such bonds would be backed by local tax revenues. At a total project cost of \$1,500,000 and a 20-year, seven percent bond issue, the annual debt service would be \$142,000. Some additional costs would be incurred for engineering, legal, and financial services, which, if included in the bond issue, would increase the annual debt service. Also, the TWDB would require an environmental assessment if loan assistance is requested.

Alternatively, the county could implement this project over a period of 10 years by allocating an annual budget of \$150,000 out of general and road revenues to the project.

There is the possibility that the county could form a separate Stormwater Control District to implement the project, and thus separate this function from general operations. The disadvantage to this option is the additional administrative cost of establishing a new subdivision of the county government.

Regarding constraints, it appears that several permits may be required. A 404 Permit, also known as a dredge/fill permit, will likely be required, although the county may be eligible for a regional General Permit which is not nearly as difficult and costly to obtain as an individual permit.

The State may require a permit to construct the proposed dams for dam safety reasons. Furthermore, if the detained water will be used for irrigation, an impoundment or diversion permit may be required.

To summarize, if the flood protection is implemented, the following recommendations are made:

- Obtain the advice of a financial advisor and determine the best means to pay for or finance the improvements, including bonding alternatives;
- Whether financed by bonds or accomplished as a 10-year staged plan, the project is estimated to require an annual allocation of \$150,000 either from existing county tax revenues, or from a new county-wide tax levy of about 4¢ per \$100 assessed evaluation;
- Administer the program using present county administrative staff; or, create a Stormwater Control District encompassing all or part of the county to administer the program and provide for on-going maintenance of the system;
- Coordinate efforts with SCS for technical support, encouragement of repair and proper maintenance of terraces, and possible financial support of the projects;
- Submit a 404 Permit Application to initiate review of the project by COE;
- Determine status of proposed dams with respect to state dam safety criteria; and
- Explore means to reduce land acquisition costs by offering to insure basin owners against crop losses, or assisting with purchase of some part of irrigation equipment if irrigation is appropriate.

SECTION 1

SECTION 1 MARTIN COUNTY FLOOD PROTECTION STUDY

1.0 INTRODUCTION

Since 1986, areas in northern and eastern Martin County have experienced severe flooding problems. Excessive rainfall in 1986 caused many of the playa lakes in the county to fill and overflow. The overflow of the playa lakes, combined with general flooding, resulted in severe damage to county roads and restricted travel for several years in some locations. Martin County has been in the process of repairing these roads to this day.

The primary purpose of the study was to define and characterize existing flood problems in the county and to develop cost-effective plans to reduce flood damages in the future. The study was initiated by Martin County, which financed 50 percent of the study cost. The Texas Water Development Board provided the remaining 50 percent with a matching grant from the Water Research and Planning Fund.

This study was performed by HDR Engineering, Inc. The purpose of the study was to develop a regional flood protection plan for Sulphur Springs Draw and area playa lakes in Martin County. The study defines the frequency, extent, and cost of flooding in the area; evaluates alternatives and develops a conceptual plan to alleviate flooding problems; and provides an implementation plan that examines sources of funds, appropriate entities or special districts to sponsor projects, and recommends an implementation schedule.

1.1 HISTORY OF FLOODING

Martin County's flooding problems began in 1986 when excessive rainfall in May, June, September, and October of that year destroyed much of the County's cotton crop and inundated or washed out many state and county roads. An October 9, 1986 Martin County News article reported that nearly 75 percent of Martin County roads and fields were under water at some time during 1986 and 50 percent of the fields contained lakes by that time. Copies of this and other newspaper articles are included in Appendix A.

In June 1987, flood waters in Sulphur Springs Draw which were generated from areas in the northern part of the county as well as Dawson County to the north washed out a bridge on State Highway FM 846. Some flooding in Martin County occurred, but it was not as severe as in 1986. In 1988 excessive rains returned to the county, causing crop damages estimated at \$25 million by the U.S. Department of Agriculture's Agricultural Stabilization and Conservation Service. Although the rainfall was not as intense as in 1986, many of the area's playa lakes were still full from previous rainfall. Consequently, they overflowed, again causing significant damage to roads.

These continuing flood problems led to the formation of the Sulphur Springs Draw Study Group in 1988, which was initially composed of representatives from Martin, Dawson, and Howard Counties. After several meetings and a tour of the flooded area by elected officials and representatives of state agencies, representatives from Howard and Dawson Counties withdrew from active participation in the study group, apparently because the flooding problems were primarily in Martin County. Subsequently, Martin County proceeded with its own plan to study flood problems within the county. The county prepared and submitted an application for Texas Water Development Board funding, which resulted in this study.

1.2 SCOPE OF STUDY

Flooding has been reported primarily in the north and northeastern part of the county after every significant rainfall event in the past four years. The flood damage takes the form of washed-out roads, impeded traffic movement, and submerged roads, rangeland, and farmland. A few private homes, businesses, and oil and gas utilities have also experienced flood damage.

A principal function of a county is to maintain the county road system. Martin County staff estimates that in the four year period from 1986 to 1989, 58% of the county road funds were expended to repair flood-damaged roads, a total of approximately \$2.25 million. In addition, losses that are more difficult to measure have resulted from disruption of farming, ranching, and oil field activities, and temporary inundation of farmland. This study focuses on preventing the inundation and erosion of the county road system.

Flooding damage to roads has occurred primarily in the areas shown on Figure 1. Most of the damage occurred in the three chains of playa lakes in the county. Two are east of Sulphur Springs Draw (identified as the Ackerly-Knott area and the Brown area) and one is in the Three League area west of Sulphur Springs Draw. These areas constitute approximately 130 square miles of the county. Flood reduction plans were developed for these areas. The study also considered the Valley View Road area, which is also shown on Figure 1.

Damage to bridges and to some extent, crops, has also occurred on Sulphur Springs Draw. Part of this study was devoted to an investigation of a detention dam for flood control on Sulphur Springs Draw to reduce these damages.

Alternatives were investigated to determine cost-effective plans to alleviate flooding problems in the county. Costs were developed and compared to benefits.

Finally, an implementation plan was developed to consider: a) sources of funds; b) appropriate entities and special districts to sponsor projects; and c) an implementation schedule. Constraints to developing this plan were examined, such as 404 Permits and wetlands issues.

At the time this study was being performed, the county had been approved for participation in the Federal Flood Insurance Program for less than a year. No previous studies have been performed in the county for the purpose of establishing flood hazard areas or base flood elevations.

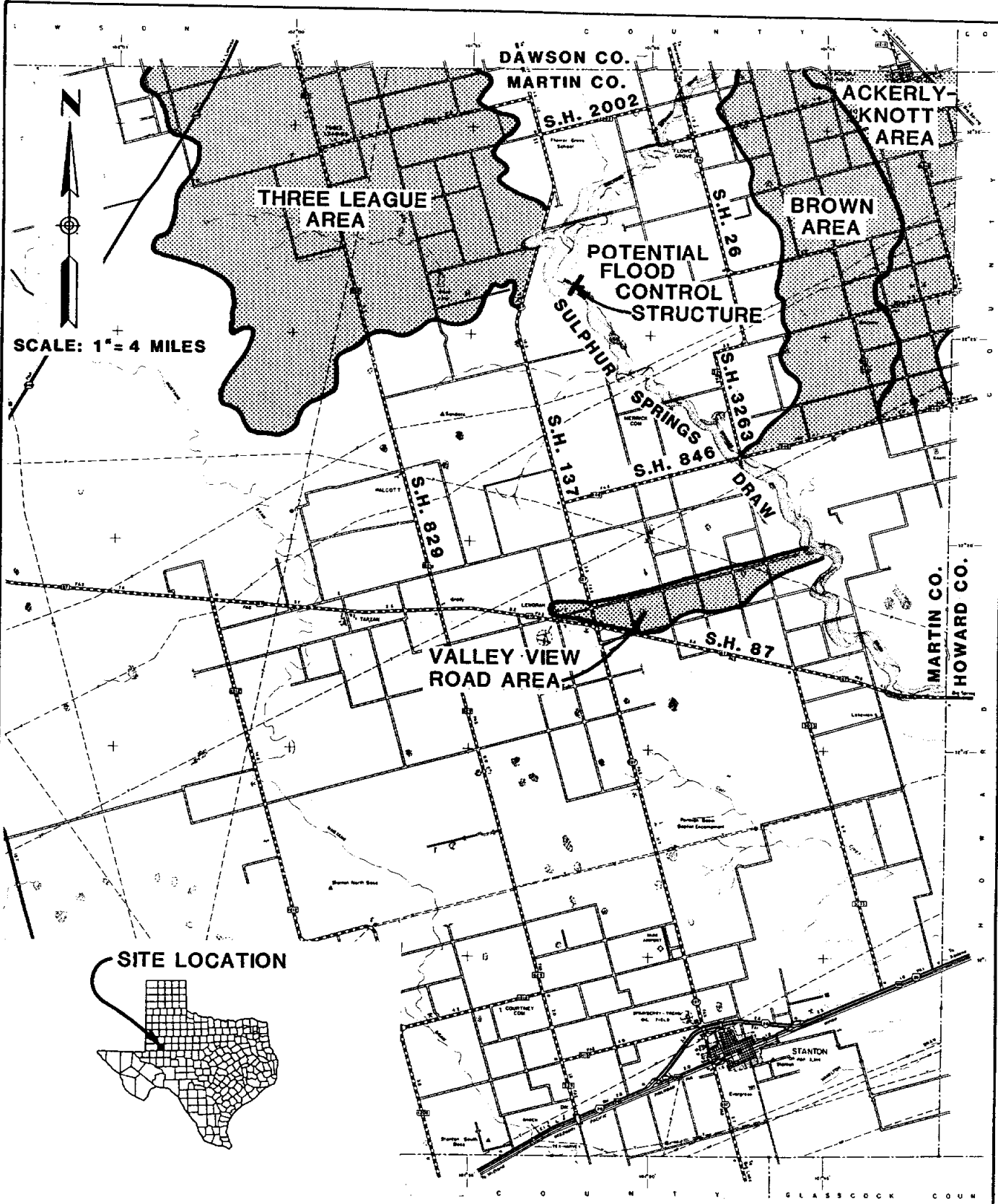
1.3 ORGANIZATION OF REPORT

Section 2 of the report provides a brief description of the study area in terms of hydrology and other factors. In this section, the various models which were used to evaluate alternatives are introduced.

Section 3 of the report provides a discussion of the alternatives considered and describes potential benefits considered in developing the flood protection plans.

Section 4 of the report is a presentation of the detailed conceptual plan for flood protection of the identified flood prone areas.

Section 5 presents an assessment of the viability of using stored flood water to irrigate cotton in the county.



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LOCATION MAP

MARTIN COUNTY FLOOD PROTECTION STUDY

JULY 1990

FIG. 1

Section 6 presents an implementation plan which considers finances, sources of funds, institutional arrangements, and constraints.

Section 7 is a summary of results and recommendations.

SECTION 2

SECTION 2 HYDROLOGY

This section describes the study area's hydrology and the development of hydrologic models used in the formulation of the plan for reducing the flood problems in Martin County.

2.1 DESCRIPTION OF STUDY AREA

Martin County is in the southern part of the High Plains region of Texas. About 300,000 acres of this farming county's 583,040 acres is cultivated. Cotton is the primary crop, along with minor crops such as alfalfa, grain sorghum, and small grains. The soils in much of Martin County are fine sandy loams which, when cultivated, are subject to excessive wind and water erosion.

Martin County has numerous naturally occurring playa lakes that influence farming practices and provide storage during runoff events. Playa lakes are natural depressions that fill periodically with runoff water and gradually dry up from the combined effects of evaporation and seepage. Most of the several hundred playas in Martin County encompass a surface area of less than 100 acres. The playas are generally farmed down to a visually discernable normal high water elevation. The playa bottom below the normal high water elevation has standing water or is moist even during extended dry periods.

Most playas do not have a defined outlet channel. When playas overflow, the outflow is a sheet flow unless the overflow point is near a road, in which case the playa spills out into the road ditch.

While the size and storage capacity of the playas varies, their generally significant storage capacity has allowed substantial portions of the Sulphur Springs Draw watershed to be considered noncontributing for storm frequencies up to and beyond the 100-year storm. In some locations in the Sulphur Springs Draw Watershed above Martin County, in excess of eight inches of rainfall is required to fill playas and produce runoff into the draw.

The average annual precipitation measured at the Lenorah weather station in Martin County is approximately 17 inches. The Lenorah gage registered a low annual precipitation of 5.29 inches and a high of 41.41 inches for the 1944 through 1988 time period. The high was experienced in 1986, which corresponds to the beginning of recent flooding problems in the area.

Much of the cultivated acreage of about 300,000 acres in the County is terraced. Terraces can be used to prevent water erosion, but if terrace end blocks are removed or not properly maintained, they can actually induce more frequent flooding and erosion of county roads. In addition, some terraces are used as diversions to prevent flow into playa lakes. This has a cascading effect in that farmers downstream are forced to construct low dikes along county roads to prevent road drainage from flooding their land. This further confines and concentrates flows in the roadway proper. By diverting runoff away from playas, the playa lakes' natural storage capacity is not used, increasing the frequency and magnitude of flooding of the county roads and downstream areas.

When the playas are full or nearly full, as they have been since 1986, the lack of storage intensifies flood damages from smaller storms. Therefore, flooding problems can be reduced by restoring natural playa storage and increasing the effectiveness of the playas to store stormwater.

It has also been noted that groundwater levels appear to have risen in recent years due to much higher annual rainfall amounts and subsequent deep percolation of excess soil moisture. Water table data provided by Martin County Underground Water Conservation District, although sparse, indicates that high groundwater levels may be keeping some playas wet in the study area.

Water quality grab samples were collected from a few selected lakes and streams in the study area. The samples were analyzed for total dissolved solids (TDS) and chlorides (CL) to determine if the water would be suitable for irrigation. Details on this investigation are explained in a later section.

2.2 HYDROLOGIC YIELD MODEL

A continuous simulation hydrologic yield model was developed for the 32 square mile Ackerly-Knott watershed in order to characterize precipitation and runoff patterns and playa lake fluctuation in the watershed and to assess the availability of water for supplemental irrigation from the playas. Daily precipitation and maximum and minimum temperatures for the 45-year time period from 1944 through 1988 were used as inputs to the model. This data was obtained from the Lenorah weather station since it is nearest to the study area.

The model utilizes daily weather records, namely precipitation and temperature, to calculate a complete moisture balance for the watershed, including runoff, infiltration, evaporation (or evapotranspiration), and deep percolation. In addition, a moisture accounting is performed for a pond or lake at the downstream end of the watershed. The lake receives runoff from the watershed, and the model assesses other inputs to and outputs from the pond, such as direct precipitation, evaporation, seepage, and overflow losses. Details of the basic model are presented in Appendix B.

Examination of both the precipitation inputs and runoff volumes calculated by the model reveal some interesting facts about the general hydrology of the area, which are discussed in the following sections.

2.2.1 Rainfall Patterns

A daily rainfall of 2.00 inches ($P_{2,24}$), which is approximately the two-year return period 24-hour rainfall, was used as the threshold amount of daily precipitation that will normally produce some runoff. Rainfalls exceeded $P_{2,24}$ in 26 of the 45 years. There was one extremely dry period from 1947 through 1956 during which the Lenorah gage recorded no daily rainfalls exceeding 2.00 inches.

There was also one wetter than normal period from 1980 through 1988 during which every year had at least one daily rainfall exceeding $P_{2,24}$. This cycle resulted in the recent flooding problems. In 1986, there were eight days in which $P_{2,24}$ was exceeded, one of which was 5.48 inches, which was the largest amount of daily rainfall for the 45-year period and equivalent to a 50-year return period event. The return period is defined as the average number of years between reoccurrences of this event or an event of a greater magnitude. Because these are random events, they do not occur in any predictable time sequence. However, over a long period of time, the average recurrence interval can be calculated, and this is defined as the return period.

2.2.2 Runoff Patterns

For each daily rainfall, the yield model estimates runoff, which is dependent upon soil type, vegetative cover, and soil moisture. Therefore, a particular rainfall will produce varying amounts of runoff depending upon wetness of soil when the rain occurs. For example, in three of the years that a $P_{2,24}$ or greater rainfall occurred, there was no runoff. In the four years in which a $P_{2,24}$ did not occur, there was runoff. However, these years only accounted for 11 percent of runoff, whereas the 23 years during which a $P_{2,24}$ occurred and produced runoff accounted for 89 percent of the runoff. There were 19 years in which no runoff occurred. This data is summarized in Table 1.

With the alternatives which considered modifying playas for flood protection, there is the possibility that stored runoff could be used as a supplemental irrigation water source. More on this subject is presented in Section 5. However, these model results indicate that runoff occurs in only about 60 percent of years, and in less than half the years, the volume of runoff would be sufficient to support supplemental irrigation.

2.3 SULPHUR SPRINGS DRAW FLOOD HYDROLOGY

The Sulphur Springs Draw watershed covers a vast area that crosses western Texas and extends into eastern New Mexico (Figure 2). The watershed encompasses approximately 1,267 square miles upstream of a potential flood control dam location in Martin County. The watershed is predominantly agriculturally based; most of the area is range, pasture land, or cultivated farm land. The topography of the watershed is relatively flat.

The elevation difference between the headwaters of the watershed in New Mexico and the potential dam location in Martin County is 2,110 feet. This elevation drop occurs over a distance of 138 miles, resulting in an average watershed slope of 15.3 feet per mile. Significant portions of the watershed have a large number of playa lakes. It was estimated that these playa lakes effectively control 886 square miles of the watershed, allowing little or no runoff to reach Sulphur Springs Draw. Playa lakes in the remaining 381 square miles also play a significant role in reducing the amount of runoff that reaches the main channel.

2.3.1 Hydrologic Model Development

One of the alternatives considered to reduce flooding damage in Martin County was a flood control dam located on Sulphur Springs Draw. In order to evaluate this proposed flood control dam, flood hydrographs were computed using a rainfall-runoff model which simulates the watershed's response to precipitation. The U.S. Army Corps of Engineers Flood Hydrograph Package, HEC-1 (HEC, 1988), was used to model the flood hydrology of the watershed. The model simulates the rainfall-runoff process and develops runoff hydrographs, peak discharges, and runoff volumes.

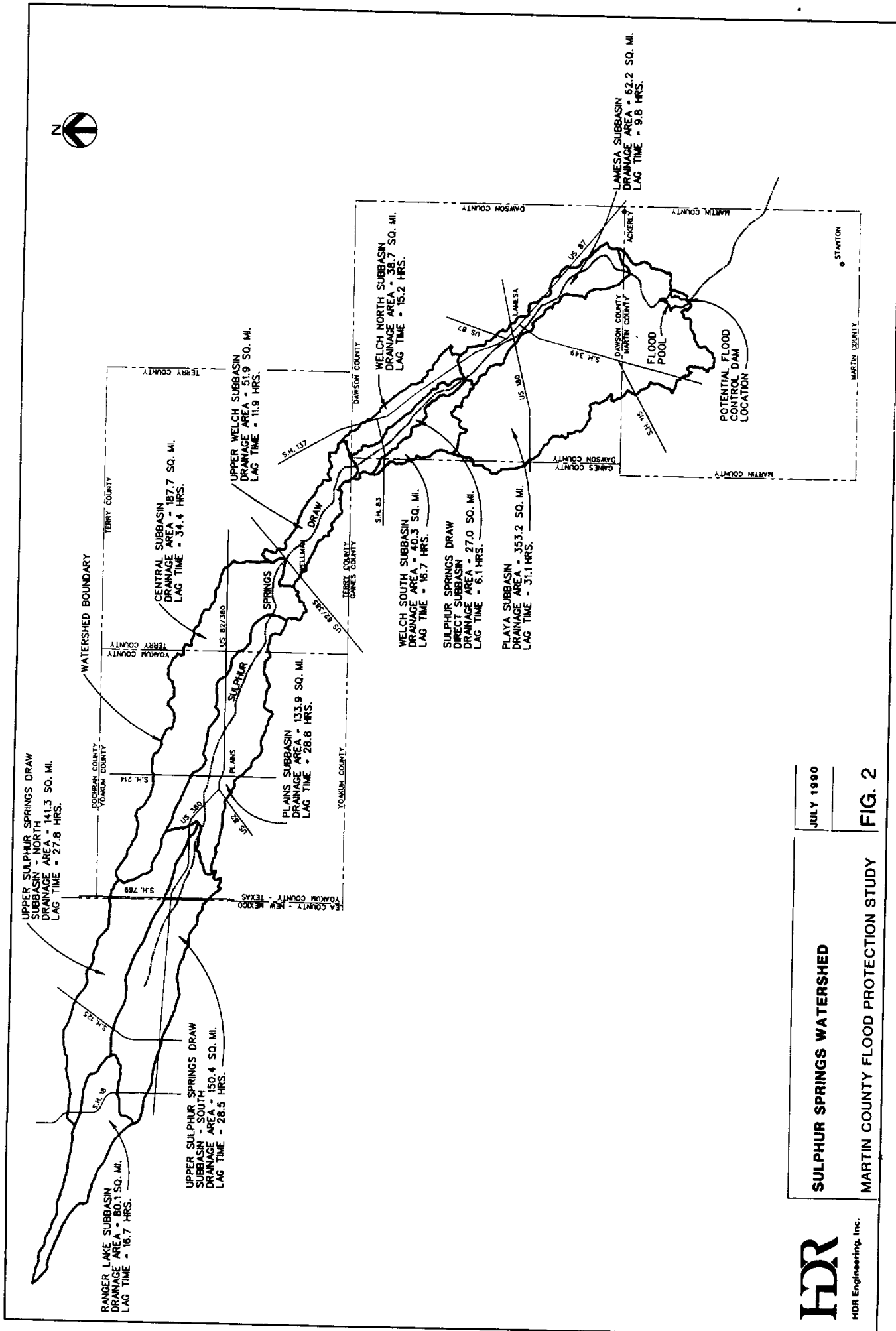
The HEC-1 model has numerous options for generating, connecting, and routing flood hydrographs. The Soil Conservation Service methodology was selected as the most appropriate option to generate flood hydrographs. Information required by the HEC-1 model includes:

- watershed area;
- precipitation amounts;
- runoff curve number;
- basin lag time; and
- channel routing parameters.

TABLE 1
ANNUAL PRECIPITATION AND ESTIMATED RUNOFF
(1944-1988)

Year	Total Precipitation (in.)	Estimated Total Runoff (in.)	Recorded Amounts Exceeding 2.00 in. in 24 hrs.
1944	13.70	0.09	2.25
1945	19.57	0.19	2.22
1946	13.76	1.07	5.35
1947	13.97	0.81	-
1948	5.24*	0.00	-
1949	14.76*	0.00	-
1950	9.90*	0.00	-
1951	7.60	0.00	-
1952	11.55	0.00	-
1953	10.38	0.00	-
1954	9.02	0.00	1.97
1955	12.26	0.00	-
1956	6.98	0.00	-
1957	28.15	0.62	3.75, 2.97
1958	18.45	0.14	-
1959	21.63*	0.19	2.88
1960	20.95	0.14	2.11, 2.07, 3.01
1961	20.21	0.14	2.91, 2.06
1962	20.63	1.18	3.14, 3.70
1963	15.62	0.00	-
1964	8.98	0.00	-
1965	13.37*	0.00	-
1966	23.73	0.08	2.67, 2.48
1967	10.00	0.00	-
1968	22.35*	0.31	2.40
1969	26.09	0.40	-
1970	14.74	0.10	-
1971	18.95*	0.05	2.38, 2.47
1972	14.89*	0.03	-
1973	13.79*	0.23	2.09
1974	25.10	0.82	2.04, 2.06
1975	23.79	0.26	2.17, 3.26
1976	17.07	0.00	-
1977	10.14	0.00	2.10
1978	19.52*	0.00	2.08
1979	16.60	0.07	2.80
1980	23.00	0.55	2.20, 2.17
1981	18.81	0.00	-
1982	16.65	0.00	-
1983	11.60	0.85	2.38, 2.28
1984	20.20	0.48	2.25, 4.33
1985	18.71	1.60	3.53
1986	41.41	3.15	2.00, 2.40, 2.37, 2.39, 5.48, 2.95, 2.59
1987	13.28*	0.00	2.25
1988	<u>20.28*</u>	<u>0.14</u>	2.18, 2.87
Annual Average	16.82	0.30	

*Years in which a month or more of data is missing. These years will underpredict rainfall by an estimated 3% on the average.



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FIG. 2

SULPHUR SPRINGS WATERSHED
MARTIN COUNTY FLOOD PROTECTION STUDY



2.3.2 Watershed Description

The watershed was subdivided into smaller areas called subbasins in order to create a more detailed hydrologic model. The subbasins modelled are listed in Table 2 along with corresponding drainage areas. Figure 2 shows the subbasin locations.

SUBBASIN	DRAINAGE AREA (SQ. MILES)
Ranger Lake	80.1
Upper Sulphur Springs Draw - North	141.3
Upper Sulphur Springs Draw - South Plains	150.4
Central Sulphur Springs Draw	133.9
Upper Welch	187.7
Welch North	51.9
Sulphur Springs Draw - Direct	38.7
Welch South	27.0
Lamesa	40.3
Western Sulphur Springs Draw	62.2
	353.2

2.3.3 Precipitation Amounts

In order to develop flood hydrographs for various return interval events, precipitation amounts that correspond with each of these return interval events were modelled using HEC-1. Point rainfall amounts for the two-year, five-year, 10-year, 25-year, 50-year, and 100-year storms were obtained from Weather Bureau TP-40 (1961) and National Weather Service HYDRO-35 (1977). These values were used in HEC-1 to develop design storms for determining runoff hydrographs. The storm rainfall was distributed using the "balanced storm" procedure in HEC-1, which creates a triangular shaped hyetograph from the given rainfall depths. Areal rainfall reduction factors were used in the model to reduce the point rainfall amounts to an average depth of rainfall for large watersheds. HEC-1 reduces the point rainfall amounts according to recommendations in Weather Bureau TP-40. A point rainfall depth versus duration summary for Martin County is given in Table 3.

To evaluate dam height and emergency spillway requirements, the probable maximum flood (PMF) was computed. The probable maximum precipitation (PMP) was used in HEC-1 to compute the probable maximum flood hydrograph. The PMP is defined as the greatest possible amount of precipitation for a given duration over a given size storm area at a geographic location. PMP amounts for the Sulphur Springs Draw watershed were obtained from Hydrometeorological Report No. 51, "Probable Maximum Precipitation Estimates - United States East of the 105th Meridian," a publication of the National Weather Service (1978). The maximum basin average precipitation for the Probable Maximum Storm (PMS) was determined using the computer program HMR52 (HEC, 1984), which computes the maximum basin average precipitation for the PMS by determining the critical storm-area size, orientation, centering, and timing which produces the maximum precipitation in accordance with the criteria in Hydrometeorological Report No. 52 (NWS, 1982). The 24-hour duration basin average PMP for the Sulphur Springs Draw watershed was calculated to be 12.13 inches, and the 72-hour duration PMP was

calculated to be 15.74 inches. It should be noted that these PMP values are averaged over the entire watershed. Portions of the watershed near the center of the storm experience much more rainfall than the basin average rainfall, while those portions farther away from the storm center experience less rainfall than the basin average. Rainfall depths for subbasins ranged from as little as four inches for those farthest away from the center to as much as 26 inches for those nearest the center.

**TABLE 3
POINT RAINFALL AMOUNTS FOR
MARTIN COUNTY, TEXAS**

Point Rainfall Depth (Inches)						
Storm Duration	2-Year Storm	5-Year Storm	10-Year Storm	25-Year Storm	50-Year Storm	100-Year Storm
5 minutes	0.42	0.51	0.58	0.67	0.75	0.82
15 minutes	0.80	1.00	1.20	1.40	1.50	1.70
1 hour	1.40	1.90	2.20	2.60	3.00	3.30
2 hours	1.60	2.20	2.60	3.10	3.40	3.80
3 hours	1.70	2.30	2.80	3.30	3.70	4.20
6 hours	2.10	2.80	3.40	3.80	4.40	5.10
12 hours	2.40	3.30	3.90	4.70	5.30	5.90
24 hours	2.80	3.90	4.60	5.30	6.10	6.90

2.3.4 Runoff Curve Number

The runoff curve number indicates the runoff potential of a hydrological soil-cover complex. The curve number is based on soil type, antecedent moisture condition, and land use. For each of the drainage basins listed in Table 2, a runoff curve number was determined based on the soil type and land use condition. The Sulphur Springs Draw watershed soils are predominantly characterized as hydrologic soil group B (SCS, 1972). These types of soils have moderate infiltration rates and consist of chiefly moderately deep to deep soils that are moderately well to well drained. Generally, these soils would be classified as silt loam or sandy silt loam.

For the two-year, five-year, 10-year, 25-year, 50-year, and 100-year flood events, average antecedent soil moisture conditions (AMC-II) were assumed. When evaluating the PMF, saturated soil moisture conditions (AMC-III) were assumed. In general, a runoff curve number of 74 was used for average runoff conditions and a runoff curve number of 88 was used for saturated runoff conditions throughout the watershed. Antecedent soil moisture is the soil moisture level assumed to exist at the time the storm occurs.

2.3.5 Basin Lag Times

The lag time, which is the length of time from the centroid of rainfall excess to the peak of the runoff hydrograph, determines the shape of the runoff hydrographs. The lag time is related to the basin length, shape, and slope. Lag times were computed for each of the Sulphur Springs Draw subbasins using procedures described in TR-55 (SCS, 1986). The lag times for each of the Sulphur Springs Draw subbasins are listed in Table 4.

**TABLE 4
SULPHUR SPRINGS DRAW SUBBASIN
LAG TIMES**

Subbasin	Lag Time (Hours)
Ranger Lake	16.7
Upper Sulphur Springs Draw - North	27.8
Upper Sulphur Springs Draw - South	28.5
Plains	28.8
Central Sulphur Springs Draw	34.4
Upper Welch	11.9
Welch North	15.2
Sulphur Springs Draw - Direct	6.1
Welch South	16.7
Lamesa	9.8
Western Sulphur Springs Draw	31.1

2.3.6 Channel Routing Parameters

Routing of flood flows through channel reaches was accomplished using the Muskingum channel routing option in HEC-1, which requires two input parameters: 1) travel time; and 2) Muskingum weighting factor. The travel time for each of the channel routing steps was computed using the measured channel length and an average channel velocity. The channel length was measured from U.S.G.S. 7.5 minute topographic maps, while the average channel velocity was determined using a hydraulic model (HEC-2; see Appendix D) developed for the lower portion of Sulphur Springs Draw. A Muskingum weighting factor of 0.2 was used for each of the channel routing steps.

2.3.7 Hydrologic Model Results

For the purpose of evaluating the potential dam site for flood control benefits, flood hydrographs for the 10-year, 25-year, 50-year, and 100-year flood events were computed along with the PMF. The results of the HEC-1 model at the potential dam site on Sulphur Springs Draw are presented in Table 5. The HEC-1 model and summary print-out are given in Appendix C.

**TABLE 5
HYDROLOGIC MODEL RESULTS**

Flood Event	Peak Flow (cfs)	Runoff Volume	
		(Acre -feet)	(Inches)
10-Year	9,879	52,719	0.78
25-Year	12,320	65,552	0.97
50-Year	16,008	85,775	1.27
100-Year	21,228	112,132	1.66
PMF	168,725	1,082,337	16.02

2.4 FLOOD HYDROLOGY OF FLOOD PRONE AREAS IN MARTIN COUNTY

For the purpose of developing detailed flood protection plans, the flood hydrology of three areas in Martin County was modelled using the HEC-1 flood hydrology package. The three areas are: 1) Ackerly-Knott; 2) Brown; and 3) Three League. The Ackerly-Knott and Brown areas are shown on Figure 3, and the Three League area is shown on Figure 4. These areas have all experienced serious flooding problems during and since 1986 and also have playa lakes that appear to offer a cost-effective means to reduce flood damage.

The basic modelling approach for each of these areas was similar to the approach taken for Sulphur Springs Draw discussed in the previous section. Each area was divided into smaller subbasins and point rainfall amounts for the two-, five-, 10-, 50-, and 100-year return interval rainfall events from Table 3 were applied to each subbasin. A runoff hydrograph was calculated for each subbasin using the "balanced storm" procedure in HEC-1 and the appropriate point rainfalls, runoff curve number, and basin lag times as discussed in Sections 2.3.3 through 2.3.5, respectively.

The hydrographs from individual subbasins were then routed and combined to produce hydrographs at selected design points. The model thus generated peak flow rates and volumes that were used to develop flood protection plans and to assess the level of protection that a particular plan provided. Computer print-outs of the HEC-1 models for these areas are included in Appendices E through H, respectively.

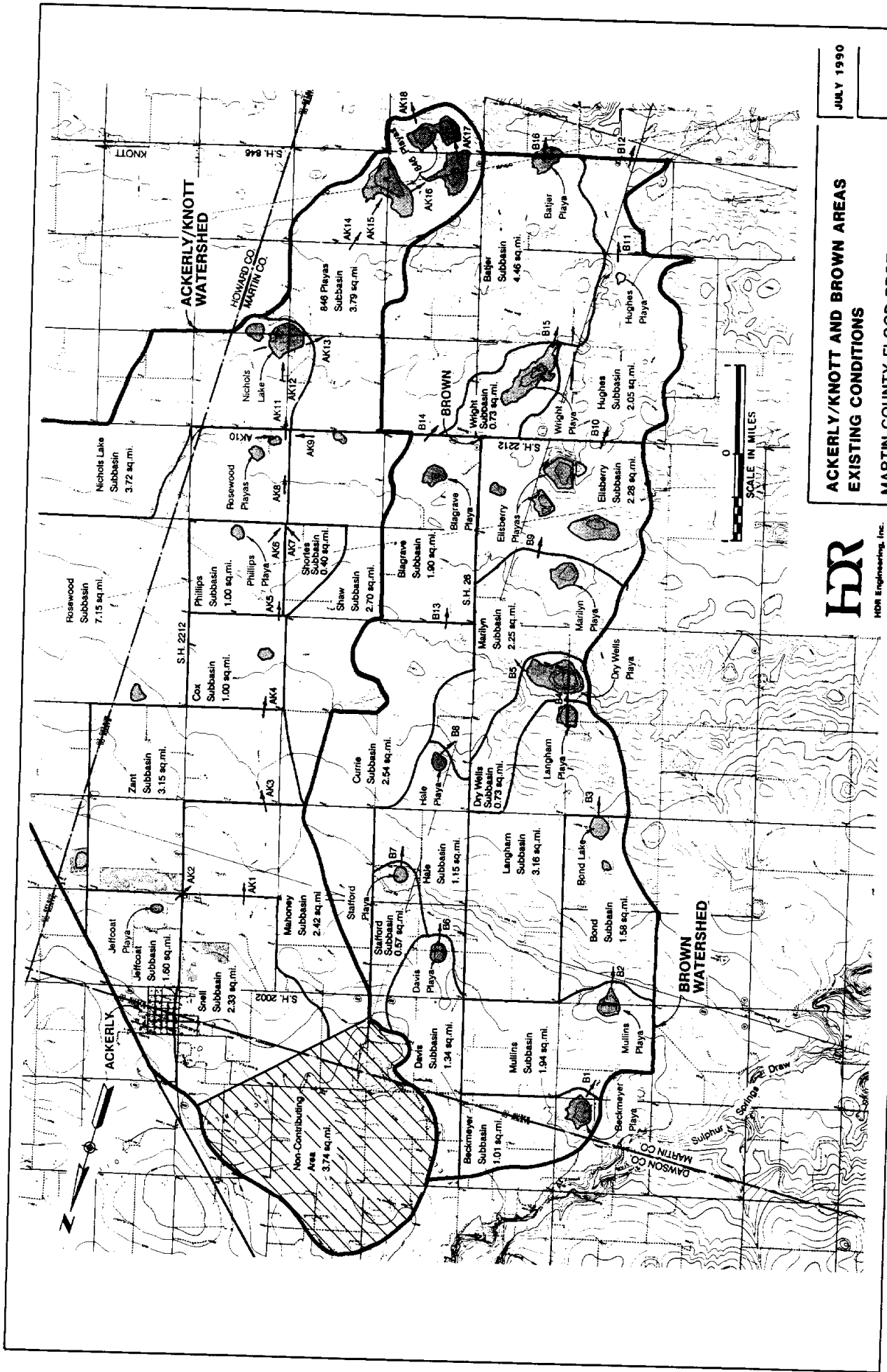
2.4.1 Ackerly-Knott Area

The Ackerly-Knott area experienced the most severe flooding in the county in the 1986 to 1988 time period. As can be seen in Figure 3, the area has a number of playa lakes that increase in size downstream from Ackerly to State Highway (SH) 846.

The area experiences flooding because the existing playa storage volume is not large and because of some particular farming operations. In some cases, diversion terraces have been used to divert runoff from the playas to the road ditches. There has also been some channeling in the fields to enhance drainage. However, road ditches serve as the primary drainage channels in the area, and the ditches are generally inadequate due to limited right-of-way. Because road ditches are inadequate, berms have been constructed along the roadways downstream to prevent flooding of fields. This further tends to concentrate flows within road right-of-way. Rainfalls in excess of two-year return period floods can cause significant damage to the unpaved country roads, especially if the storm occurs during wet conditions when soils are saturated and playas are full. These were the conditions during and following the heavy rainfalls in 1986, and they continued for about three years.

The playa lakes in this 32 square mile area provide only a limited storage capacity for excess runoff. Peak flow rates and volumes calculated by the HEC-1 model for two-, five-, 10-, 25-, 50-, and 100-year return periods for existing conditions are given later in Section 4. In most cases, the playas do not have sufficient storage to contain even a two-year event.

The existing storage capacity of playas is given in Table 6. These are rough estimates determined from five-foot contour interval USGS 7.5-minute maps prepared in 1966, which is currently the best available mapping for Martin County.



**ACKERLY/KNOTT AND BROWN AREAS
EXISTING CONDITIONS**



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FIG. 3

MARTIN COUNTY FLOOD PROTECTION STUDY

ACKERLY/KNOTT WATERSHED

BROWN WATERSHED

HOWARD CO. MARTIN CO.

DAWSON CO. MARTIN CO.

Non-Contributing Area 3.74 sq. mi.

Scale: 0 to 1 mile

North Arrow

Rosewood Subbasin 7.15 sq. mi.
Nichols Lake Subbasin 3.72 sq. mi.
Cox Subbasin 1.00 sq. mi.
Zant Subbasin 3.15 sq. mi.
Phillips Subbasin 1.00 sq. mi.
Phillips Play 0.40 sq. mi.
Shaw Subbasin 2.70 sq. mi.
Blagrove Subbasin 1.80 sq. mi.
Currie Subbasin 2.54 sq. mi.
Hale Subbasin 1.15 sq. mi.
Langham Subbasin 3.16 sq. mi.
Bond Subbasin 1.58 sq. mi.
Beckmeyer Subbasin 1.01 sq. mi.
Mullins Subbasin 1.94 sq. mi.

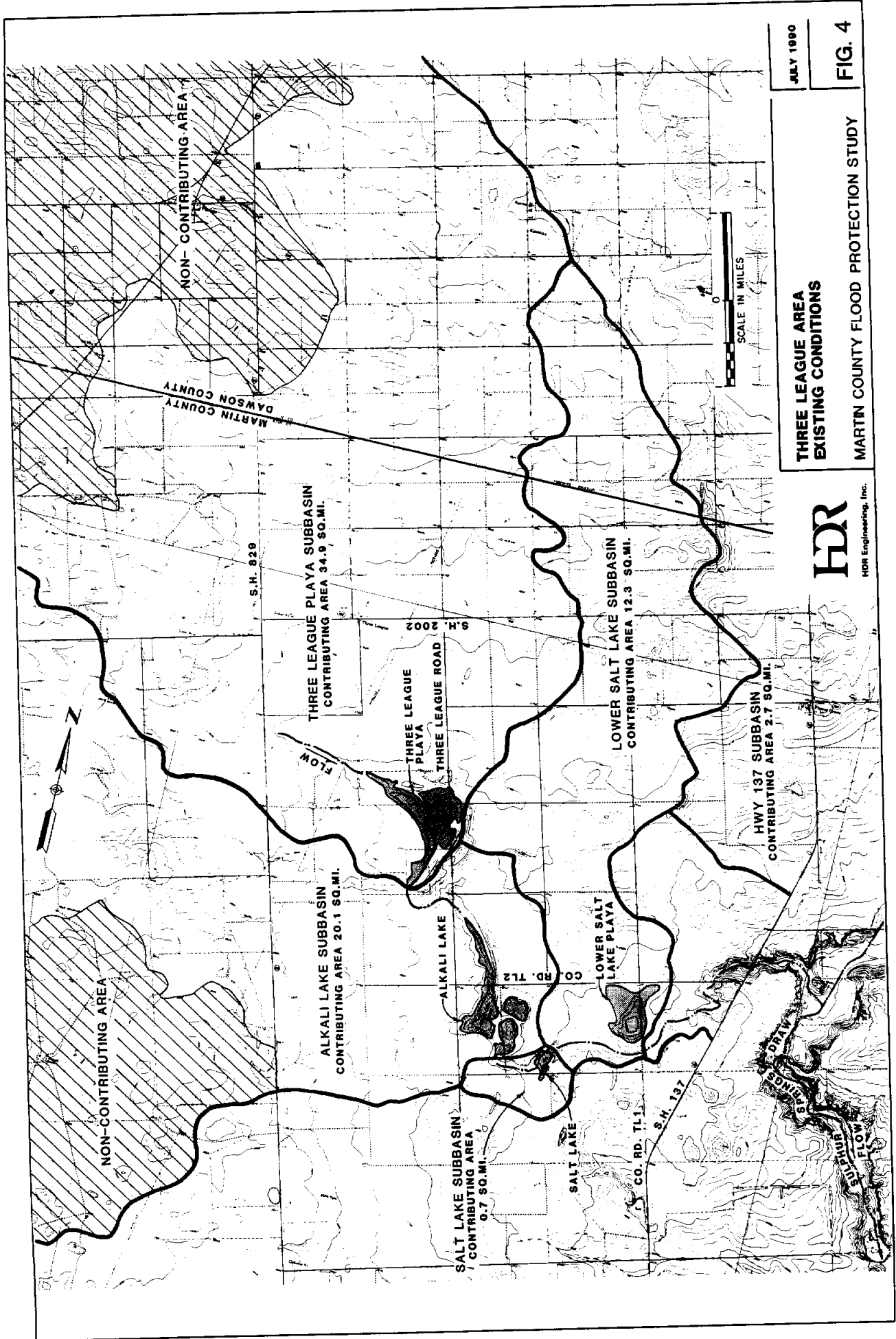
Nichols Lake 846 Playas 3.79 sq. mi.
Resewood Playas
Wright Subbasin 0.73 sq. mi.
Wright Playas
Hughes Subbasin 2.05 sq. mi.
Hughes Playas
Elisberry Subbasin 2.28 sq. mi.
Elisberry Playas
Marilyn Subbasin 2.25 sq. mi.
Marilyn Playas
Dry Wells Subbasin 0.73 sq. mi.
Langham Playas
Bond Lake
Mullins Playas
Beckmeyer Playas

Baljer Subbasin 4.46 sq. mi.
Baljer Playas
B11
B12
B13
B14
B15
B16
B17
B18

AK10
AK11
AK12
AK13
AK14
AK15
AK16
AK17
AK18
AK5
AK6
AK7
AK8
AK9
AK4
AK3
AK2
AK1

S.H. 846
S.H. 2212
S.H. 202
S.H. 28
S.H. 12
S.H. 11
S.H. 10
S.H. 9
S.H. 8
S.H. 7
S.H. 6
S.H. 5
S.H. 4
S.H. 3
S.H. 2
S.H. 1

Jeffcoat Playas
Jeffcoat Subbasin 1.60 sq. mi.
Sreell Subbasin 2.39 sq. mi.
Maroney Subbasin 2.42 sq. mi.
Starford Playas
Starford Subbasin 0.57 sq. mi.
Davis Playas
Davis Subbasin 1.34 sq. mi.
Mullins Playas
Beckmeyer Playas
Sulphur
Sulphur Draw



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FIG. 4

**THREE LEAGUE AREA
EXISTING CONDITIONS**
MARTIN COUNTY FLOOD PROTECTION STUDY

HR
HDR Engineering, Inc.

**TABLE 6
ACKERLY-KNOTT AREA
PLAYA STORAGE VOLUMES***

Playa Location	Volume (Ac-Ft)	Surface Area (Acres)
Jeffcoat Playa	0	0
Phillip Playa	0	21
Rosewood Playa	0	21
Nichol's Lake	388	72
SH 846 Playa A	357	110
SH 846 Playa B	216	66
SH 846 Playa C	<u>258</u>	<u>69</u>
Total	1219	359

* Natural storage above the normal high water elevation.

The total playa volume of 1219 acre-feet represents approximately 0.7-inch of runoff for the 32 square-mile watershed. However, about 90 percent of this storage is in the Nichol's and SH 846 playas at the south end of the area. The small playas in the upper part of the watershed either have no storage or the drainage into them has been diverted so the storage is not effective. The floodwaters eventually accumulate in the Nichols and SH 846 playas, which in July of 1990 were still partly full from the 1986 to 1988 events. The SH 846 playas have no natural outlet and SH 846 was flooded during this time period. The road has been raised several feet to reduce the potential for flooding in the future.

2.4.2 Brown Area

The Brown area is similar to the Ackerly-Knott area, except the flooding problems have not been as severe. This area has a larger number of playas that are more evenly distributed throughout the area, as shown in Figure 3.

Cultivated agriculture predominates in this area, similar to the Ackerly-Knott area and the entire northeast part of the county. The open-ended terraces and diversions away from the playas have had a flood damage impact on the local county road system, although not as serious as in Ackerly-Knott because there is a better distribution of natural storage in the area.

Peak flow rates and volumes for the two-, five-, 10-, 25-, 50-, and 100-year return periods for existing conditions are given in Section 4. The surface area and storage volume of playas in the Brown area are shown in Table 7.

2.4.3 Three League Area

The Three League area is west of Sulphur Springs Draw in north central Martin County. As shown in Figure 4, the area contains several large playas that presently provide significant storage of runoff. However, one of the contributing areas in this basin does not have playas and has added to flooding problems. This area is identified as Alkali Lake Subbasin.

**TABLE 7
BROWN AREA
PLAYA STORAGE VOLUMES***

Playa Location	Volume (Ac-Ft)	Surface Area (Acres)
Bechmeyer Playa	154	43
Mullins Playa	111	29
Langham Playa	114	28
Dry Wells Playa	526	96
Davis Playa	68	20
Stafford Playa	0	13
Hale Playa	0	14
Marilyn Playa	122	38
Blagrave Playa	76	27
Wright Playa	322	88
Ellsberry Playa	160	64
Hughes Playa	0	4
Batger Playa	0	4
Total	1672	509

* Natural storage above the normal high water elevation.

From 1986 to present, a number of county roads in this area have been damaged or have been underwater for extended periods of time. The county road identified as Three League Road in Figure 4 was diverted around the playa for several years until the county was able to build up the roadbed about five feet to maintain a dry crossing.

In this area, therefore, the primary flooding problem is that the existing playas extend across or along roads in several locations, resulting in road washouts or blockage from high water. Peak flow rates and volumes calculated by the HEC-1 model for two-, five-, 10-, 25-, 50-, and 100-year return periods for existing conditions are given at selected locations in Section 4. Again, it is noted that the playas in the area provide fairly large natural storage capacity (see Table 8).

**TABLE 8
THREE LEAGUE AREA
PLAYA STORAGE VOLUMES***

Playa Location	Volume (Ac-Ft)	Surface Area (Acres)
Alkali Lake	1182	199
Hughes Playa	168	24
Batger Playa	880	153
Total	2230	376

* Natural storage above the normal high water elevation.

2.4.4 Other Areas

In several meetings with the Martin County Commissioners Court, the areas experiencing flood problems were identified and discussed. The areas experiencing the greatest problems were modelled in detail as presented. Several other areas were considered in the flood protection plan, but were not modelled in as great a detail for various reasons. A summary of considerations and conclusions for these areas follows.

Valley View Drive Area. This area is shown on Figure 5. Valley View Road essentially becomes a free flowing channel during heavy storm events, transporting runoff generated along its right of way from the high point at Lenorah to Sulphur Springs Draw seven miles to the east. In this seven-mile distance, the road drops 300 feet in elevation. Unlike the areas previously discussed, this area has no playas and very few locations where storage could be created. Furthermore, farming operations have tended to divert overland flows from natural cross-field drainage courses to the road right-of-way. Over the years, this has resulted in the road becoming a major drainage channel. The road bed is eight to 12 feet below the natural grade (i.e., the elevation of abutting fields) for several miles of its length.

However, the county has undertaken projects to minimize the impact of frequent flooding on Valley View including deepening and widening the capacity of side ditches, (sometimes at the expense of up to one lane of roadway), paving intersections, and paving side slopes at intersections to form stabilized flow through sections. At the present time, the county is satisfied that these precautions will eliminate the problem of the road becoming impassible every time there is significant rainfall. Information which will be useful in sizing road ditches on Valley View Road is presented in Section 4.

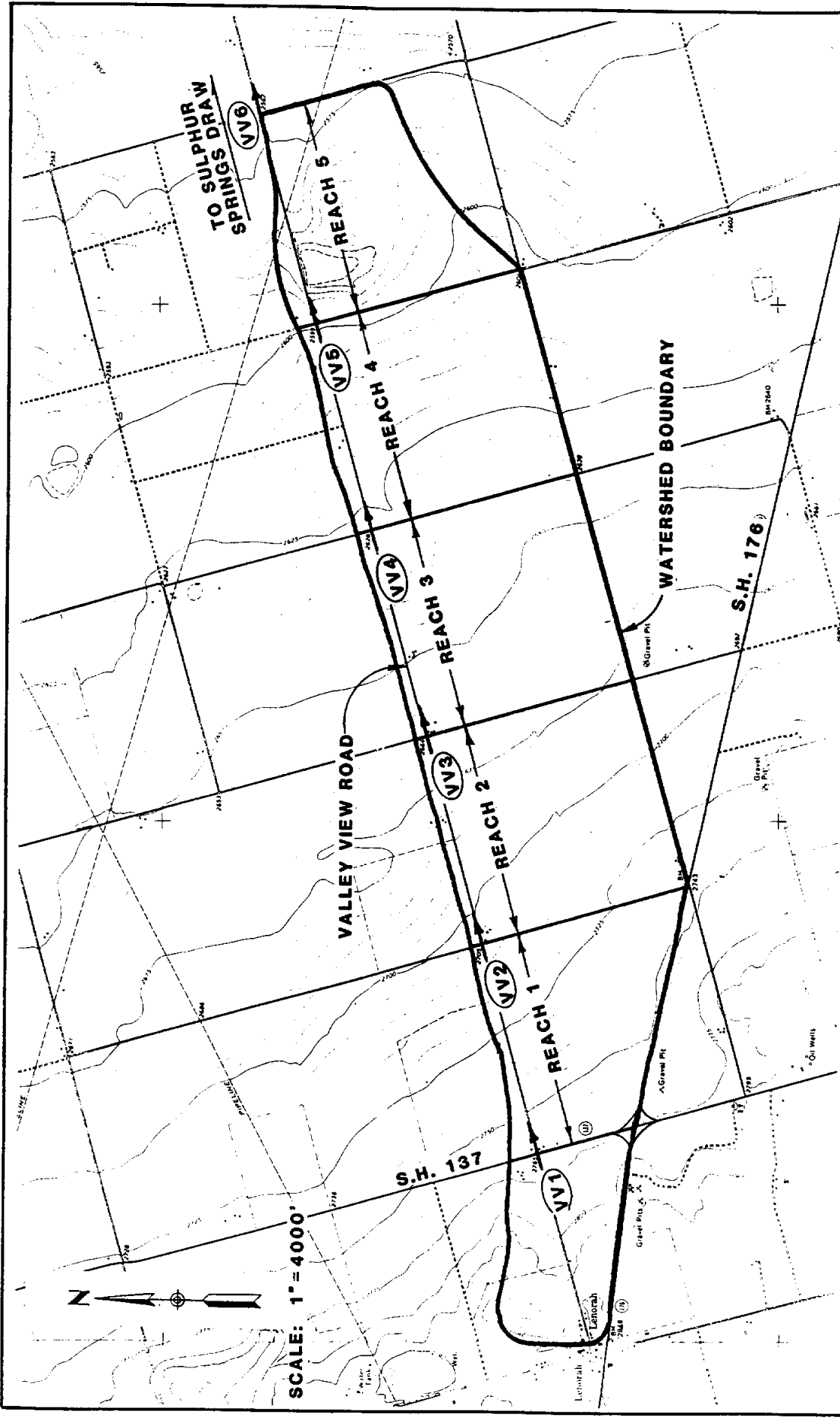
Because there are few locations in this area where storage could be inexpensively developed, the county is doing what it can, short of getting landowners to redirect runoff to natural channels, rebuilding and blocking terrace channels, and perhaps constructing stock tanks where it would benefit the farming operations.

It is noted that other east-west roads in this area also experience these problems, but to a much lesser extent than Valley View Road.

City of Ackerly. The City of Ackerly in the northwest corner of Martin County is divided by the Dawson-Martin county line. The city has a population of less than 400. The city has no storm sewer system, and the streets currently provide the main conveyance for flood flows. Therefore, streets flood whenever a significant rainfall occurs. Developing a detailed stormwater control plan for Ackerly was considered to be outside the scope of this study, other than to acknowledge that Ackerly is part of the Ackerly-Knott area that was modelled in detail, and stormwater flows from Ackerly were considered in the flood protection plan for the area to the south of Ackerly.

Three League Gin. The Three League area, which was previously discussed, derives its name from the community of Three League, which consists of a cotton gin and a number of homes and businesses.

Flooding is experienced in this area, but problems have been reduced since the State installed a series of 24-inch diameter culverts to convey floodwater from north to south across SH 2002. However, some flow originating from northwest of Three League still causes problems in the area. A plan to divert these flows away from this area is included in this study (see Section 4).



**VALLEY VIEW ROAD AREA
EXISTING CONDITIONS**

MARTIN COUNTY FLOOD PROTECTION STUDY

JULY 1990

FIG. 5



HDR Engineering, Inc.

State Highways. State highways in Martin County have also experienced damage in recent years. The Texas Department of Highways and Public Transportation has undertaken a number of projects, including the replacement and substantial improvement of the SH 846 crossing of Sulphur Springs Draw, the installation of culverts at many other locations, and the raising of roadways at a few locations. The improvements that are proposed in this study are therefore primarily directed toward improving the county road system. These improvements would not directly affect the state highway system, although there would likely be some indirect benefits in terms of the reduced conveyance requirements at some state highway drainage crossings.

SECTION 3

SECTION 3 PLAN FORMULATION

This section discusses the various alternatives and factors that were considered in developing a flood protection plan for Martin County. Topics presented in this section include structural and nonstructural approaches and benefit-cost analysis, which influenced the selected type and level of flood protection.

3.1 STRUCTURAL AND NONSTRUCTURAL APPROACHES

A comprehensive flood protection plan generally considers both structural and nonstructural approaches to problems and may ultimately be comprised of a combination of different alternatives. Structural controls consisting of dams, detention basins, channels, storm sewers, and levees are usually necessary in a flood protection plan. Nonstructural controls such as land use controls, purchase of flood prone areas, removing structures from flood prone areas, relocating residents, and flood-warning systems may or may not be applicable.

Martin County is a sparsely populated, rural area with fairly straightforward flooding problems. The primary issue is damage to and loss of use of county roads during and following a flood event. Therefore, certain structural and nonstructural controls are not applicable. In particular, nonstructural controls, such as zoning or subdivision regulations, would not be applicable in this rural setting, unless substantial development were to begin to occur.

Other than damage to roads, the losses due to floods have been damage to cultivated land. The United States Soil Conservation Service (SCS), through its watershed protection and erosion control programs, has for many years encouraged and cost-shared soil and water conservation practices to reduce flooding and erosion on farms. Therefore, this study does not consider flooding of private land, except for the leasing or purchase of land for storage of floodwaters, as part of the county road protection plan. Therefore, in developing the flood protection plan, efforts were directed to structural controls to reduce flooding of county roads.

3.2 BENEFIT-COST ANALYSIS

Flood protection plans are generally not considered to be economically feasible unless the benefits exceed the costs. Sometimes, this results in the conclusion that the only cost-effective alternative is to do nothing. For Martin County, the following factors were considered in the benefit-cost analysis.

3.2.1 Benefits

Martin County staff estimates that nearly \$2.25 million, or 58 percent, of the county's road funds in the past four years were spent to repair flood-damaged roads. Considering that some repairs are still being made, the county expenditures will likely exceed \$2.5 million by the end of 1990. The result has been the delay of normal noncritical maintenance and planned improvements of county roads. If the recent flooding is considered to be a 50-year recurrence interval event, the county could have afforded to spend \$50,000 per year on flood prevention in the past 50 years to avoid the recent flood losses. This is a simple approach which ignores the occurrence of flood damage in other years.

A more desirable way to calculate flood damages is to develop a damage cost-frequency curve. The area under such a curve represents the annual average damages incurred. The

difficulty of preparing a damage cost-frequency curve is in knowing what the actual damages were for at least several points on the frequency curve. This data does not exist for Martin County, and therefore must be estimated.

In the absence of data on actual flood damages, a method was derived to estimate historical flood damages. Utilizing the yield model results presented in Section 2.2 for the 45-year simulation period, simulated flood volumes for previous years were compared to the 1986 event, which was easily the most severe event in the 45-year period. Annual flood volumes were considered to be relatable to the level of flood damage that may have occurred. Synthetically generated annual flood flows for the Ackerly-Knott area from the yield model presented in Section 2 are tabulated in decreasing order of magnitude in Table 9.

Year	Annual Runoff Volume (acre-inches)	Rank n (N=45)	Assumed Probability P = n/N + 1
1986	64,997	1	0.022
1985	33,059	2	0.043
1962	24,439	3	0.065
1946	22,109	4	0.087
1983	17,613	5	0.109
1974	16,922	6	0.130
1947	16,804	7	0.152
1957	12,807	8	0.174
1980	11,322	9	0.196

Table 9 reflects that significant runoff occurred in only nine of the 45 years in the sequence. As previously mentioned, 19 years had no simulated runoff and for the remainder, less than 10,000 acre-inches were generated. Since these events were not expected to cause significant damage, they were not included in this analysis.

Table 9 can be interpreted as follows. The year 1986 had the largest runoff in 45 years; therefore, the probability that such an event will occur again in any given year is about two percent, or about once in 45 + 1 years. The ninth ranked volume, 1980, has a one in five chance (9/46) of occurring this year, or in any given succeeding year.

Since there was only one data point for damage cost related to storm events--that is, the 1986 runoff caused \$2.5 million in damages--an equation to relate runoff volume to damage cost was assumed, as follows:

$$D_{(x)} = D_{(86)} (R_{(x)}/R_{(86)})^{1.5}$$

in which $D_{(x)}$ is the damage cost for year X, $D_{(86)}$ is \$2.5 million, $R_{(x)}$ is the runoff volume for year X, and $R_{(86)}$ is the 1986 runoff volume.

Applying this equation to the runoff volumes in Table 8 results in the damage cost shown in Table 10 (Column 2). Since the annual damage cost is the total damage multiplied by the

probability that this will occur in a given year, the annual flood damages can be calculated as shown in Table 10. In this table, it is assumed that larger events than 1986 will occur, but would not cause damage in excess of \$2.5 million. Also, damages were assumed to be zero for years with runoff less than that for 1980. Both of these assumptions are conservative in that they tend to reduce the calculated total annual damage cost. Also, the equation reduces the damage costs calculated for events three through nine in Table 10.

**TABLE 10
ANNUAL ROAD DAMAGE COSTS FOR MARTIN COUNTY**

Year	Damage Cost	Probability	Incremental Probability	Damage Cost Average	Annual Damage Cost
1986	>2,500,000 \$2,500,000	0.022	0.022	\$2,500,000	\$55,000
1985	906,000	0.043	0.021	1,703,000	35,800
1962	576,000	0.065	0.022	741,000	16,300
1946	496,000	0.087	0.022	536,000	11,800
1983	353,000	0.109	0.022	425,000	9,400
1974	332,000	0.130	0.021	342,000	7,200
1947	329,000	0.152	0.022	330,000	7,200
1957	219,000	0.174	0.022	274,000	6,000
1980	181,000	0.196	0.022	200,000	4,400
			0.022	90,000	2,000
Total Annual Road Damages =					\$155,100

From this table, it can be concluded that Martin County may spend, on the average, about \$155,000 annually on road maintenance to repair flood damaged roads. However, the expenditures would occur periodically because a damaging storm event occurs only once in five years, on the average.

It can be further concluded that Martin County can afford to spend up to \$155,000 annually on flood protection projects to avoid periodic large expenditures to repair damaged roads, especially if the desired protection level is achieved in a number of years. The benefits will continue to accrue beyond the period of time that the flood protection projects are implemented.

Benefits that are much more difficult to quantify in monetary terms should also be considered. The flood protection plan will have significant impact on traffic movement in the county. There would be fewer occasions when farming, ranching, and oil field operations would be hampered by flooded roads. Although the primary benefit of the plan would be reduced damage to roads, there would also be some cropland that would be flooded less frequently. The mapping currently available in the county is not sufficient to

accurately determine the number of acres that might be affected, although the benefitted cropland would generally be downstream of proposed storage facilities (see Section 4).

3.2.2 Costs

Expenditures for flood protection are usually justified by comparing the expected benefits to the cost of improvements, and benefits should exceed cost in order to justify improvements. The cost of flood protection is proportional to the level of protection provided. That is, it costs more to provide a greater level of protection. And, the level of protection is usually stated as a return period, which relates to the frequency that a storm may be expected to occur.

In Section 2, hydrologic data on peak discharges and flood volumes were developed in terms of return periods (i.e., two-, five-, 10-, 25-, 50-, and 100-year). The two-year event reoccurs every other year, on the average, whereas the much larger 100-year event usually occurs only once in 100 years. Therefore, a flood protection plan for the two-year event would be far less costly than one for the 100-year event, but would only provide protection for the two-year events, and thus would not provide very large benefits.

Flood control structures are designed for a particular frequency depending upon the level of protection desired. But in addition to considering flood damages, safety and social issues such as inconvenience, loss of time, and quality of life must also be considered. For Martin County, it appears it is practical to attempt to reduce flood damages to a 10- to 50-year level. As will be seen in the following sections, this appears to be a realistically achievable level of protection. In Section 4, conceptual plans for a large structure on Sulphur Springs Draw and for various facilities in the modelled areas (Ackerly-Knott, Brown, Three League, and Valley View Drive) are developed and estimated costs are presented.

SECTION 4

SECTION 4 CONCEPTUAL FLOOD PROTECTION PLAN

4.1 GENERAL CONSIDERATIONS

Flood hydrology for Sulphur Springs Draw and three areas in the northeastern and north central part of the county was presented in Section 2. For the three modelled areas, the best flood protection approach would be to utilize and enhance existing storage to the maximum extent possible. This would be accomplished by constructing berms or low dams at the downstream ends of natural playas or other suitable sites to create detention basins to temporarily store excess floodwater. Each berm or dam would be provided with a small diameter outlet pipe that would gradually discharge stored water back into the drainage system at a rate that will not cause damage or exceed the capacity of existing ditches. The berms would be constructed with on-site material taken from the storage area. In some locations, only a small drain would need to be added to existing playas so the natural storage can be made available for the next storm. These systems will provide variable protection from a minimum of 10 years up to 50 years and even 100 years in a few locations.

A variation of this plan that could have economic and water conservation benefits is using the stored flood water to irrigate crops. This is viable where the storage is sufficient and water quality is acceptable. This possibility is explored in detail in Section 5.

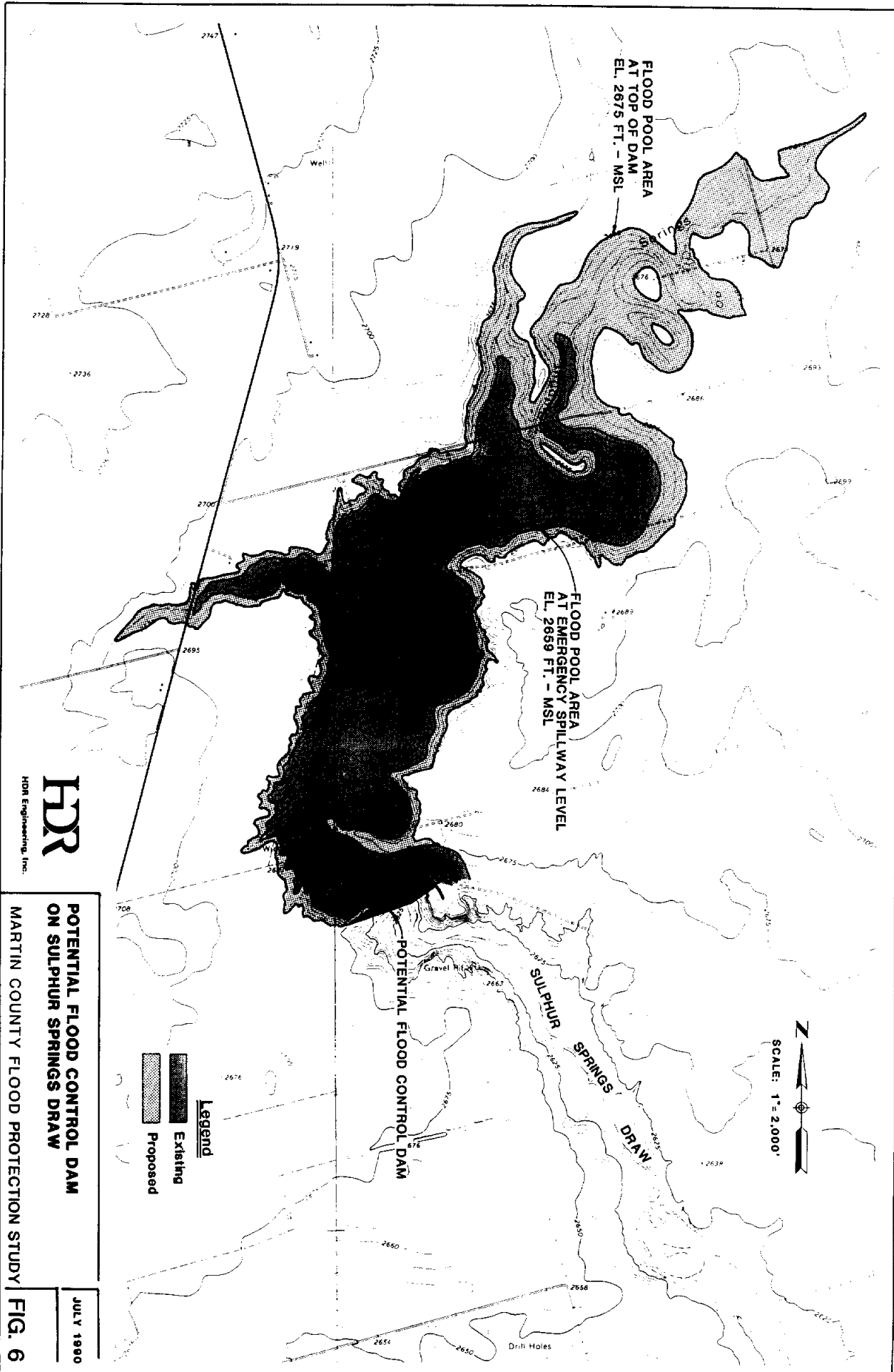
4.2 FLOOD CONTROL STRUCTURE ON SULPHUR SPRINGS DRAW

A potential flood control structure was evaluated on Sulphur Springs Draw southeast of the Three League area (Figure 6). The structure would consist of a flood control dam with a drop inlet type principal spillway and an earth/rock cut emergency spillway. Based on the topography of the site, the top of dam elevation would be approximately 2,675 feet-MSL. The principal spillway would retain a normal pool level of 2,630 feet-MSL. The emergency spillway would be approximately 1,000 feet in length at a crest elevation of 2,659 feet-MSL. The structure would have a flood control capacity between the principal spillway level and the emergency spillway level of 20,670 acre-feet. The total storage at the top of dam elevation would be approximately 42,472 acre-feet. The flood hydrographs summarized in Table 11 were routed through the proposed dam to determine the amount of flood flow reduction. As seen in the table, very little reduction is achieved for the 10-year flood event and even less reduction is achieved for the 25-year to 100-year flood events.

Because the justification for a flood control structure depends upon reduction of damages downstream, there appears to be little or no flood control benefit that can be derived from this structure.

A water surface profile model was developed for the stream downstream of the dam to the Martin County line using the U.S. Army Corps of Engineers HEC-2 Water Surface Profiles Program (HEC, 1982). The purpose of this model was to calculate flood levels with and without the dam to show how much flood plain would be removed for a particular flood. However, as the reductions were minimal, there is virtually no change in flood levels downstream, and therefore no benefit.

The only other possible benefits might be to the SH 846 and Romine crossings. However, both of these have been substantially improved since 1986 and would therefore not be benefitted by this structure.



FLOOD POOL AREA
AT TOP OF DAM
EL. 2675 FT. - MSL

FLOOD POOL AREA
AT EMERGENCY SPILLWAY LEVEL
EL. 2659 FT. - MSL

POTENTIAL FLOOD CONTROL DAM

SULPHUR SPRINGS DRAW

Legend

 Existing
 Proposed

N
 SCALE: 1" = 2,000'

HDR

HDR Engineering, Inc.

**POTENTIAL FLOOD CONTROL DAM
ON SULPHUR SPRINGS DRAW**

MARTIN COUNTY FLOOD PROTECTION STUDY **FIG. 6**

JULY 1980

**TABLE 11
SULPHUR SPRINGS DRAW
POTENTIAL FLOOD CONTROL STRUCTURE
SUMMARY OF RESULTS**

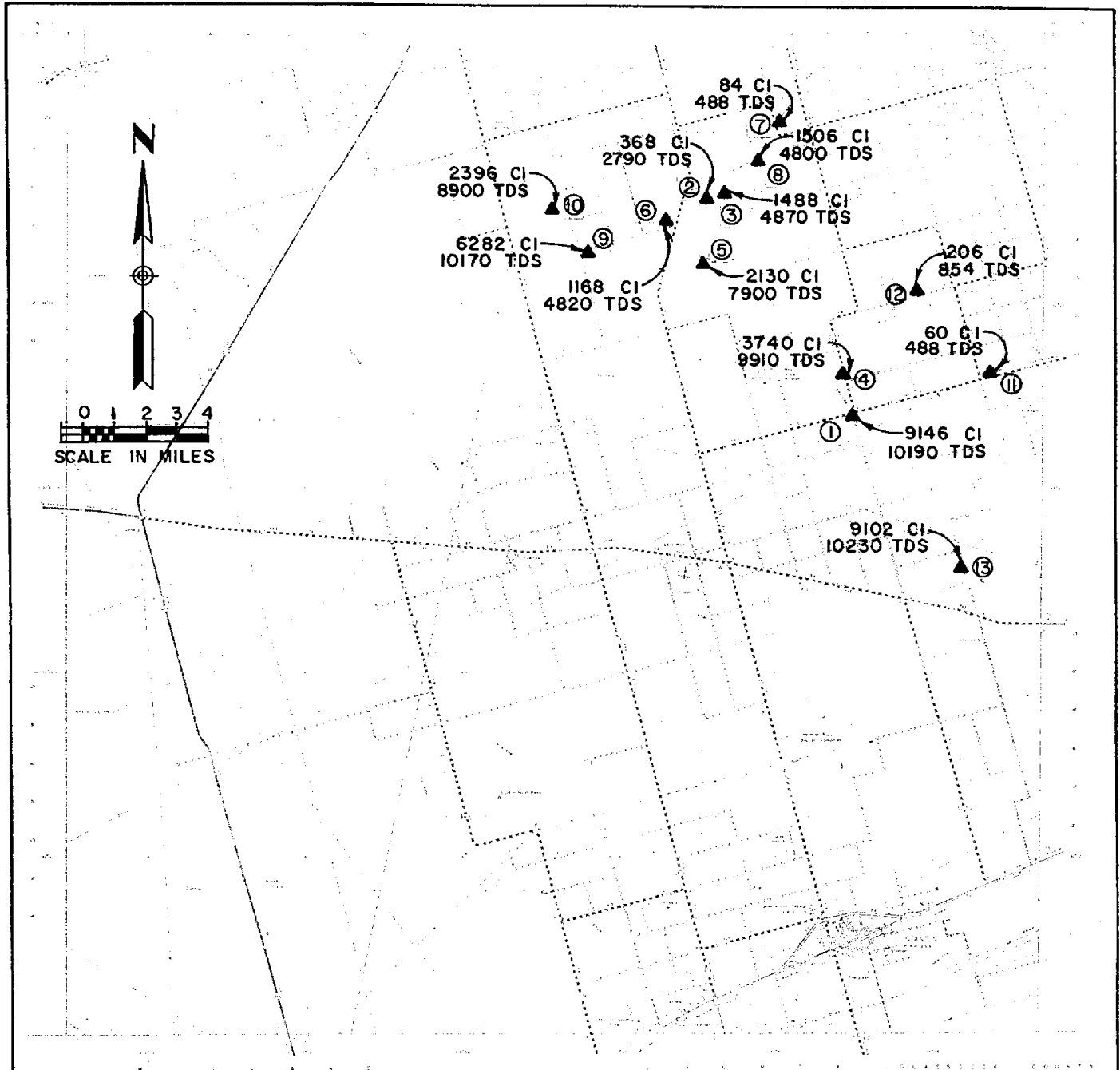
Flood Event	Peak Inflow (cfs)	Runoff Volume (Ac-ft)	Peak Outflow (cfs)	Peak Stage (ft-MSL)	Peak Storage (Ac-ft)	Peak Reduction (%)
10-Year	9,879	52,719	9,101	2661.4	24,833	8.0
25-Year	12,320	65,552	12,097	2661.8	25,458	2.0
50-Year	16,008	85,775	15,889	2662.4	26,175	1.0
100-Year	21,228	112,132	21,100	2663.1	27,067	0.5
PMF	168,725	1,082,337	168,494	2675.0	42,409	0.0
Reservoir Data:	Top of Dam Elevation = 2675.0 ft-MSL Principal Spillway Crest Elevation = 2630.0 ft-MSL Emergency Spillway Crest Elevation = 2659.3 ft-MSL Normal Pool Storage = 1446 Ac-ft Flood Storage = 20,668 Ac-ft					

A cost estimate for the dam was also made. Items considered in the estimate were the dam itself, the earth fill, excavation of emergency spillway, principal spillway, land acquisition, and engineering, environmental, and permitting costs. The estimated cost to design and construct this dam is \$3.0 million. There may be some possibility that the structure could be used for water supply or irrigation purposes. To give serious consideration to evaluating this structure for raw water storage was beyond the basic scope of this study, although the development of storage-elevation data and the cost of the dam provides some useful data to support a more detailed study. Of primary concern for water supply would be the potential yield of the watershed and water quality.

Water samples taken from the draw were tested for total dissolved solids and chlorides, and it was found that water in the draw may be suitable as a raw water supply. The results of the water quality survey are shown in Figure 7. The samples were taken during dry weather conditions from base flow in the Draw and from playas in the county. There may, therefore, be little comparison between the quality of these samples and the quality of flood flows. There is no known data available on either the quantity or quality of Sulphur Springs Draw flood flows.

4.3 ACKERLY-KNOTT AREA PLAN

The proposed plan for the Ackerly-Knott area is shown in Figure 8. The plan is to enhance the storage capacity of existing playas and provide detention basins at other suitable sites. The storage volume can be increased by constructing small berms or low dams at low points in the basin which generally occur at road intersections or where drainage channels or swales cross the roads. The source of fill for the berms would be locally excavated materials from the basin. Each basin would have a 24-inch diameter outlet pipe connected to a short riser in the reservoir to slowly discharge the temporarily detained floodwater back into the ditch system following a storm.



HDR Engineering, Inc.

**SULPHUR SPRINGS DRAW
WATER QUALITY SURVEY**

MARTIN COUNTY FLOOD PROTECTION STUDY

JULY 1990

FIG. 7

The entire system consists of nine detention basins or enhanced playas, the largest of which is the system of playas along SH 846 noted as 846 playas A, B, C, in Figure 8. Nichol's Lake is also quite large. The remaining playas or basins are much smaller but provide much needed flow reduction at road crossings immediately downstream. The estimated existing and proposed storage volumes and surface area of the proposed basins are compared in Table 12. Total temporary storage in the proposed system is increased from 1,219 acre-feet to 4,866 acre-feet, and the increase in surface area is approximately 909 acres. For basins which have existing playas, the outlet pipe would be placed above the normal high water level as determined by field observation. Following a storm, the basin contents would be evacuated down to the established existing high water level for the playa. For the basins that do not currently contain a playa, all of the temporarily detained water would be allowed to drain out.

**TABLE 12
ACKERLY-KNOTT AREA
PROPOSED DETENTION BASINS**

Storage Location	Existing Conditions		Proposed Conditions	
	Storage Volume (Ac-Ft)	Surface Area (Acres)	Storage Volume (Ac-Ft)	Surface Area (Acres)
Snell Detention Basin	0	0	68	41
Jeffcoat Playa	0	0	353	106
Mahoney Detention Basin	0	0	189	64
Zant Detention Basin	0	0	118	71
Cox Detention Basin	0	0	175	70
Phillip Playa	0	11	193	76
Rosewood Playa	0	21	433	220
Nichol's Lake	388	72	1145	174
846 Playa A	357	110	1539	281
846 Playa B	216	66	395	86
846 Playa C	<u>258</u>	<u>69</u>	<u>258</u>	<u>69</u>
Totals	1219	349	4866	1258

Because all of the basins would drain following a storm, the SH 846 playas would eventually receive all of the stormwater. However, there is no natural outlet for the 846 playas, so in order for these playas to drain back to normal high water, an outlet must be provided. Several alternatives were investigated, but the least expensive would be a 18-inch diameter outlet pipe from playa B draining west along the south right-of-way of SH 846 to a point where the pipe can discharge freely into a ditch channel. The ditch channel would be extended westerly from the pipe outlet to an existing channel that drains to Sulphur Springs Draw. The excavated material from the ditch channel would be used to construct a berm along the south edge of the ditch to prevent it from overflowing into the abutting fields.

The level of protection that this system provides was investigated using the HEC-1 model. In Table 13 the existing and proposed peak flows for two-, five-, 10-, 25-, 50-, and 100-year return periods are compared. Only key outflow points are given in Table 13 and locations are noted on Figure 8. This table shows that there are significant reductions in peak flows

TABLE 13
ACKERLY-KNOTT AREA FLOOD FLOWS
EXISTING AND PROPOSED CONDITIONS

Location	Drainage Area (Sq Mi)	Two-Year Flood		Five-Year Flood		10-Year Flood		25-Year Flood		50-Year Flood		100-Year Flood	
		Existing Peak Flow (CFS)	Proposed Peak Flow (CFS)	Existing Peak Flow (CFS)	Proposed Peak Flow (CFS)	Existing Peak Flow (CFS)	Proposed Peak Flow (CFS)	Existing Peak Flow (CFS)	Proposed Peak Flow (CFS)	Existing Peak Flow (CFS)	Proposed Peak Flow (CFS)	Existing Peak Flow (CFS)	Proposed Peak Flow (CFS)
Snell Outflow (AK1)	2.33	340	24	1006	245	1520	956	2077	1699	2625	2565	3152	2991
Jeffcoat Outflow (AK2)	1.60	227	12	669	23	1000	28	1360	32	1708	36	2035	40
Mahoney Outflow (AK3)	10.09	867	34	2674	90	3992	281	5414	596	6799	1169	8072	1914
Zant Outflow (AK4)	13.24	1209	30	3772	142	5569	444	7511	948	9605	1750	11632	2775
Cox Outflow (AK5)	14.24	1271	26	3902	56	5987	387	8214	850	10342	1590	12304	2616
Phillips Outflow (AK6)	1.00	171	7	483	17	709	21	958	24	1205	27	1436	30
Shortes Outflow (AK7)	0.45	87	87	249	249	373	373	504	504	624	624	752	752
Phillips/Shortes Outflow (AK8)	15.69	1327	87	4271	249	6352	421	8871	905	11283	1658	13565	2700
Shaw Outflow (AK9)	2.70	275	275	867	867	1326	1326	1819	1819	2297	2297	2756	2756
Rosewood Outflow (AK10)	7.15	526	54	1784	175	2697	260	3752	705	4712	1346	5663	2148
Rosewood/Shaw Outflow (AK11)	25.54	1946	317	6182	1036	9509	1574	13366	2160	16950	3342	20476	5405
Nichols Lake Inflow (AK12)	29.26	2183	625	7047	2013	10806	3089	15111	4286	19307	5466	23426	6603
Nichols Lake Outflow (AK13)	29.26	1848	50	6347	164	10142	589	14181	1572	18309	2813	22381	4718
County Road Crossing (AK14)	31.17	1894	287	6464	910	10333	1334	14536	1801	18660	2956	22994	4881
846 Playa A Inflow (AK15)	32.27	1929	440	6480	1397	10371	2054	14693	2850	18742	3600	23211	4968
846 Playa A Outflow (AK16)	32.27	1351	15	4883	75	8237	167	11997	365	15671	1292	19796	2346
846 Playa B Outflow (AK17)	32.58	1323	3	4797	24	8097	165	11829	361	15452	1279	19574	2318
846 Playa C Outflow (AK18)	33.05	1091	11	3907	42	6761	162	9938	350	13109	1218	16643	2234

for all outflow locations for all return periods up to 10 years and beyond. For many of the outflow points, the 25-year peak flow is reduced to less than the two-year existing peak outflow. In a few cases, even the 50-year peak flow is reduced to the two-year level. Significant reductions are also noted for the 100-year level, which in most cases is less than the five-year existing peak.

Because of the distribution of basins included in this plan, the level of protection is variable. In all cases, the protection level will exceed 10 years. Judging from the 100-year peak flow reductions, if this system were constructed, the area would rarely experience damages in excess of what would presently be caused by a five-year flood event.

For full benefits, all of the basins must be constructed. However, if one of the basins is not constructed, the next downstream basin could be increased in size to make up for the unavailable storage volume. This would not prevent the road immediately downstream of the unconstructed basin from being flooded, but it would maintain the overall level of protection.

An alternative was investigated to determine if excavating the basins to reduce surface area required for temporary storage was a viable alternative. The intent would be to excavate the lower portion of the basin and build up the perimeter with a terrace to reclaim (i.e., not flood) some of the land that would normally be periodically flooded.

A test case was examined to determine the excavation volume and area savings that could reasonably be accomplished. For the test in which the proposed basin storage volume was 190 acre-feet, approximately 40 acre-feet (64,500 CY) of earth could be moved out of the bottom of the basin to reduce the total surface area required from 64 to 40 acres. At \$1.00 per cubic yard excavation cost, the total cost of the excavation would be \$64,500, which removes 24 acres from the basin. The net benefit is only \$9,600 if the land is valued at \$400 per acre. Therefore, at these excavation costs, this procedure would not be cost effective.

Furthermore, it should be clarified that the basins would only temporarily detain water, and there would be very few years, perhaps one in five, in which a significant percentage (more than 50 percent) of the total volume of the basin would be utilized. Most years would require less than 10 percent of the storage; and in many years, the flood event would not occur during the growing season. Therefore, the area that would have been "reclaimed" in the above example would potentially experience a serious crop loss only once in 10 years or less.

A cost estimate is provided in Table 14 for the proposed plan for the Ackerly-Knott area. The total construction cost is estimated to be \$367,000. As shown at the end of the table, \$91,000 is included for the purchase of flood easements for the total intermittently flooded acreage of 909 acres for the proposed basins in Ackerly-Knott area. The total project cost is estimated to be \$458,000.

4.4 BROWN AREA PLAN

The proposed plan for the Brown area, which was also shown in Figure 8, is very similar to the Ackerly-Knott area plan. The area and storage volume of basins to be upgraded are given in Table 15, and the level of protection provided at key outlet locations can be found in Table 16. Because the existing playas in the Brown area are well distributed and have more natural storage than those in the Ackerly-Knott area, the only modification proposed for many of the playas is to provide a positive outlet in the form of a small channel to drain the playa down to the existing normal high water level. Thus, the storage will become available for the next storm event.

**TABLE 14
ACKERLY-KNOTT AREA PROPOSED PLAN
COST ESTIMATE**

Snell Detention Basin				
Item	Quantity	Units	Unit Cost	Total
Playa Dam (8' high) ³	6,520	¹ CY	\$2.00	\$13,040
Pipe Outlet (24")	34	² FT	\$20.00	680
Subtotal A				13,720
Miscellaneous (10%)				1,372
Subtotal B				15,092
Contingencies (15%)				<u>2,264</u>
Total Construction Cost				\$17,356
Jeffcoat Playa Expansion				
Item	Quantity	Units	Unit Cost	Total
Playa Dam (13' high)	9,260	CY	\$2.00	\$18,520
Pipe Outlet (24")	63	FT	\$20.00	1,260
Subtotal A				19,780
Miscellaneous (10%)				1,978
Subtotal B				21,758
Contingencies (15%)				<u>3,264</u>
Total Construction Cost				\$25,022
Mahoney Detention Basin				
Item	Quantity	Units	Unit Cost	Total
Playa Dam (12' high)	15,300	CY	\$2.00	30,600
Pipe Outlet (24")	70	FT	\$20.00	1,400
Subtotal A				32,000
Miscellaneous (10%)				3,200
Subtotal B				35,200
Contingencies (15%)				<u>5,280</u>
Total Construction Cost				\$40,480

Table 14 - Continued

Zant Detention Basin				
Item	Quantity	Units	Unit Cost	Total
Playa Dam (8' high)	11,000	CY	\$2.00	\$22,000
Pipe Outlet (24")	40	FT	\$20.00	800
Subtotal A				22,800
Miscellaneous (10%)				2,280
Subtotal B				25,080
Contingencies (15%)				<u>3,762</u>
Total Construction Cost				\$28,842
Cox Detention Basin				
Item	Quantity	Units	Unit Cost	Total
Playa Dam (8' high)	14,670	CY	\$2.00	\$29,340
Pipe Outlet (24")	58	FT	\$20.00	1,160
Subtotal A				30,500
Miscellaneous (10%)				3,050
Subtotal B				33,550
Contingencies (15%)				<u>5,033</u>
Total Construction Cost				\$38,583
Phillips Playa Expansion				
Item	Quantity	Units	Unit Cost	Total
Playa Dam (8' high)	8,101	CY	\$2.00	\$16,202
Pipe Outlet (24")	40	FT	\$20.00	800
Subtotal A				17,002
Miscellaneous (10%)				1,700
Subtotal B				18,702
Contingencies (15%)				<u>2,805</u>
Total Construction Cost				\$21,508
Rosewood Playa Expansion				
Item	Quantity	Units	Unit Cost	Total
Playa Dam (9' high)	26,240	CY	\$2.00	\$52,480
Pipe Outlet (24")	70	FT	\$20.00	1,400
Subtotal A				53,880
Miscellaneous (10%)				5,388
Subtotal B				59,268
Contingencies (15%)				<u>8,890</u>
Total Construction Cost				\$68,158

Table 14 - Continued

Nichol's Lake Expansion				
Item	Quantity	Units	Unit Cost	Total
Playa Dam (9' high)	13,362	CY	\$2.00	\$26,724
Pipe Outlet (24")	55	FT	\$20.00	1,100
Subtotal A				27,824
Miscellaneous (10%)				2,782
Subtotal B				30,606
Contingencies (15%)				<u>4,591</u>
Total Construction Cost				\$35,197
846 Playa A Expansion				
Item	Quantity	Units	Unit Cost	Total
Playa Dam (9' high)	2,300	CY	\$2.00	\$4,600
Pipe Outlet (24")	55	FT	\$20.00	1,100
Subtotal A				5,700
Miscellaneous (10%)				570
Subtotal B				6,270
Contingencies (15%)				<u>941</u>
Total Construction Cost				\$7,211
846 Playa B Outlet				
Item	Quantity	Units	Unit Cost	Total
Ditch Expansion	3,000	CY	\$2.00	\$6,000
Outlet Pipe (18")	2,700	FT	\$20.00	54,000
Inlet Structure	1	LS	\$7,000	7,000
Subtotal A				67,000
Miscellaneous (10%)				6,700
Subtotal B				73,700
Contingencies (15%)				<u>11,055</u>
Total Construction Cost				\$84,755
Total Estimated Construction Cost - Ackerly-Knott Area Alternatives				\$367,000
Total Easements 909 acres				\$91,000
Total Cost				\$458,000
Notes:				
1. Cubic Yards				
2. Feet				
3. Height listed is maximum height.				

The total estimated construction cost (Table 17) of the improvements is \$272,000, and a \$35,000 allowance is included for the purchase of 351 acres of flood easements. Thus, the estimated total cost is \$307,000.

**TABLE 15
BROWN AREA
PROPOSED PLAYA MODIFICATIONS**

Storage Location	Existing Conditions		Proposed Conditions	
	Storage Volume (Ac-Ft)	Surface Area (Acres)	Storage Volume (Ac-Ft)	Surface Area (Acres)
Bechmeyer Playa	154	43	154	43
Mullins Playa	111	29	124	30
Bond Lake	0	22	205	87
Langham Playa	114	28	114	28
Dry Wells Playa	526	96	526	96
Davis Playa	68	20	208	37
Stafford Playa	0	13	84	21
Hale Playa	0	14	114	33
Marilyn Playa	122	38	410	117
Blagrove Playa	76	27	184	51
Wright Playa	322	88	322	88
Ellsberry Playa	160	64	160	64
Hughes Playa	0	40	181	58
Currie Detention Basin	0	0	227	84
Batger Playa	<u>19</u>	<u>23</u>	<u>19</u>	<u>23</u>
Totals	1672	509	3032	860

4.5 THREE LEAGUE AREA PLAN

The proposed plan for the Three League area is shown in Figure 9. It differs from the previous plans in that the existing playas in this area are quite large and offer considerable opportunity for storage. Therefore, there are fewer and larger basins proposed for this area, and several roads must be raised or relocated.

Tables 18, 19, and 20 summarize the basin areas and volumes, level of protection, and costs, respectively. The total cost is estimated to be \$399,000, including \$27,000 for flood easements on 272 acres that would be intermittently flooded as a result of the construction.

**TABLE 16
BROWN AREA FLOOD FLOWS
EXISTING AND PROPOSED CONDITIONS**

Location	Drainage Area (Sq Mi)	Two-Year Flood		Five-Year Flood		10-Year Flood		25-Year Flood		50-Year Flood		100-Year Flood	
		Existing Peak Flow (CFS)	Proposed Peak Flow (CFS)	Existing Peak Flow (CFS)	Proposed Peak Flow (CFS)	Existing Peak Flow (CFS)	Proposed Peak Flow (CFS)	Existing Peak Flow (CFS)	Proposed Peak Flow (CFS)	Existing Peak Flow (CFS)	Proposed Peak Flow (CFS)	Existing Peak Flow (CFS)	Proposed Peak Flow (CFS)
Beckmeyer Outflow (B1)	1.01	55	9	198	19	321	23	464	27	601	30	748	43
Mullins Outflow (B2)	2.95	172	27	587	91	935	155	1321	255	1686	572	2081	944
Bond Lake Outflow (B3)	4.53	202	12	703	22	1173	139	1700	254	2217	465	2792	902
Langham Outflow (B4)	7.69	336	25	1091	201	1785	518	2538	779	3286	1053	4123	1924
Dry Wells Outflow (B5)	8.42	0	0	62	46	541	109	1231	386	2161	875	3234	1671
Davis Outflow (B6)	1.34	74	12	217	23	334	28	456	32	576	117	705	252
Stafford Outflow (B7)	0.57	46	8	146	17	224	22	309	26	388	29	471	32
Hale Outflow (B8)	3.06	153	17	464	28	733	51	1003	119	1269	234	1564	447
Marilyn Outflow (B9)	13.73	211	10	640	20	1031	25	1890	545	3285	1208	4926	2168
Ellsberry Outflow (B10)	16.01	273	8	866	17	1446	21	2053	31	3543	962	5354	1950
Hughes Outflow (B11)	18.06	331	20	1086	34	1844	36	2617	145	3892	970	5900	1976
SH 846 Outflow (B12)	18.53	338	46	1116	134	1892	200	2673	273	3932	986	5955	2004
Currie Outflow (B13)	2.54	108	23	296	28	454	32	607	135	768	308	949	515
Blagrave Outflow (B14)	4.44	172	25	490	35	771	38	1052	183	1343	420	1670	684
Wright Outflow (B15)	0.73	43	4	154	11	254	15	368	18	479	20	596	23
Bajfer Outflow (B16)	9.63	316	290	987	850	1531	1289	2123	1771	2686	2219	3366	2700

**TABLE 17
BROWN AREA PROPOSED PLAN
COST ESTIMATE**

Beckmeyer Playa Modification

Item	Quantity	Units	Unit Cost	Total
Channel Excavation	9,200	¹ CY	\$2.00	\$18,400
Pipe Outlet (24")	100	² FT	\$20.00	2,000
Subtotal A				20,400
Miscellaneous (10%)				2,040
Subtotal B				22,440
Contingencies (15%)				<u>3,366</u>
Total Construction Cost				\$25,806

Mullins Playa Modification

Item	Quantity	Units	Unit Cost	Total
Channel Excavation	4,200	CY	\$2.00	\$8,400
Pipe Outlet (24")	100	FT	\$20.00	2,000
Subtotal A				10,400
Miscellaneous (10%)				1,040
Subtotal B				11,440
Contingencies (15%)				<u>1,716</u>
Total Construction Cost				\$13,156

Bond Lake Expansion

Item	Quantity	Units	Unit Cost	Total
Playa Dam (6' high) ³	10,000	CY	\$2.00	\$20,000
Pipe Outlet (24")	100	FT	\$20.00	2,000
Subtotal A				22,000
Miscellaneous (10%)				2,200
Subtotal B				24,200
Contingencies (15%)				<u>3,630</u>
Total Construction Cost				\$27,830

Table 17 - Continued

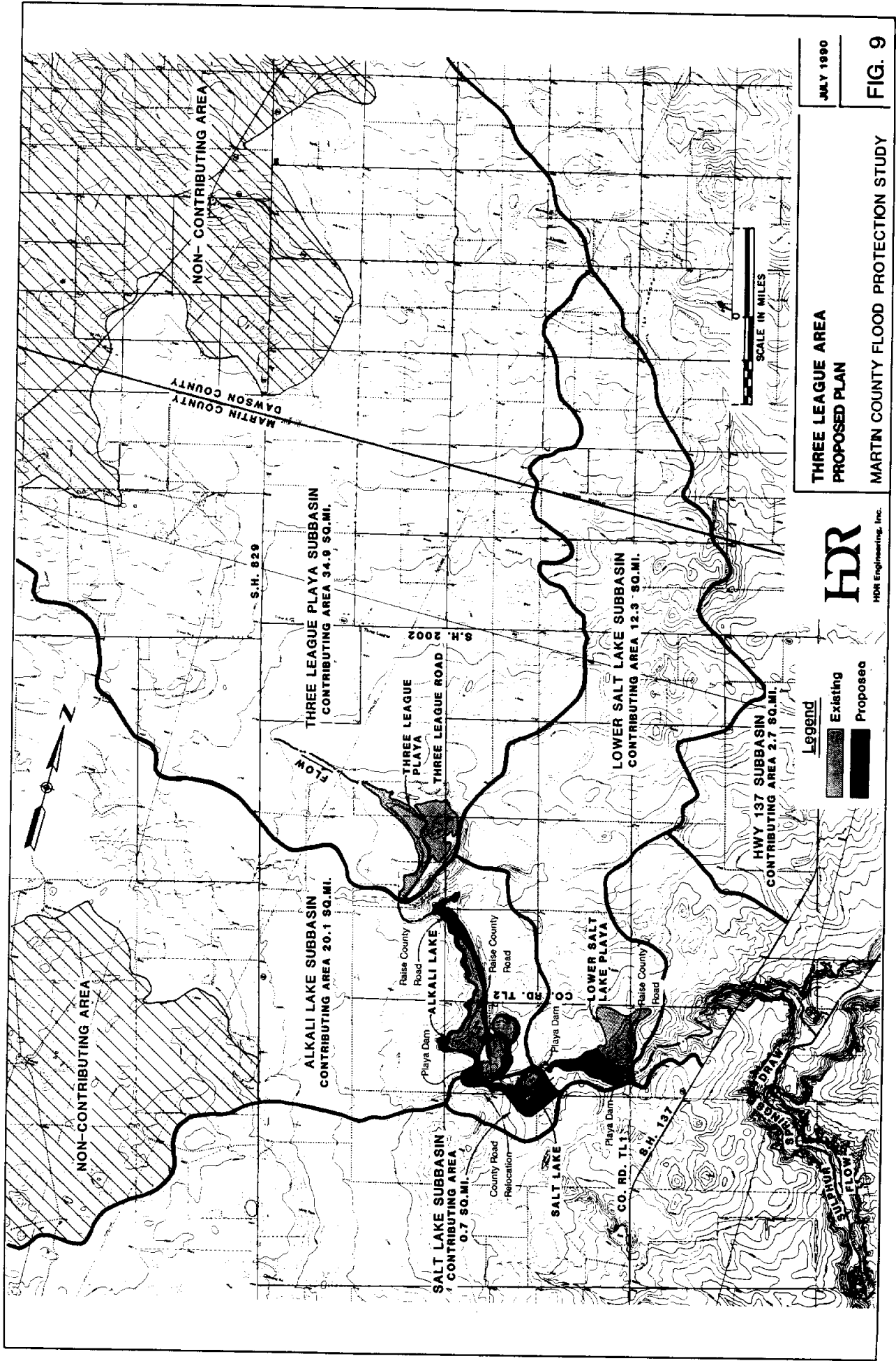
Langham Playa Modification				
Item	Quantity	Units	Unit Cost	Total
Channel Excavation	1,400	CY	\$2.00	\$2,800
Pipe Outlet (24")	50	FT	\$20.00	1,000
Subtotal A				3,800
Miscellaneous (10%)				380
Subtotal B				4,180
Contingencies (15%)				<u>627</u>
Total Construction Cost				\$4,807
Dry Wells Playa Modification				
Item	Quantity	Units	Unit Cost	Total
Channel Excavation	3,900	CY	\$2.00	\$7,800
Pipe Outlet (24")	100	FT	\$20.00	2,000
Subtotal A				9,800
Miscellaneous (10%)				980
Subtotal B				10,780
Contingencies (15%)				<u>1,617</u>
Total Construction Cost				\$12,397
Davis Playa Expansion				
Item	Quantity	Units	Unit Cost	Total
Playa Dam (6' high)	3,700	CY	\$2.00	\$7,400
Pipe Outlet (24")	60	FT	\$20.00	\$1,200
Subtotal A				\$8,600
Miscellaneous (10%)				\$860
Subtotal B				\$9,460
Contingencies (15%)				<u>\$1,419</u>
Total Construction Cost				\$10,879
Stafford Playa Expansion				
Item	Quantity	Units	Unit Cost	Total
Playa Dam (10' high)	17,600	CY	\$2.00	\$35,200
Pipe Outlet (24")	100	FT	\$20.00	2,000
Subtotal A				37,200
Miscellaneous (10%)				3,720
Subtotal B				40,920
Contingencies (15%)				<u>6,138</u>
Total Construction Cost				\$47,058

Table 17 - Continued

Hale Playa Expansion				
Item	Quantity	Units	Unit Cost	Total
Playa Dam (7' high)	3,200	CY	\$2.00	\$6,400
Pipe Outlet (24")	75	FT	\$20.00	1,500
Subtotal A				7,900
Miscellaneous (10%)				790
Subtotal B				8,690
Contingencies (15%)				<u>1,304</u>
Total Construction Cost				\$9,994
Marilyn Playa Expansion				
Item	Quantity	Units	Unit Cost	Total
Playa Dam (7' high)	6,400	CY	\$2.00	\$12,800
Pipe Outlet (24")	60	FT	\$20.00	1,200
Subtotal A				14,000
Miscellaneous (10%)				1,400
Subtotal B				15,400
Contingencies (15%)				<u>2,310</u>
Total Construction Cost				\$17,710
Ellsberry Playa Modification				
Item	Quantity	Units	Unit Cost	Total
Channel Excavation	5,600	CY	\$2.00	\$11,200
Outlet Pipe (24")	100	FT	\$20.00	2,000
Inlet Structure	1	LS	\$7,000	7,000
Subtotal A				20,200
Miscellaneous (10%)				2,020
Subtotal B				22,220
Contingencies (15%)				<u>3,333</u>
Total Construction Cost				\$25,553
Hughes Playa Modification				
Item	Quantity	Units	Unit Cost	Total
Playa Dam (10' high)	20,800	CY	\$2.00	\$11,200
Outlet Pipe (24")	100	FT	\$20.00	2,000
Inlet Structure	1	LS	\$7,000	7,000
Subtotal A				20,200
Miscellaneous (10%)				2,020
Subtotal B				22,220
Contingencies (15%)				<u>3,333</u>
Total Construction Cost				\$25,553

Table 17 - Continued

Currie Detention Basin				
Item	Quantity	Units	Unit Cost	Total
Detention Basin Dam	24,600	CY	\$2.00	\$11,200
Outlet Pipe (24")	100	FT	\$20.00	2,000
Inlet Structure	1	LS	\$7,000	7,000
Subtotal A				20,200
Miscellaneous (10%)				2,020
Subtotal B				22,220
Contingencies (15%)				<u>3,333</u>
Total Construction Cost				\$25,553
Wright Playa Modification				
Item	Quantity	Units	Unit Cost	Total
Channel Excavation	1,600	CY	\$2.00	\$11,200
Outlet Pipe (24")	100	FT	\$20.00	2,000
Inlet Structure	1	LS	\$7,000	7,000
Subtotal A				20,200
Miscellaneous (10%)				2,020
Subtotal B				22,220
Contingencies (15%)				<u>3,333</u>
Total Construction Cost				\$25,553
Total Estimated Construction Cost - Brown Area Alternatives				\$272,000
Total Drainage Easement 351 acres				\$35,000
Total Cost				\$307,000
Notes:				
1. Cubic Yards				
2. Feet				
3. Height listed is maximum height.				



Legend

- Existing (hatched pattern)
- Proposed (solid black)

Scale in Miles

Flow Direction

Subbasins and Contributing Areas:

- SALT LAKE SUBBASIN CONTRIBUTING AREA 0.7 SQ. MI.
- ALKALI LAKE SUBBASIN CONTRIBUTING AREA 20.1 SQ. MI.
- THREE LEAGUE PLAYA SUBBASIN CONTRIBUTING AREA 34.9 SQ. MI.
- LOWER SALT LAKE SUBBASIN CONTRIBUTING AREA 12.3 SQ. MI.
- LOWER SALT LAKE PLAYA SUBBASIN CONTRIBUTING AREA 2.7 SQ. MI.

Other Features:

- NON-CONTRIBUTING AREA
- DAWSON COUNTY
- MARTIN COUNTY
- RAISE COUNTY ROAD
- PLAYA DAM
- PLAYA DAM
- PLAYA DAM
- HWY 137 SUBBASIN CONTRIBUTING AREA 2.7 SQ. MI.
- EDWARDS DRAIN
- SUBSTRAIN FLOW
- S.H. 829
- S.H. 137
- CO. RD. TL1
- County Road Relocation

**TABLE 18
THREE LEAGUE AREA
PROPOSED DETENTION PONDS**

Storage Location	Existing Conditions		Proposed Conditions	
	Volume (Ac-Ft)	Surface Area (Acres)	Volume (Ac-Ft)	Surface Area (Acres)
Alkali Lake	1182	199	2519	343
Salt Lake	168	24	350	50
Lower Salt Lake Playa	<u>880</u>	<u>153</u>	<u>1223</u>	<u>255</u>
Totals	2230	376	4092	648

4.6 THREE LEAGUE GIN COMMUNITY

A plan to divert flood flows was developed for the Three League Community as shown in Figure 10. The plan consists of a flood channel to divert flood flows west and south around the SH 2002 intersection, across SH 2002, and then into the general drainage swale southwesterly from SH 2002. The channel dimensions required to pass the 10-year frequency flood of 900 cfs are: Bottom Width = 17 feet; Depth = 5 feet; Side Slope = 2H:1V; and Top Width = 37 feet. Other variations could be used. A large number of culverts would be required to pass the flow under SH 2002 because of the shallow drainage outlet available. It is estimated that five 36-inch diameter pipes would be required to pass the two-year discharge of 260 cfs, and 17 36-inch diameter pipes would be required to pass the 10-year flow. The estimated construction cost is presented in Table 21. The estimated cost to obtain 1.5 acres of drainage easement is \$600.

**TABLE 21
THREE LEAGUE GIN COMMUNITY PROPOSED PLAN
COST ESTIMATE**

Item	Length (FT)	Volume (CY)	Unit Cost (\$/CY)	Total
Excavation	1,200	6,400	\$2.00	\$12,800
Culvert (36" CMP)	1,700	N/A	\$30.00	<u>\$51,000</u>
Total				<u>\$63,800</u>
Contingencies (15%)				<u>\$9,600</u>
Total Construction Cost				<u>\$73,400</u>

4.7 VALLEY VIEW ROAD

As stated in Section 2, the Valley View Road right-of-way is essentially a flood channel whenever significant runoff occurs. Unlike the previous areas, the contributing basin does not have suitable locations for detention basins. Therefore, a plan including basins was not developed. Instead, the expected peak flows were calculated at key intersections (Table 22) and the channel requirements and costs (Table 23) to discharge the 10-year peak design flow were determined for the five reaches shown in Figure 5.

**TABLE 19
THREE LEAGUE AREA FLOOD FLOWS
EXISTING AND PROPOSED CONDITIONS**

Location	Drainage Area (Sq Mi)	Two-Year Flood		Five-Year Flood		10-Year Flood		25-Year Flood		50-Year Flood		100-Year Flood	
		Existing Peak Flow (CFS)	Proposed Peak Flow (CFS)	Existing Peak Flow (CFS)	Proposed Peak Flow (CFS)	Existing Peak Flow (CFS)	Proposed Peak Flow (CFS)	Existing Peak Flow (CFS)	Proposed Peak Flow (CFS)	Existing Peak Flow (CFS)	Proposed Peak Flow (CFS)	Existing Peak Flow (CFS)	Proposed Peak Flow (CFS)
Alkali Lake Inflow	53.53	1035	1035	3260	3260	6080	6080	10254	10254	14826	14826	19794	19794
Alkali Lake Outflow	53.53	0	0	1739	121	4813	1405	8039	3688	12024	6412	16651	10159
Salt Lake Inflow	55.72	82	82	1754	219	4841	1416	8094	3712	12095	6462	17318	10218
Salt Lake Outflow	55.72	68	68	1567	99	4469	1268	8094	3519	12069	6234	17289	9879
Lower Salt Lake Inflow	67.99	N/A	150	N/A	385	N/A	1295	N/A	3641	N/A	6472	N/A	10252
Lower Salt Lake Outflow	67.99	N/A	48	N/A	59	N/A	87	N/Q	2015	N/A	4390	N/A	7236
Oil Well Rd TL1	67.99	48	48	1575	59	4486	87	8143	2015	12121	4390	17371	7236
County Road TL2	70.66	177	147	1633	438	4619	671	8456	2053	12580	4503	18064	7416

**TABLE 20
THREE LEAGUE AREA PROPOSED PLAN - COST ESTIMATE**

Alkali Lake Expansion

Item	Quantity	Units	Unit Cost	Total
Playa Dam (10' high) ³	6,370	CY ¹	\$2.00	\$12,741
Raise County Rd@U/S End	5,769	CY	\$5.00	28,843
Raise Co Rd Intersec.	7,778	CY	\$5.00	38,889
Raise Co Rd W of Alkali Lake	2,722	CY	\$5.00	13,611
Culverts - 36" CMP	680	FT ²	\$30.00	20,400
Subtotal A				114,484
Miscellaneous (10%)				11,448
Subtotal B				125,932
Contingencies (15%)				<u>18,890</u>
Total Construction Cost				\$144,822

Salt Lake Expansion

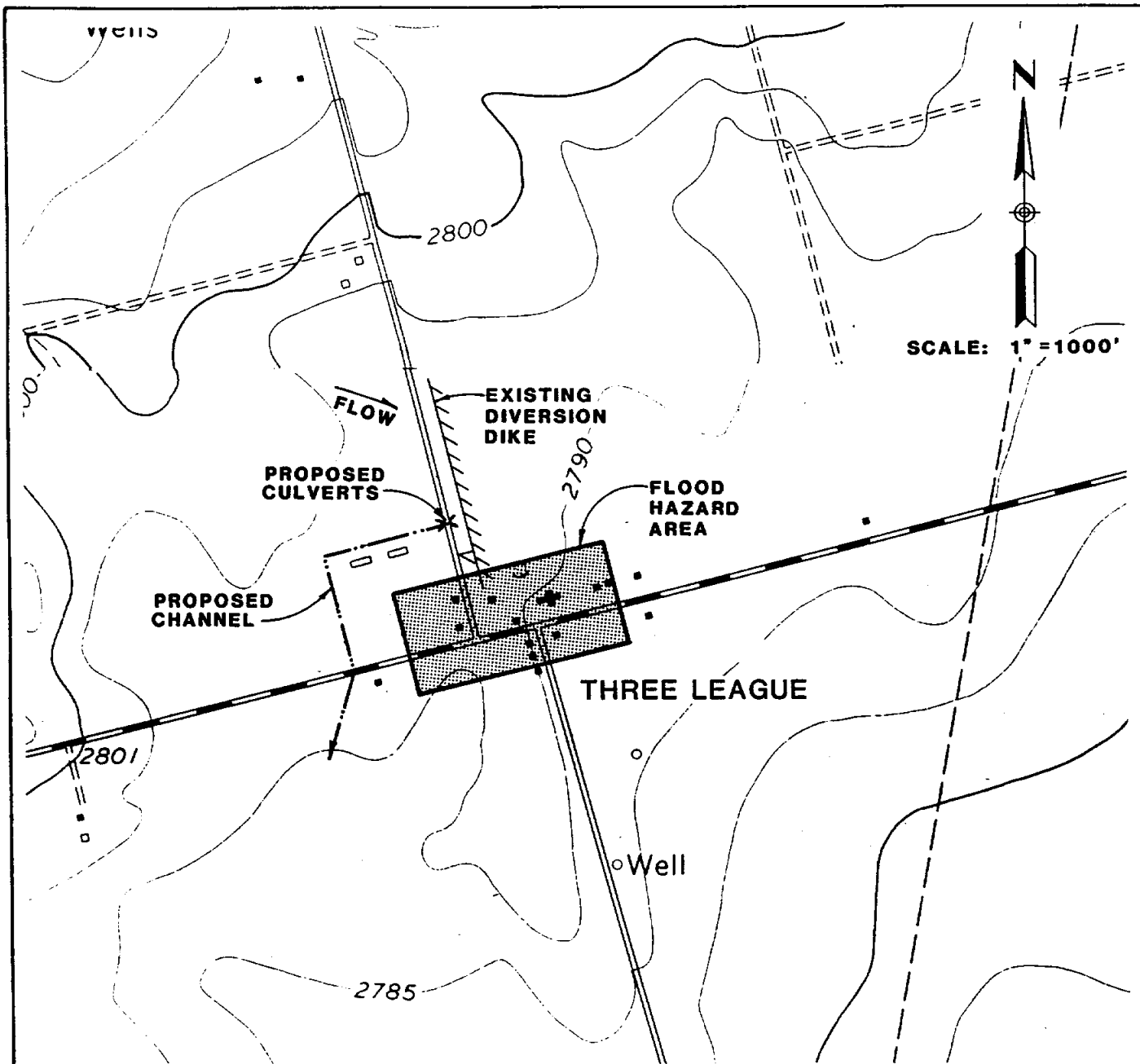
Item	Quantity	Units	Unit Cost	Total
Playa Dam (10' high)	6,181	CY	\$2.00	\$12,361
Relocate Co Rd@ So.Edge	6,667	CY	\$5.00	33,333
Co Rd ROW	3	AC	\$400.00	1,377
Culverts - 36" CMP	150	FT	\$30.00	4,500
Subtotal A				51,571
Miscellaneous (10%)				5,157
Subtotal B				56,728
Contingencies (15%)				<u>8,509</u>
Total Construction Cost				\$65,237

Lower Salt Lake Expansion

Item	Quantity	Units	Unit Cost	Total
Playa Dam (13' high)	9,567	CY	\$2.00	\$19,133
Raise Co Rd D/S of Dam	18,333	CY	\$5.00	91,667
Channel Excavation	4,822	CY	\$2.00	9,664
Culverts - 36" CMP	250	FT	\$30.00	7,500
Subtotal A				127,964
Miscellaneous (10%)				12,796
Subtotal B				140,760
Contingencies (15%)				<u>21,114</u>
Total Construction Cost				\$161,874

Total Estimated Construction Cost - Three League Area Alternatives	\$372,000
Total Drainage Easement 272 acres	\$27,000
Total Cost	\$399,000

Notes: 1.Cubic Yards; 2.Feet; 3.Height listed is maximum height.



HDR

HDR Engineering, Inc.

**PROPOSED CHANNEL
NEAR THREE LEAGUE GIN**

MARTIN COUNTY FLOOD PROTECTION STUDY

JULY 1990

FIG. 10

The costs in Table 23 assume that Valley View Road does not now have a channel, which is not the case in reality, because for much of the length of the road, the ditch has been improved since 1986. The estimate also does not include the cost of structures such as intersection and slope paving. This is assumed to already have been done. The conceptual plan is presented here for reference if further improvements are contemplated.

Location	Drainage Area (Sq Mi)	2-Year Peak Flow (CFS)	5-Year Peak Flow (CFS)	10-Year Peak Flow (CFS)	25-Year Peak Flow (CFS)	50-Year Peak Flow (CFS)	100-Year Peak Flow (CFS)
VV1	0.51	84	240	356	482	602	727
VV2	1.30	189	541	803	1092	1372	1650
VV3	2.36	261	743	1099	1497	1886	2263
VV4	3.42	313	889	1317	1788	2252	2701
VV5	4.50	360	1016	1504	2043	2568	3086
VV6	5.33	423	1196	1773	2405	3021	3630

Channel Reach	Channel Depth (Ft)	Bottom Width (Ft)	Side Slope (H:V)	Channel Slope (%)	Excavation Volume (CY)	Unit Cost (\$/CY)	Channel Cost (\$)
1	5	4	1:1	1.1	8,800	\$2.00	\$17,600
2	5	12	1:1	0.8	16,622	\$2.00	\$33,244
3	5	18	1:1	0.7	22,489	\$2.00	\$44,978
4	5	25	1:1	0.5	29,333	\$2.00	\$58,667
5	5	28	1:1	0.5	32,267	\$2.00	\$64,533
Total Cost							\$219,000

4.8 SUMMARY

A conceptual flood protection plan was presented for the Ackerly-Knott, Brown, Three League, Three League Gin, and Valley View Road areas in Martin County. The proposed facilities are small floodwater retarding dams constructed across the outlet of existing playas and other suitable locations. Each dam would be constructed with a 24-inch diameter outlet pipe which would slowly drain the playa or detention basin following a runoff event.

The cost of easements, the estimated construction cost, and the total project cost of the proposed facilities is summarized as follows:

Area	Construction Cost	Easements	Total Cost
Ackerly-Knott	\$367,000	\$91,000	\$458,000
Brown	272,000	35,000	307,000
Three League	372,000	27,000	399,000
Three League Gin	73,400	600	74,000
Valley View Road	<u>219,000</u>	<u>N/A</u>	<u>219,000</u>
Totals	\$1,303,400	\$153,600	\$1,457,000

The structures provide significant floodwater retarding benefits. The average level of protection is to approximately the 25-year event, although significant reductions in peak flow occur for the 50-year return period event for many of the proposed structures. A few structures also show significant floodwater retarding effect for the 100-year event in that peak discharges are reduced to less than peak discharge for the five-year event. The economical justification of these proposed plans is discussed in Section 6.

The feasibility of a flood control dam on Sulphur Springs Draw was also investigated. A suitable site was found on the draw and it was designed to make maximum use of the available storage. The estimated construction cost is \$3,000,000. The structure was found to provide only minimal reductions in peak flood flows for the 10-, 50-, 100-year, and PMF design flows. It would therefore not measurably reduce flood damages on the reach below the draw. For these reasons, the structure is not justified for a strictly flood control purpose. Other purposes could be investigated, such as water supply and recreation, but these are beyond the scope of the present study.

SECTION 5

SECTION 5 IRRIGATION

5.1 IRRIGATION CONSIDERATIONS

In the areas in which additional flood storage is created, there is a possibility that there may be sufficient water supply of suitable quality to justify an irrigation system. This section considers the viability of this option with respect to the reliability and quality of the water supply and the potential net benefits.

5.2 WATER YIELD AND WATER SUPPLY RELIABILITY CONSIDERATIONS

In Section 2.2, the hydrologic yield model for the Ackerly-Knott area was introduced. Part of the purpose for developing this model was to evaluate the expected water yield in this basin which could be used for supplemental irrigation. Estimated annual water yields (i.e., runoff) for the 45-year simulation period were given in Table 1. The yields were given in terms of inches of runoff produced in a given year.

A re-examination of Table 1 reveals the following general conclusions about water supply reliability in Martin County:

1. Runoff production is highly variable. In half of the years, on the average, little or no runoff is expected in amounts that will be useful for irrigation.
2. In about one in five years, at least 0.5 inches of runoff is produced, which likely represents an abundant water supply for irrigation purposes if sufficient storage volume is available.
3. Examination of model output shows that significant runoff-producing storms occur most frequently in September and October, and 75 percent of runoff occurs in the non-growing season from September to May. If this water is to be utilized for irrigating cotton, it must either be stored until the growing season, or applied prior to planting to increase the soil moisture. If this water is kept in storage, some will inevitably be lost to evaporation and pond exfiltration; whereas, if it is put in the soil, there is limited storage of about four to six inches available in the soil profile.

These considerations limit the extent to which supplemental irrigation can be practiced. In effect, a large watershed is needed to reliably irrigate a reasonably-sized plot. For example purposes, the Ackerly-Knott area was modelled as follows:

- The entire area (20,642 acres) was considered to be the watershed for calculation of total runoff volumes;
- A simulated storage pond having a storage volume roughly equivalent to the total of all storage areas in the conceptual plan for the Ackerly-Knott area was used. At the time the model was run, this total storage volume was about 4,500 acre-feet, which is what was used in this example.
- The model calculates pond storage volumes and levels in response to daily runoff inputs, and evaporation and exfiltration losses for the entire 45-year period. From this, water availability for irrigation was calculated. The model output produces tabulations of volumes on a monthly and annual basis.

According to an article in The Cross Section (High Plains UWCD, 1990), cotton requires 10 to 12 inches of supplemental irrigation, on the average, to produce maximum yields. In this analysis, it was assumed that 16 inches total were required to produce maximum crop yield. This accounts for 25 percent losses in storage and delivery to the field. In 22 of the 45 years in the simulation period, a 160-acre field could have been fully irrigated using runoff from the 20,642 acre watershed. In addition, in four other years, at least half the water requirement would have been available. Therefore, this watershed could fully sustain a 160-acre plot in half the years.

In other words, roughly 130 acres of watershed are required to support the full irrigation of one acre of cotton in 50 percent of the years in Martin County. In half the years, there will be no runoff and therefore water will not be available. The years in which runoff occurs or does not occur appear to run in cycles of three to 10 years. The foregoing analysis includes and accounts for carry-over of water into a succeeding year or years when significant runoff is produced, as in 1986.

The preceding analysis is not intended to imply that a 160-acre plot is needed to actually sustain a supplemental irrigation enterprise. It only serves to show that water availability is intermittent and that utilizing the available resources to maximum benefit will take good planning and management. The question of whether an irrigation enterprise is viable in this area is considered in the next section.

5.3 IRRIGATION ECONOMICS

Since it is estimated that the lakes in which water would be captured and stored in Martin County would contain water in only five years out of 10, the installation of permanent pumping and conveyance facilities for each lake would not be justified. Thus, the use of trailer mounted, portable lake pumps and motors and movable lengths of agricultural PVC pipe represent the lowest capital investment for the county to move water from the lakes to the fields. It is further estimated that irrigation application to the fields would be through low capital, side-roll sprinkler irrigation methods. A complement of irrigation equipment for use in this type of water supply setting would be:

Item	Price
Trailer Model Pump (20' long, 6" discharge pipe, with trailer)	\$3,550
Motor (8-cylinder, automobile type)	2,400
Agricultural PVC Pipe (six inch 50 psi, 5,280 feet) @ \$94.60/100'X1.05	5,250
Gated Pipe (60 feet)	250
Pipe Trailer (2)	3,200
Freight (Factory to Farms) 3 loads @ \$500	<u>1,500</u>
TOTAL	\$16,150

It is estimated that this equipment would have a 15-year life, with no salvage value at the end of the 15-year period. Using straight line depreciation, an interest rate of 10 percent, and the estimate that the equipment could serve 150 acres, annual depreciation and investment cost per acre totals:

Annual Depreciation	\$1,077
Interest on Investment	<u>808</u>
TOTAL	\$1,885

Annual Cost per Acre \$12.57

It is estimated that a side-roll sprinkler system would have a 20-year life, with no salvage value at the end of the 20-year period. Using straight line depreciation, an interest rate of 10 percent, and the estimate that the equipment could serve 150 acres, annual depreciation and investment cost totals:

Side-roll Sprinkler Cost	\$25,000
Annual Depreciation	\$1,250
Interest on Investment @ 10%	<u>1,250</u>
TOTAL	\$2,500
Annual cost per acre	\$16.66

Annual depreciation and investment per acre for irrigation system to irrigate 150 acres is:

Pump, Motor, and Pipe	\$12.57
Side Roll Sprinkler	<u>\$16.66</u>
TOTAL	\$29.23

For purposes of assessing the potential economic feasibility of using surface water impounded in lakes and catchment basins in the flood prone areas of Martin County, the estimated net returns to both dryland and irrigated cotton were calculated and are presented in Tables 24, 25, and 26. Under average conditions, there are net losses to irrigation of approximately \$10 per acre. (Irrigation net returns of Table 25 minus dryland net returns of Table 24). Note that these estimates are net estimated costs of the irrigation equipment and sprinkler systems.

Under high fertility conditions (Table 26), net returns to irrigation are \$230 per acre (irrigation net returns of Table 26 minus dryland net returns of Table 24). This level of returns depends upon cotton producers being able to achieve cotton yields of two bales per acre using high levels of nitrogen and phosphate fertilizers and careful coordination of water and fertilizer inputs, as is being demonstrated by research and in practice on cotton farms in Lubbock County.

TABLE 24
CROP: COTTON
DRYLAND (SANDY SOILS)
MARTIN COUNTY, TEXAS
AVERAGE CONDITIONS

Item	Quantity	Units	Price	Total
Income				
Cotton Lint	215.00	lbs.	0.51	\$109.65
Cottonseed	0.17	tons	100.00	17.00
Deficiency Payment	215.00	lbs.	0.17	<u>36.55</u>
Total Income				\$163.20
Variable Expenses				
<u>Pre-Harvest</u>				
Soil Test	1.0	acre	0.25	\$ 0.25
Seed & Treatment	16.0	lbs.	0.78	12.48
Nitrogen & Appl.	-	-	-	-
Phosphate & Appl.	-	-	-	-
Insecticide & Appl.	1.0	acre	7.00	7.00
Herbicide	1.0	acre	4.00	4.00
Hoing	1.0	acre	5.00	5.00
Fuel & Lube (Mech)	1.0	acre	12.00	12.00
Fuel & Lube (Irrig)	-	-	-	-
Repairs (Mech)	1.0	acre	3.00	3.00
Repairs (Irrig)	-	-	-	-
Labor (Mech)	3.0	hours	5.50	16.50
Labor (Irrig)	-	-	-	-
Crop Insurance	1.0	acre	8.00	8.00
Other	-	-	-	<u>-</u>
Subtotal Pre-Harvest				\$68.23
<u>Harvest</u>				
Defoliant & Appl.	-	-	-	-
Strip & Module	10.21	cwt.	1.75	17.86
Haul Module	0.45	bale	3.00	1.35
Gin	10.21	cwt.	1.65	16.85
Bagging & Ties	0.45	bale	14.50	<u>6.53</u>
Subtotal Harvest				42.59
Total Variable Costs				\$110.82
Fixed Expenses				
Set aside land	0.222	acre	16.50	\$3.66
Depr. (Mech & Eqpt)	1.0	acre	20.00	20.00
Depr. (Irrig & Eqpt)	-	-	-	<u>-</u>
Subtotal Fixed Costs				\$23.66
Interest on Operating Capital	68.00	do.	0.085	<u>5.79</u>
Total Costs				\$140.27
Returns Land & Management				\$ 22.93

TABLE 25
CROP: COTTON
SPRINKLER IRRIGATED (SANDY SOILS)
MARTIN COUNTY, TEXAS
AVERAGE CONDITIONS

Item	Quantity	Units	Price	Total
Income				
Cotton Lint	500.00	lbs.	0.51	\$255.00
Cottonseed	0.40	tons	100.00	40.00
Deficiency Payment	500.00	lbs.	0.17	85.00
Total Income				\$380.00
Variable Expenses				
<u>Pre-Harvest</u>				
Soil Test	1.0	acre	0.25	\$ 0.25
Seed & Treatment	12.0	lbs.	0.80	9.60
Nitrogen & Appl.	50.0-	lbs	0.30	15.00
Phosphate & Appl.	30.0	lbs	0.30	9.00
Insecticide & Appl.	1.0	acre	10.00	0.00
Herbicide	1.0	acre	4.50	4.50
Hoeing	1.0	acre	10.00	10.00
Fuel & Lube (Mech)	1.0	acre	10.00	10.00
Fuel & Lube (Irrig)	1.0	acre	32.00	32.00
Repairs (Mech)	1.0	acre	3.75	3.75
Repairs (Irrig)	1.0	acre	8.75	8.75
Labor (Mech)	3.6	hours	5.50	19.80
Labor (Irrig)	2.0	hours	5.50	11.00
Crop Insurance	1.0	acre	11.00	11.00
Other	-	-	-	-
Subtotal Pre-Harvest				\$154.65
<u>Harvest</u>				
Defoliant & Appl.	-	-	-	-
Strip & Module	22.50	cwt.	1.75	\$39.37
Haul Module	1.00	bale	3.00	3.00
Gin	22.50	cwt.	1.65	37.12
Bagging & Ties	1.00	bale	14.50	14.50
Subtotal Harvest				93.99
Total Variable Costs				\$248.64
Fixed Expenses				
Set aside land	0.33	acre	16.50	\$5.44
Depr. (Mech & Eqpt)	1.0	acre	40.00	40.00
Depr. (Irrig & Eqpt)	1.0	acre	30.00	60.00*
Subtotal Fixed Costs				\$105.44
Interest on Operating Capital	155.00	do.	0.085	13.17
Total Costs				\$367.25
Returns Land & Management				\$ 12.75

*Takes into account that equipment is used only 50 percent of the time, since on the average the lakes contain water in 5 of 10 years.

TABLE 26
CROP: COTTON
SPRINKLER IRRIGATED (SANDY SOILS)
MARTIN COUNTY, TEXAS
HIGH FERTILIZER

Item	Quantity	Units	Price	Total
Income				
Cotton Lint	1,000.00	lbs.	0.51	\$510.00
Cottonseed	0.80	tons	100.00	80.00
Deficiency Payment	500.00	lbs.	0.17	<u>170.00</u>
Total Income				\$760.00
Variable Expenses				
<u>Pre-Harvest</u>				
Soil Test	1.0	acre	0.25	\$ 0.25
Seed & Treatment	12.0	lbs.	0.80	9.60
Nitrogen & Appl.	120.0	lbs	0.30	36.00
Phosphate & Appl.	40.0	lbs	0.30	12.00
Insecticide & Appl.	2.0	acre	7.00	14.00
Herbicide	1.0	acre	4.50	4.50
Hoeing	1.0	acre	10.00	10.00
Fuel & Lube (Mech)	1.0	acre	15.00	15.00
Fuel & Lube (Irrig)	1.0	acre	32.00	32.00
Repairs (Mech)	1.0	acre	3.75	3.75
Repairs (Irrig)	1.0	acre	8.75	8.75
Labor (Mech)	3.6	hours	5.50	19.80
Labor (Irrig)	2.0	hours	5.50	11.00
Crop Insurance	1.0	acre	11.00	11.00
Other	-	-	-	<u>-</u>
Subtotal Pre-Harvest				\$187.65
<u>Harvest</u>				
Defoliant & Appl.	1.0	acre	9.00	9.00
Strip & Module	45.0	cwt.	1.75	\$78.75
Haul Module	2.0	bale	3.00	6.00
Gin	45.0	cwt.	1.65	74.25
Bagging & Ties	2.0	bale	14.50	<u>29.00</u>
Subtotal Harvest				197.00
Total Variable Costs				\$384.65
Fixed Expenses				
Set aside land	0.33	acre	16.50	\$5.48
Depr. (Mech & Eqpt)	1.0	acre	40.00	40.00
Depr. (Irrig & Eqpt)	1.0	acre	30.00	<u>60.00*</u>
Subtotal Fixed Costs				\$105.48
Interest on Operating Capital	188.00	do.	0.085	<u>16.00</u>
Total Costs				\$506.13
Returns Land & Management				\$253.87

*Takes into account that equipment is used only 50 percent of the time, since on the average the lakes contain water in 5 of 10 years.

5.4 IRRIGATION POTENTIAL

From the previous analysis, it can be concluded that through careful management, it is possible to derive a net gain on an irrigation enterprise using water temporarily stored in detention basins. Whether a particular modified playa or detention basin would have sufficient water available for irrigation depends upon the contributing watershed area, the size of the basin, and the size of the plot to be irrigated. It appears that only one playa, 846 Playa A (or B if A is not used), would have the combination of sufficient water and storage volume to irrigate a 160-acre plot, if no one else had a similar irrigation operation in the 32-square mile Ackerly-Knott watershed. In the Brown area, there is not a single basin with a large enough watershed (about 30 square miles) to support a 160-acre plot.

Smaller irrigation plots could be supported by proportionally smaller watersheds. Thus, a 40-acre plot requires an eight-square mile watershed. However, the pond must be of sufficient size to carry through two seasons, including losses, which is approximately 30 inches. A 40-acre plot would thus require a basin/playa with minimum storage capacity of 100-acre feet.

After modification, many of the playas and basins in the Ackerly-Knott and Brown areas would have sufficient storage capacity to irrigate 40 acres. However, only about eight operations of this size could be placed in the combined Brown and Ackerly-Knott areas--four in each area. It can be seen that various combinations are possible, but each operation must have the required watershed area of 130 acres per acre irrigated.

Groundwater has been suggested as an alternate source of water for these operations. Most of the wells in this area are low capacity and water quality is highly variable. The only wells in this area appear to be for domestic supply and have limited yield. Whether a conjunctive use operation in which groundwater is used to supplement the highly variable surface water supply should be investigated. It may be that a low-capacity well could fill a ground level concrete storage tank over the winter to provide preplant or full-season moisture. The combination of surface and groundwater could result in a more reliable and effective irrigation enterprise.

In addition, the county might encourage irrigation by purchasing one or more mobile trailer-mounted pumping rigs which could be shared by a number of irrigators. This might be a trade-off in lieu of purchasing leases for the development of the playas and detention basins.

In the Three League area, there are several large basins; however, the water quality in the playas is such that it is apparently not suitable for irrigation. Figure 7 showed that water quality in the playas east of Sulphur Springs is fairly good, whereas west of the Draw, the water is very high in total dissolved solids and chlorides.

The purpose of the overall flood protection plan is to temporarily detain water to reduce peak flows, and then to slowly discharge the water back into the drainage system at a non-damaging rate. If basins are to be used for irrigation, either the water must be utilized immediately or the outflow pipe shut-off to retain the water. If water is retained more than six months or into the next "wet" season, the flood protection purpose is defeated. Therefore, if irrigation is to be performed, and if the outlet pipe is to be equipped with a shut-off valve, the water must be used either immediately if it becomes available during the growing season, or within six months as preplant application if the water becomes available during the fall or winter. This approach will result in little or no diminuation of the flood control benefits.

SECTION 6

SECTION 6 IMPLEMENTATION PLAN

In this section, methods and means to implement the proposed plan are presented. Topics considered are: project costs, sources of funds, institutional arrangements, schedules, constraints, and other impacts.

6.1 PROJECT COSTS AND BENEFIT/COST CONSIDERATIONS

The costs for the conceptual plans are presented in Table 27.

TABLE 27 COSTS FOR PROPOSED PLANS				
Area	Estimated Construction Cost	Area Requiring Easements (acres)	Estimated Cost for Easements	Total Cost
Ackerly-Knott	\$367,000	909	\$91,000	\$458,000
Brown	\$272,000	351	\$35,000	\$307,000
Three League	\$372,000	272	\$27,000	\$399,000
Three League Gin	\$73,400	1.5	600	\$74,000
Valley View Road	<u>\$219,000</u>	<u>N/A</u>	<u>—</u>	<u>\$219,000</u>
Total	\$1,303,400	1,533.5	\$153,600	\$1,457,000

6.1.2 Benefit/Cost Calculation

As noted in Section 3, the county is estimated to have expended over \$2.5 million in general and road tax revenues in the past five years (1986-90) to repair damaged roads from the flooding that began in 1986. Analysis of the expected frequency of flooding and flood damage led to the conclusion that the county was essentially spending, on the average, roughly \$155,000 per year to repair roads damaged by floods. The expenditures, however, do not necessarily occur every year. Major flood damage is expected in only one of five years. Therefore, larger expenditures are made in the years following these events, and thus, funds are temporarily diverted from other budgeted activities.

Examining the effectiveness of the proposed flood protection plans, it can be concluded that the plans represent at least a 25-year protection level, on the average. A 25-year level of protection is a four percent probability level. From Table 10 (Section 3), it can be shown that this level of protection would provide at least \$64,300 in annual benefits. To this can be added approximately \$25,000 in annual benefits due to partial reduction of flood damages occurring from events greater than the 25-year event, including the 100-year (one percent) and beyond. Thus, expected flood damages would be reduced by approximately \$90,000 annually by implementing this plan.

The question is whether the county is justified in undertaking the proposed improvements at a cost of \$1.5 million to avoid an annual expenditure of \$90,000 for flood damage. On an actuarial basis, the present worth of annual damages of \$90,000 for 50 years at seven percent interest rate per year is \$1.25 million. Nominally, this yields a benefit to cost ratio of 0.83, which is less than 1.0. Therefore, the project is not, on an actuarial basis, economically justified.

However, several factors that may reduce the cost of the project should be considered in this analysis. First, a cost of \$100 per acre was included to allow for the fact that occasionally a loss of crop may occur in the impoundment of the modified playas and detention basins. The total cost allowed for this is \$154,000. As previously noted, these areas may be significantly flooded once in five years, and since the flooding is more likely to occur when the area is not cropped, the likelihood of a major crop failure in a given year is less than 10 percent. Carefully examining Table 26 (Dryland Cotton Economics) reveals that the monetary loss of a total failure of a crop at the most critical time is \$84 per acre. If there is a 10 percent chance of failure in any year, the annual average potential loss is less than \$10 per year. Therefore, the payment of \$100 per acre to acquire a perpetual easement for occasional flood losses appears reasonable. However, many of the existing playas to be modified, particularly in the Three League and Brown Areas, would either flood non-cultivated land, or will actually improve the playa cultivated area by draining the lake quickly after a storm. Therefore, at least half of allocations of \$154,000 for flood easements would not appear to be necessary in reality.

Secondly, Valley View Road has already been substantially improved. It can therefore be assumed that only half of the cost of \$219,000 for the area would be necessary.

Finally, the Three League Gin area improvements include \$50,000 for a state highway culvert crossing, which may be a project that could be undertaken by the State instead of the county.

Thus, \$236,000 in total costs may not be required in the proposed plan, which would reduce the total cost to slightly less than the calculated benefits, and raise the ratio of benefits to costs to a 1:1 correspondence.

When difficult-to-quantify benefits, such as reduced flooding of homes and businesses, reduction in crop losses, and reduced inconvenience to farm, ranch, and oil field operations are considered, the proposed projects are definitely cost-effective and justifiable.

During and after the flood events of 1986, a number of private homes and businesses experienced property damage as well as inconvenience. Flood levels reportedly reached structure foundation levels for a number of homes, perhaps a dozen total, located south of Ackerly, in the Knott area, and in the Three League Gin area. In the latter area, the cotton gin was also flooded. The proposed plans would reduce or substantially eliminate flooding of these structures.

Crop losses would be reduced in some areas in one of two ways. First, the areas with playas that will be modified as part of this plan will be provided with an outlet. This outlet will allow the field to drain following a storm and thus recover more quickly for cultivation. Second, some cropland downstream of proposed structures is damaged by erosion when floodwater which is confined within roadway ditches "breaks-out" into a field. If the flood control plan is undertaken, this type of damage would be significantly reduced.

Oil and gas production facilities are greatly affected by flooding of roads and road wash-outs in the proposed plan areas. It is often not possible to reach some well fields for several days, or even weeks or months following a significant flood event. Farm and ranch operations are similarly effected.

Monetary costs cannot be precisely calculated for these damages. However, in 1988 the United States Department of Agriculture estimated the total losses from recent flooding in the County to be \$25 million. These were primarily crop losses reported by the Agricultural Stabilization and Conservation Service (See Appendix A, 9/23/88). Based upon the proportion of total county cultivated acreage (300,000 acres) in Martin County and the

amount protected by the proposed plan in the Ackerly-Knott and Brown areas (38,000 acres), and assuming only 50 percent effectiveness of the proposed plan, the losses prevented would have been about \$160,000. Using the methodology in Section 3, this would convert to annual damages to crops of about \$10,000 that the flood plan would prevent.

Therefore, although approximate, it is conservatively estimated that the "other" flood damages (i.e. to cropland, homes, businesses, and vehicular movement) prevented by the proposed plan would easily exceed an annual cost of \$20,000. When these costs are added to the \$90,000 previously calculated as the annual reduction in flood damage to county roads, the present net worth of benefits is greater than \$1.5 million, and the project is justified.

Finally, there are social benefits to be gained in that "downstream" landowners now being adversely affected by the accumulative effect of poor drainage practices that aggravate flooding will benefit from a general, cooperative effort to reduce flooding, and will be less likely to seek redress in other ways.

6.2 SOURCES OF FUNDS

Unfortunately, there are few sources of funds that are available for flood control projects other than the county's maintenance funds or bond issues, both of which must be paid for through taxes levied on county residents.

There is a possibility that some help may be obtained from the SCS. The SCS may be willing to contribute technical assistance to implement individual projects, and even monetary assistance to construct projects if the projects fall into SCS's general soil and water conservation program initiatives. The potential for this would need to be explored with the SCS.

Recently, the municipal code was amended to allow municipalities to set up stormwater utilities to finance both capital investments and maintenance of stormwater systems by charging fees for these services. This, however, is more suited to cities with extensive facilities and may not be practical for the county.

No other federal or state agencies have outright grants for flood control projects. Most Federal programs now require local matching funds. The United States Army Corps of Engineers (COE) assists local entities for projects that are generally quite a bit larger than that proposed for Martin County. These projects would require strict adherence to Federal guidelines for project justification and generally take many years from initial planning to completion. Therefore, the COE is not likely to be a viable source of finances for Martin County's flood protection plans.

The primary potential contribution of the State of Texas is through the Texas Water Development Board's revolving funds to capitalize flood control and other water projects. The State, in effect, purchases local bonds to finance the local projects. This is done as service to the local entities that may not be able to sell bonds on the open market at a reasonable interest rate. The bonds would be backed by local taxes and retired over a period of time, such as 20 or 30 years. The average interest at the present time would be in the vicinity of seven percent.

If the county chooses to construct the facilities in a short period of time of one or two years, then it may be reasonable to consider a bond issue to capitalize the project. However, if the project is built over a longer period of time, such as 10 years, it may be possible to budget and allocate general tax revenues for that purpose without borrowing. In order to

ensure that the county makes the best decision possible on the funding of these projects, it is recommended that the financing recommendations of a financial advisor be sought. The following section describes some possible financing options, but these are provided only to assist the county in determining whether they should proceed beyond this study.

6.3 INSTITUTIONAL CONSIDERATIONS

The county can view these projects in three ways. The first, which is easiest in terms of managing and carrying out the project, is to view the project as beneficial to the county at large. If this is the case, the project could be administered by present county general and road maintenance staff. Not considering inflation, the proposed projects could be constructed in 10 years if \$150,000 were allocated per year out of general revenues.

According to county staff, the 1989 road and bridge budget, less capital purchases, was slightly more than \$1 million. Therefore, an annual allocation of \$150,000 for flood protection would represent about 15 percent of road maintenance funds. The 15 percent is much less than the average of 58 percent (\$562,000 per year) the county has spent to repair roads from 1986 through 1989.

The 1989 assessed evaluation of the county is about \$394 million. For reference, it would require a tax assessment of about \$0.04 per \$100 assessed evaluation to finance the annual expenditure of \$150,000 for flood control.

The second method would be for the county to issue bonds (after voter approval) and accomplish the entire project at one time. It is expected that this project could be funded by the Texas Water Development Board. If bonds totalling \$1,500,000 are purchased by the TWDB for 20 years at seven percent interest, the annual debt service would be \$142,000. There would be some additional, engineering, financial, and legal services costs related to a bond issue.

A third method to carry out the flood control program is to organize a Stormwater Control District. Such a district could issue bonds or perform the work over a long period as mentioned above. If the facilities are constructed over a long period, such as 10 years, the district could maintain more focus to ensure the work is funded each year. The district can be formed county-wide or for any part of the county. Stormwater Control Districts are authorized in Section 66 of the Texas Water Code (adopted in 1985 by the 69th Legislature). The purpose of a Stormwater Control District is to ". . .control stormwater and floodwater and abate harmful excesses of water for the purpose of preventing area or downstream flooding in all or any part of a watershed." (Paragraph 66.012, Texas Water Code).

Creating a district requires petition to the Texas Water Commission (TWC) by majority vote of Commissioner's Court or at least 50 persons who reside in the district boundaries. The TWC convenes an Administrative Hearing and if the petition is granted, five temporary directors are appointed by the TWC to organize for an election to be held to confirm the formation of the district and to elect permanent directors.

The stormwater district has power to issue bonds and to levy taxes for the payment of bonds by majority vote of qualified voters on a bond proposition. The district also has the power of eminent domain, and other powers similar to other General Law Districts such as the Martin County Underground Water Conservation District.

Although there are a number of legal and administrative issues that would need to be discussed and resolved in order to undertake the formation of a Stormwater Control District, there are some advantages that the county may consider, such as:

- A district is a separate entity formed for a specific identifiable purpose; and
- A district can receive monies allocated to it from other sources, including the county, and/or levy taxes to undertake improvements and to provide for maintenance and operation of the system.

There are also several disadvantages, such as:

- Potential overlap of county road maintenance activities and flood control activities; and
- Additional administrative overhead involved with adding another subdivision of the county government.

6.4 IMPLEMENTATION SCHEDULE

Regardless of the institutional arrangement, it appears that the county can undertake the flood protection plan in the form of several small projects over a period of years or as one large project. If the county chooses to proceed with several small projects, it is recommended that the projects be undertaken starting from the upper end of the watershed and working down to the lower end. Each project depends upon all the other projects above it being in place in order for it to function properly. The schedule for construction of the projects would depend upon the funding mechanism chosen by the county.

6.5 CONSTRAINTS

There can be many constraints to the development of flood control projects. Not the least of these concerns are for cultural resources, endangered species, loss of wetlands, sediment and erosion control, and dam safety. Cultural resources and endangered species do not appear to be significant issues in the identified project areas of Martin County. However, wetlands, sediment and erosion control, and dam safety are issues that would arise and require resolution as the project is implemented. There do not appear to be any irresolvable issues involved in this flood protection plan; however, several permits may be required.

6.5.1 Loss/Gain of Wetlands

The area contains numerous playas that are normally considered to be wetlands. This project does not propose to eliminate any existing wetlands, nor does it intend to add any wetlands. Existing playas will not be drained below the identified normal high water level. The enhanced playas will temporarily store water above this level, but will drain back down to normal high water within several weeks after the storm.

6.5.2 Sediment and Erosion Control

The Federal Water Pollution Controls Act Amendments of 1972 established the 404 Permit program administered cooperatively by United States Environmental Protection Agency (EPA) and the Corps of Engineers. Unless exempted, a flood control project must normally obtain a 404 Permit if it involves discharge of dredge or fill material into "waters of the United States."

Recently, the EPA and COE issued a memorandum to clarify permit requirements with regard to agricultural activities. Because of the potential importance to this project, a copy of this memorandum is included in Appendix I.

Basically, the memorandum defines agricultural activities that are considered normal farming operations and are therefore exempt from 404 Permit requirements. A study of this document results in the following conclusions:

- The playa modifications and detention basins cannot be regarded as "normal farming operations" and are not exempt for that reason, but may be exempt for other reasons;
- Playa modifications proposed herein would not alter the playa below the normal high water line. In other words, the part of the playa that is considered wetlands would neither increase or decrease as a result of the modifications;
- Playas that are now farmed and have been farmed for some time may apparently continue to be farmed under these rules without a 404 Permit;
- Detention basins on land not now identified as wetlands will be drained after every event and therefore will not become wetlands after the fact;
- The objective of playa modification and detention basins is to detain water temporarily to reduce peak discharges and flood damage. The basins will also impound sediment. Therefore, the project will reduce erosion and sediment discharge and is in keeping with the general intent and purpose of the Section 404 program, and may be exempt for that reason;
- If, however, modifications are not exempt, it appears likely that they may be eligible for a General Permit as projects that will cause only minimal adverse environmental effects. A General Permit would cover all projects of a particular type in a region; and
- The worst case scenario is that an individual permit may be required. If so, the process may require the development of additional data on environmental impacts, and there would be delays that result from the public notification and review process. There would also be additional costs to develop the permit application.

To summarize, it would appear likely that a 404 Permit will be required. However, as indicated in the COE memorandum (Appendix B), it also appears that the project may be eligible for a General Permit. In either case, the COE should be notified by submitting a permit application prior to undertaking the project. This initiates the review process, during which time a determination will be made as to the type of permit required, and whether additional data will be needed.

6.5.3 Dam Safety

Dam safety is regulated in Texas by the Texas Water Commission (see 31 Texas Administrative Code Chapter 299). The dams proposed in this plan are all anticipated to be classified as small, low hazard structures. The maximum height of proposed dams ranges from six to 13 feet. The dams may or may not be exempt from minimum hydrologic criteria, that is, that the dam must pass 25% of the Probable Maximum Flood (PMF) without overtopping. If the dam height is less than six feet, the structure is automatically

exempt. Given the rural nature of this project and improbability of loss of life or any structural damage other than to unpaved county roads, it is likely that even the dams greater in height than six feet could be exempted.

Although the dams may be exempted, in order to preserve structural integrity and reduce maintenance, the dams should be designed with an emergency spillway to pass 1.7 times the 100-year flood, which is roughly equivalent to the 500-year flood. In many cases, such a spillway may even meet the 25% PMF criteria. This may require a shallow grassed emergency spillway channel in most cases not more than 50 or 100-feet wide and one to two feet high. The earth excavated out of this channel would be used to construct the embankment.

Impoundment Permit. If water from the modified playas or detention basins is used for irrigation, an impoundment permit will be required under Section 11 of the Texas Water Code. This section generally refers to a dam erected to impound water for other than domestic and livestock purposes. Furthermore, Section 11 indicates that a permit is required to appropriate stormwater stored in a natural lake for irrigation purposes.

6.6 NATURAL DAM LAKE IMPACTS

Recently, the Colorado River Municipal Water District (CRMWD) undertook extensive modifications to Natural Dam for dam safety purposes. Natural Dam Lake is several miles downstream from the project area, and Sulphur Springs Draw (or Sulphur Springs Creek, as it is called in the lower reaches) is a major tributary of Natural Dam Lake.

This project is expected to have a minimal but generally beneficial impact on Natural Dam Lake, because the project will reduce peak flows discharging into Sulphur Springs Draw from 130 square miles of watershed.

If the Ackerly-Knott and Brown areas are provided with an 18-inch diameter outlet as part of this project, a small volume of water, estimated to be less than 1,000 acre-feet per year, will flow to the Draw that did not previously reach it. The water quality samples taken of this water indicate that it is quite low in total dissolved solids (TDS) and chlorides (Cl). Natural Dam Lake is known to be very high in TDS, and therefore, the impact water from Ackerly-Knott and Brown areas would have a beneficial, although very minor, effect on the water quality of Natural Dam Lake. The original capacity of Natural Dam Lake was about 26,000 acre-feet prior to the recent dam modifications (FN, Undated).

The outlet to the Draw for the Ackerly-Knott and Brown areas would not be necessary if full-scale irrigation of stored flood water was undertaken in these areas.

SECTION 7

SECTION 7 - SUMMARY AND RECOMMENDATIONS

A flood protection plan has been developed for frequently flooded areas in the northeastern and north central part of Martin County. For three areas totalling 130 square miles, detailed HEC-1 hydrograph models were used to develop a flood protection plan which involves increasing the temporary storage capacity of existing playas and constructing other detention basins.

In the Ackerly-Knott area, nine dam structures are proposed; five are expansions of existing playas and four are new detention ponds. In addition, an outlet is proposed to draw down the SH 846 playas following a storm. The total cost of these facilities is estimated to be \$458,000, including easements.

In the Brown area, eleven projects are proposed. Eight of these projects involve only the installation of a small channel and/or pipe outlet to drain the playa back to natural high water level following a storm. Two of the projects involve a dam to expand playas, and one involves a new detention basin. These facilities are estimated to cost \$307,000 to construct, including easements.

In the Three League area, three large playas will be enlarged to reduce flooding on several miles of road in this area. The construction cost of the three dam structures and the associated raising or relocation of county roads is estimated to be \$399,000.

In addition to these facilities, the size and capacity of a channel to drain along Valley View Road right-of-way was calculated, and the cost to excavate a channel of that size was calculated at \$219,000. However, much of this work has already been done, and further improvements may not be a high priority at this time.

Finally, a diversion channel was proposed for the Three League Gin community at an estimated cost of \$74,000. The total estimated cost to construct all facilities is about \$1.5 million.

Some design considerations are:

- Provide 24-inch diameter outlets to drain playas back down to normal high water line. Other detention basins should be drained dry; and
- Provide emergency spillways and freeboard on dams (one to two feet) to pass 1.7 times the 100-year peak flow without overtopping.

It was determined that irrigation could be economically performed for the larger basins in the Ackerly-Knott and Brown areas. Although less watershed area could be used, it appears that 130 acres of watershed would be optimally required to reliably irrigate one acre of cotton every other year, on the average.

It was determined that good management and additional fertilization would make an irrigation operation profitable in this area utilizing stormwater as the water source. It is possible that groundwater could be used as an alternative source in order to irrigate every year and to provide a more reliable and consistent water supply. However, whether sufficient well capacity of suitable quality can be obtained would need to be determined on a site-specific basis. Well specific yields are generally low and water quality highly variable in this area. Filling the basin or a concrete tank (to minimize seepage loss) over winter with groundwater using low capacity wells would likely improve the economics of the operation.

A cost benefit analysis determined that benefits of the protection plan would be approximately equal to the cost. However, benefits for which it is difficult to establish a monetary value, such as the reduction in damage to cropland, homes, businesses, and inconvenience and loss of time when roads become impassible, and quality of life issues, are sufficiently important to justify the undertaking of this plan.

If the protection plan is implemented, the following recommendations are made:

- Obtain the advice of a financial advisor and determine the best means to pay for or finance the improvements, including bonding alternatives;
- Whether financed by bonds or accomplished as a 10-year staged plan, the project is estimated to require an annual allocation of \$150,000 either from existing county tax revenues, or from a new county-wide tax levy of about 4¢ per \$100 assessed evaluation;
- Administer the program using present county administrative staff; or, create a Stormwater Control District encompassing all or part of the county to administer the program and provide for on-going maintenance of the system;
- Coordinate efforts with SCS for technical support, encouragement of repair and proper maintenance of terraces, and possible financial support of the projects;
- Submit a 404 Permit Application to initiate review of the project by COE;
- Determine status of proposed dams with respect to state dam safety criteria; and
- Explore means to reduce land acquisition costs by offering to insure basin owners against crop losses, or assisting with purchase of some part of irrigation equipment if irrigation is appropriate.

SECTION 8

SECTION 8 - REFERENCES

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APPENDIX A

Flooding creates lakes, destroys cotton



Rain! Rain came the rain for forty days and forty nights the rain fell and the world was flooded.

Various times this summer. Lakes dot the fields of Martin County removing hundreds of acres from productive use.

Lake sizes vary from Harold Henley, 10-acre lake, four miles west of Stanton, to a multi hundred acre lake winding back and forth across the Martin and Howard County lines encompassing parts of several farms.

The Sawyer farm is host to a 30-acre lake. Fourteen miles west of Stanton, Highway 29 serves as a dam dividing a 20-acre lake.

Many farmers are not planning to harvest their fields. Paradoxically, this year's crop is one of the bushiest, tallest and greenest in years.

L.R. Shoemaker reports that he received another 3 and 7/10 inches, while Rufus Tom reported 4 1/2". Southeast of town received only an inch refilling a small 5-acre lake.

Last week's rains served to refill some lakes that Martin county farmers were hoping to re-enter.

State road 829, 15 miles northwest of Stanton will be closed for two months, local residents believe. The lake covers approximately thirty acres.

Rufus Tom, for instance, has 3 1/2" foot high cotton that should make 1 1/2 bales per acre, but will perhaps produce 1/3 bale per acre this year.

Teddy Stewart nine miles west of Stanton received 2.2 inches while Tommy Newman who farms 11 miles Northwest of Stanton received four inches of rain.

Several farmers reported that they believe at least 75% of Martin County's fields have had or now have lakes this year.

Another 35-acre lake blocks Highway 2002 four miles East of Three League's.

Both Stewart and Newman believe that their 2-foot tall cotton will make about one bale of cotton per acre with only 50 lbs. of lint per acre.

Grover Springer, official U.S. weather reporter for Martin County reports that he believes part of Martin County has received up to 30 inches of rain this year.

Helen Thrakill reports six inches of rain Wednesday night. The roads were so bad that a four wheel drive vehicle had to be used to bring Helen to Stanton.

Highway 137, both east and west of Stanton was closed for

Both flea hoppers and fleas have contributed to the crop failure.

Ironically, the sandy land farms near Klondike in Martin County are showing signs of a lack of rains while farms located in the so called dry flat have higher crops.

They did not receive subsequent rains that swept through much of Martin County this summer.

Nearly 75 percent of Martin County Roads and Fields have been under water during the 1986 Rainy Season. Some estimates show that over 50 percent of Martin County's Fields still have lakes in them.

Tollison pinpoints road damages

County Commissioner Donald L. Tollison has outlined major roads in his district damaged by rains. He also praised the attitude of the residents of Martin County.

Tollison's statement, requested by Martin County News, follows: County roads in precinct two of Martin County have been inundated the past eight months with approximately 60 inches of rain causing several roads to be closed or difficult to drive on. The hardest hit of these roads were in the Northern part of the precinct.

The old Valley View road and other East-West roads received the major portions of run off water which comes from South of State Highway 176 and the Lenorah area then North along State Highway 137. Folks that have lived or farmed in this area have told me that they haven't seen rains of this magnitude in over 50 years.

The existing road that is proposed extension of State High-

way 3033 has been closed four miles North of Highway 176 since the last of May and probably will remain closed for some time yet. There just isn't many ways to drain these low places that collect a good portion of the run off water.

The old Valley View road is closed four miles East of Highway 137 and is just a quagmire of water and silt.

We have completely lost several miles of caliche road at one time or another during this period of time. Most all have been reworked and are in decent condition. We expect to begin resurfacing some of these in the near future.

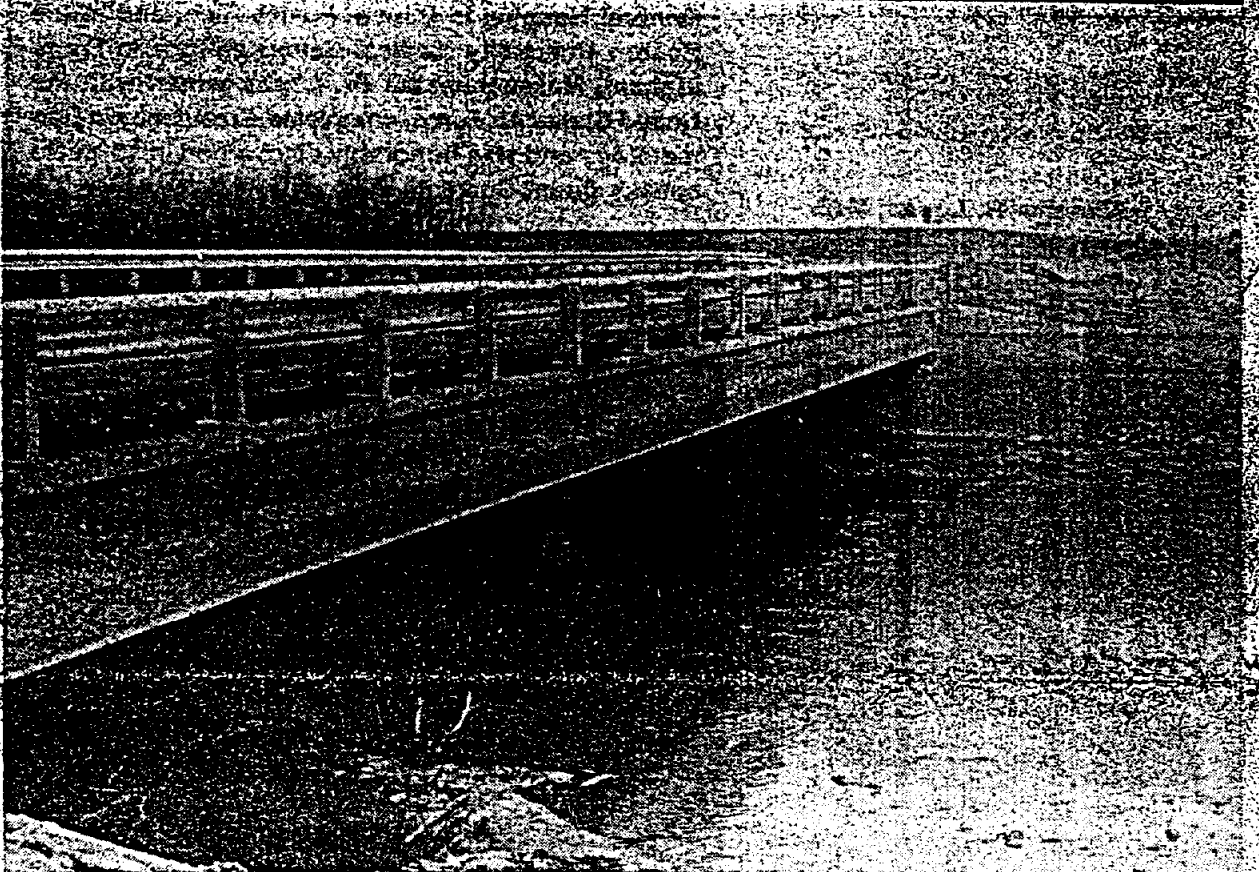
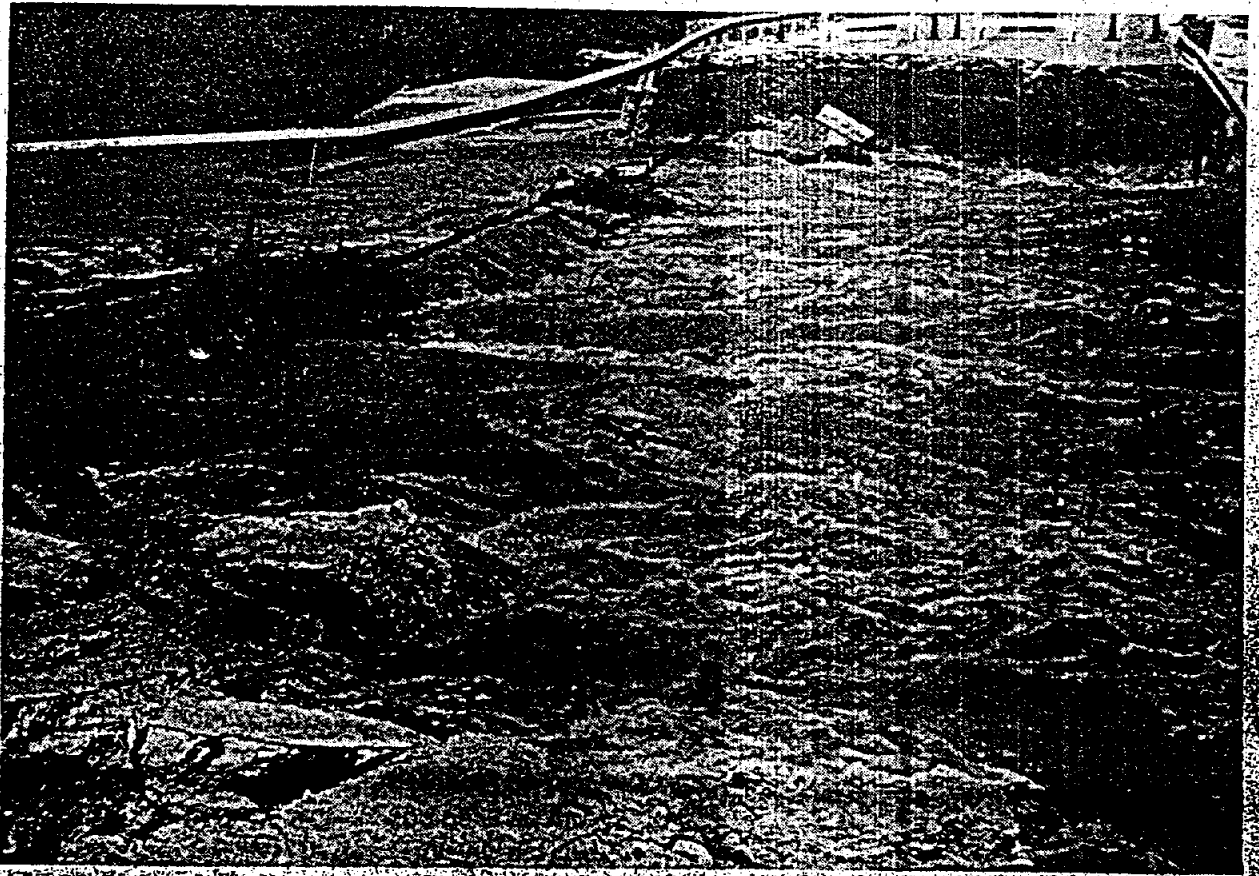
I feel these rains have just about washed away most of the road improvements that were made in the past four years.

Our county crews have worked very hard and diligently during these times to maintain our

roads in passable conditions.

I think one of the most important aspects of this natural disaster is that our citizens have main-

tained a very admirable attitude during these difficult times, that not only damaged our roads, but literally ruined hundreds of acres of valuable crops and farm land.



(Photos by Roy Lee Barnhill)
NEW BRIDGE IN SERVICE — Martin County traffic can now use the recently opened bridge on FM 846 at Sulphur Draw. The old structure was wiped out by flood waters on Sulphur Draw in June of 1987. Construction of the new bridge was delayed by continuing water problems. The Highway Department project was completed at a cost of \$219,000.

Stanton Herald

Serving All of Martin County

Wednesday

Vol. 1, No. 52 July 27, 1988

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Officials view flood problems in area

Heavy rains last week in the northeast portion of Martin County compounded flooding problems from the prior weeks rainfall. In the area east of Highway 137 and north of Highway 176 many farmers reported rainfall ranging from four to six inches. Much of the Ackery, Brown, and Knott areas had received 10 inches the preceding week.

State Sen. John T. Montford, D-Lubbock, on Saturday, July 23, toured extensive portions of northeast Martin County and the northwestern corner of Howard County to survey the serious flooding problems as a result of the recent heavy rainfall in the region. Montford was accompanied by Martin County Judge Bob Deavenport, Sheriff Dan Saunders, Com-

missioner E.D. "Wimp" Holcomb, and Marshall Huffman, district engineer with the State Department of Highways and Public Transportation from Odessa.

Montford saw the standing water, washed out roads, flooded homes, and other problem areas, touring the region on ground and by air in a private plane.

"It's a lot worse than I imagined," Montford said. "We are going to get the local and regional authorities together with the various state agencies and federal agencies to help with this problem." Montford stated.

Montford represents the 28th Senate District of Texas which includes Martin and Howard Counties and 12 other counties in the Permian

Basin and South Plains. Commenting on road conditions in the north end of Martin County, Huffman said contractor crews were now working on FM 2002 near Three League and should have that road open this week.

Concerning the two areas on FM 846 east of Sulphur Draw that are still under water, Huffman advised

they expected water to remain high in that area for sometime and that this week contractors would start fill work.

Estimated cost for this work will be \$80,000 over the contract of work that is currently in progress. Huffman disclosed the heavy rains had delayed work on these segments by approximately two months.



WATER, WATER AND MORE WATER DOES WOES — Seeing is believing. While much of the nation is suffering from a drought, the northeast section of Martin County is hard hit by too much water. State Sen. John Montford, D, Lubbock, shown above in top left photo, discusses a muddy "lake" with Marshall Huffman, right, district engineer with

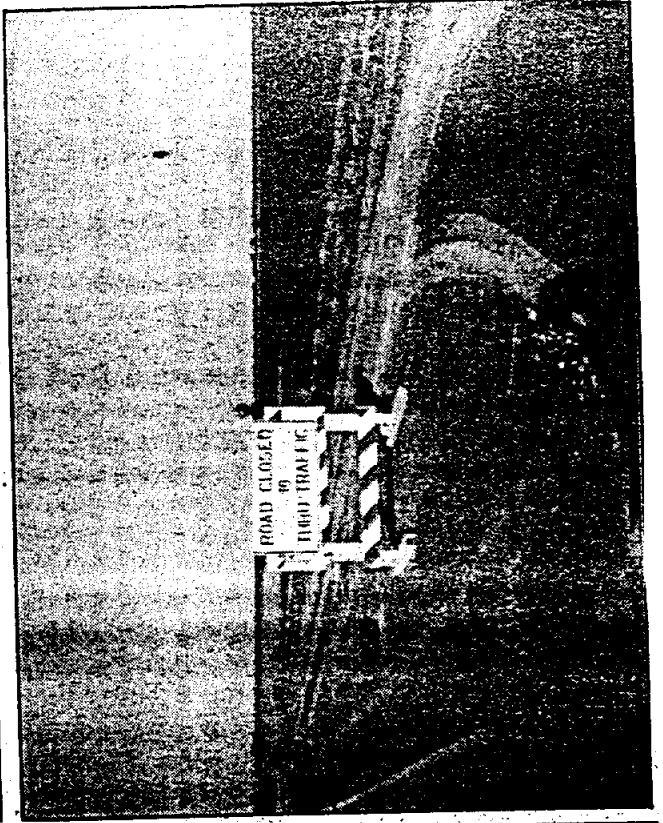


the State Department of Highways and Public Transportation headquartered in Odessa. In center photo, Martin County Commissioner E. D. "Wimp" Holcomb, second from right, uses his hands to help explain flood damages to Ray Long, Brown farmer, Sheriff Dan



Saunders, Sen. Montford, and Morris Wilkes, Lubbock, aide to Montford, right. Sheriff Saunders is shown trying to "dig out" with a shovel after a sheriff's department car became "stuck in the mud." Holcomb offers advice, right photo.

Stanton Herald, Wednesday, August 24, 1988



WATER PROBLEMS LINGER — Local officials continue to ponder the flooding situation in northeast Martin County. In the top picture, James Biggs, left, and Ronnie Deatherage, county commissioners, board a plane supplied by the CRMWD, to get an aerial view of the situation. In the center photo, Morris Wilkes, administrative assistant to Sen. John Montford (D-Lubbock) and Owen Ivie, CRMWD manager, discuss the problem. The bottom photo shows a stretch of FM 846 near Knott closed by high water. Martin County Commissioners Don Tollison and E.D. "Wimp" Holcomb were named to serve on a study group along with Dawson and Howard County representatives.

Big Spring Herald

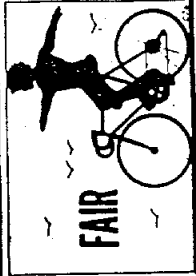
The Crossroads of West Texas

16 Pages 2 Sections Vol. 61 No. 97 35c

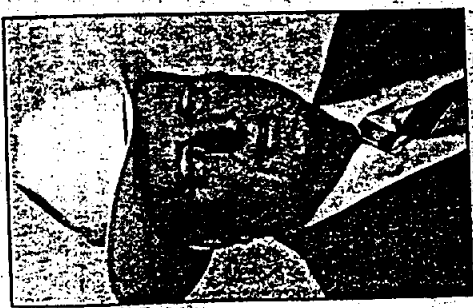
Friday
September 23, 1988

Crossroads weather

Forecast for the Big Spring area: Mostly fair, partly cloudy tonight with scattered late afternoon and nighttime thunderstorms, possibly severe. Mostly fair Saturday. Highs Saturday mainly in the 60s. Lows tonight mid 50s. High Thursday was 87, low was 60.



Sulphur Draw group studies water, funds



PAUL ALLEN

BY SARAH LUMAN
Staff Writer

STANTON — The Sulphur Draw watershed study group — meeting for the first time — has begun planning a study of flooding and possible solutions in the watershed. Also being considered is the impact on Natural Dam-Lake, Beal's Creek and Big Spring. Howard County Commissioner Paul Allen was named vice chairman of the group by acclamation Thursday. The panel named Martin County Commissioners E.D. Holcomb, chairman, and Donald Tollison, secretary, by acclamation. In a 3 1/2-hour meeting, sometimes sounded like an extended session of a county commissioners' court — the panel's members (five county commissioners and representatives from

the city of Big Spring and the Colorado River Municipal Water District) discussed possible study funding with Texas Water Development Board representatives. Reg Arnold, the board's executive administrator, also said the problems along Sulphur Draw are related to problems with Beal's Creek and Big Spring. He urged the county to plan operations. Dan Black, a financial analyst for the board, pointed out that loans are available — with interest rates varying from as low as 5 to as high as 8 1/2 percent for water development sewage treatment. In addition to these long-term bonds, the sale of state-wide flood control projects and the sale of bonds to these long-term supported loans, the panel also

But, he said, that would mean the Andrews Highway would be underwater. The lake peaked earlier this summer at almost 30,000 acre feet, Lewis said, an amount of water about equal to Lake Colorado City. The water is of poor quality and high salt content, however, and is being released gradually into Beal's Creek, eventually the saltwater arrives in Lake E.V. Spence, from which CRMWD supplies water for the cities of Big Spring, Midland, Odessa and points between. CRMWD officials have said. Allen expressed concern about the ability of Natural Dam, which is currently being strengthened by the district and has been nearly "overtopped" in the past, to definitely contain large amounts of water.

The group also heard from engineering representatives with the water development board, who offered to contract for construction of flood control projects once funding is available. Big Spring representative D.D. Johnston raised the question of the group's authority and what it will be named, saying that those details are necessary for applying to the water board for funding and other assistance with the studies. As a result, Jerry Tshauner of the Permian Basin Regional Planning Committee agreed to research the panel's legal responsibilities and provide an outline of the authority available under various names. The group will meet again after information from Decell and Tshauner becomes available. **SULPHUR page 3-A**

and approached the venue, court decision and was released on DUM

Sulphur

Continued from page 1-A
Holcomb said. He specified that the group would meet again within at least 30 days, "because if we let it go longer than that we are letting this thing lag and letting it die." Morris Wilkes, aide to Texas Senator John Montford, D-Lubbock, was also present and promised help through the senator's office to assist the group in any way possible with funds searches. He also said the senator's office will coordinate the group's work with the state

highway department. Flooding in the watershed has been blamed for repeated washouts of county and state roads, damage to croplands and farm homes, and damage to personal property. Martin County Judge Bob Deavenport estimated that losses in Martin County amount to 10,000 acres of cropland. Howard County Commissioner O.L. (Louis) Brown also attended, as did Dawson County Commissioner Rudy Arredondo. Nestor Hernandez, and Alvin Riddle,

representing the Martin County Agricultural Stabilization and Conservation Service and Soil Conservation Service respectively, also attended. Riddle and Hernandez told the panel that funds for individual farm conservation projects were available through the ASCS and SCS offices and federal farm programs. Hernandez said some \$20,000 in conservation funds had been returned to the federal government from Martin County this year — because no one applied for them.

Martin County prepares flood study

By ED TODD
Staff Writer

Friday, September 23, 1988
Midland Reporter-Telegram

STANTON — An engineering study to determine how to rid northeast Martin County of flood waters that are ruining farmland and flooding houses and roads is in the planning stages, according to Martin County Judge Bob Deavenport.

"It's serious," he said Thursday. "The rains last weekend sure didn't help anything."

Sulphur Springs Creek or Sulphur Draw, which flows southeasterly through the county, is flooding its brackish waters into cotton fields and is fueling salt-cedar shrubs, which thrives on salty soil and displaces cotton and grasses.

The runoff from summer rains has flooded farmland in the Brown and Flower Grove farming areas of Martin County and the nearby Knott community area in Howard County.

Deavenport estimated that 10,000 acres of farmland in northeast Martin County are in serious trouble.

"That farmland is either under water or is heavily damaged," Deavenport said. "That's a lot of good farmland."

And an additional 50,000 acres have been taken out of cotton production due to the overland flooding and from water rising to the topsoil from the mysteriously-rising Ogallala Aquifer. Damage to cropland, roads, houses, and other property has been estimated at \$25 million by Nestor Hernandez, Martin County executive director of the United States Department of Agriculture's Agricultural Stabilization and Conservation Service. "We've got an awful lot of cropland that's under water," Nestor said.

A state agency and area groups are studying the rising-water problem.

Reg Arnold, executive administrator for the Texas Water Development Board, and his staff are looking into the phenomenon.

"The group is going to pursue a number of resources," Deavenport said, "and work toward having an engineering study. I think they will be very cooperative in studying it (the problem)."

Arnold and four members of his staff discussed the rising water problems here Thursday with the newly-organized Sulphur Draw Study Group. Others who joined in the meeting included Rod Lewis, assistant administrator of the Colorado River Municipal Water District in Big Spring; Jerry Tschauner, planning director for the Permian Basin Regional Planning Commission in Midland, and Morris Wilkes, administrative assistant to Texas Senator John Montford of Lubbock.

Making up the Sulphur Draw Study Group are: Dawson County Commissioners Rudy Arredondo and Guy Kinnison; Howard County Commissioners Paul Allen and Louie Brown; Martin County Commissioners E.D. Holcomb and Donald Tollison, and City of Big Spring officials, D.D. Johnston, city councilman, and Tom Decell, the city's director of public works.

Holcomb, a farmer, is chairman of the study group. Allen is vice chairman. And Tollison, a businessman, is secretary.

"We need in the worst way to drain some land," Deavenport said, "but you've got to consider the impact on Natural Dam Lake."

Sulphur Draw flows into the lake, a 21,000-acre-foot impoundment west of Big Spring.

"I believe it's a little worse since the last rain," Deavenport said. "A lot of the problem in bringing more (water) through the draw."

The rising and flooding waters appeared after unusually heavy rains following a period of droughts, noted Alvin Riddle, Martin County district conservationist for the USDA's Soil Conservation Service.

The rains, which farmers usually welcome without complaint, fell generously but in quantities they didn't plan on.

"We've never had this high-intensity, short-duration rain," Riddle said. "And you can't control it. That's the same way with wind. When you've got wind blowing at 75 miles an hour, you're not going to control it."

Stanton Herald, Wednesday, October 5, 1988

Holcomb elected to head Sulphur Draw group

Representatives of local area governing bodies have continued their work concerning flooding that has occurred in Howard, Dawson and Martin Counties over the last few months. The Sulphur Draw Study Group was organized as a result of a meeting of area officials. The group is composed of two

representatives from each county as well as the city of Big Spring.

Following a recent meeting with staff members of the Texas Water Development Board the group elected officers. Commissioner E. D. Holcomb from Martin County was selected as chairman with Martin County Commissioner Donald Tollisois serving as secretary. Paul Allen, a Howard County Commissioner, is vice-chairman.

Holcomb advised that assignments were given to different group members and that the group will be meeting again shortly.

APPENDIX B

US Army Corps
of Engineers
Fort Worth District

Public Notice

Applicant: N/A

Permit Application No.: N/A

Date: May 11, 1990

The purpose of this public notice is to inform you of a proposal for work in which you might be interested. It is also to solicit your comments and information to better enable us to make a reasonable decision on factors affecting the public interest. We hope you will participate in this process.

Regulatory Program

Since its early history the US Army Corps of Engineers has played an important role in development of the nation's water resources. Originally this involved construction of harbor fortifications and coastal defenses. Later duties included the improvement of waterways to provide avenues of commerce. An important part of our mission today is the protection of the nation's waterways through the administration of the US Army Corps of Engineers Regulatory Program.

Section 10

The US Army Corps of Engineers is directed by Congress under Section 10 of the River and Harbor Act of 1899 (33 USC 403) to regulate *all work or structures in or affecting the course, condition or capacity of navigable waters of the United States*. The intent of this law is to protect the navigable capacity of waters important to interstate commerce.

Section 404

The US Army Corps of Engineers is directed by Congress under Section 404 of the Clean Water Act (33 USC 1344) to regulate the *discharge of dredged and fill material into all waters of the United States including wetlands*. The intent of this law is to protect the nation's waters from the indiscriminate discharge of material capable of causing pollution and to restore and maintain their chemical, physical and biological integrity.

Contact

Name Mr. Jim Townsend

Phone Number (817) 334-4625

SPECIAL PUBLIC NOTICE

CLEAN WATER ACT SECTION 404 REGULATORY PROGRAM
AND AGRICULTURAL ACTIVITIES

Enclosed is a copy of a Memorandum for the Field jointly prepared by the U. S. Environmental Protection Agency and the Army Corps of Engineers regarding the application of the Section 404 regulatory program to agricultural activities. The Memorandum was prepared in response to numerous questions that have been raised recently regarding the applicability of the Section 404 regulatory program to agriculture.

This Memorandum provides clarification to the Corps and EPA field offices on the applicability of the Section 404 regulatory program to agriculture. This memorandum confirms the way in which the Corps and EPA field offices have generally implemented the Section 404 program. Thus, it serves as clarification of the agencies' current field practices. It also provides information valuable for the general public clarifying the regulatory approach of the Corps on agricultural activities.

The memorandum clarifies that if a farmer is producing crops on land that has been in cultivation in an ongoing manner and he uses normal farming practices, his activities generally do not require a permit from the Corps. The memorandum provides specific information on the regulatory requirements for activities such as rotational rice farming, and fish pond construction.



United States Environmental Protection Agency
Office of Water
Washington, D.C. 20460



United States Department of the Army
Office of the Assistant Secretary
Washington, D.C. 20310-0103

1 3 MAY 1990

MEMORANDUM FOR THE FIELD

SUBJECT: Clean Water Act Section 404 Regulatory Program and Agricultural Activities

A number of questions have recently been raised about the applicability of the Clean Water Act Section 404 Regulatory Program to agriculture. This memorandum is intended to assist Section 404 field personnel in responding to those questions and to assure that the program is implemented in a consistent manner. At the outset, we should emphasize that we respect and support the underlying purposes of the Clean Water Act regarding the exemption from Section 404 permitting requirements for "normal farming" activities. The exemptions (at Section 404(f) of the Act) recognize that American agriculture fulfills the vitally important public need for supplying abundant and affordable food and fiber and it is our intent to assure that the exemptions are appropriately implemented.

What are normal farming activities? Who makes that determination? Can agricultural producers plant crops in wetlands areas that have been farmed for many years? These are questions that have generated significant confusion and concern in the agricultural community. This memorandum will explain the extent of the Section 404 program and clarify some misunderstandings that may exist in the field. Therefore we encourage you to widely distribute this memorandum.

What is Section 404?

The Federal Water Pollution Control Act Amendments of 1972 established the Section 404 Regulatory Program. Under this Act, it is unlawful to discharge dredged or fill material into waters of the United States without first receiving authorization (usually a permit) from the Corps, unless the discharge is covered under an exemption. The term "waters of the United States" defines the extent of geographic jurisdiction of the Section 404 program. The term includes such waters as rivers, lakes, streams, tidal waters, and most wetlands. A discharge of dredged or fill material involves the physical placement of soil, sand, gravel, dredged material or other such materials into the waters

of the United States. Section 404(f) exemptions, which were added in 1977, provide that discharges that are part of normal farming, ranching, and forestry activities associated with an active and continuous ("ongoing") farming or forestry operation generally do not require a Section 404 permit.

With this background in mind, we can now turn to the issues that are the focus of concern. As previously noted, Section 404(f) exempts discharges of dredged or fill material into waters of the United States associated with certain normal agricultural activities. Of course, activities that do not involve a discharge of dredged or fill material into waters of the United States never require a Section 404 permit. Further, as provided in the Interagency Federal Manual for Identifying and Delineating Jurisdictional Wetlands, while a site is effectively and legally drained to the extent that it no longer meets the regulatory wetlands hydrology criteria (as interpreted by the Interagency Manual), it is not a wetland subject to jurisdiction under Section 404 of the Clean Water Act.

What is the "normal farming" activities exemption?

The Clean Water Act exempts from the Section 404 program discharges associated with normal farming, ranching and forestry activities such as plowing, cultivating, minor drainage, and harvesting for the production of food, fiber, and forest products, or upland soil and water conservation practices (Section 404(f)(1)(A)). To be exempt, these activities must be part of an established, ongoing operation. For example, if a farmer has been plowing, planting and harvesting in wetlands, he can continue to do so without the need for a Section 404 permit, so long as he does not convert the wetlands to dry land. Activities which convert a wetland which has not been used for farming or forestry into such uses are not considered part of an established operation, and are not exempt. For example, the conversion of a bottomland hardwood wetland to crop production is not exempt.

In determining whether an activity is part of an established operation, several points need to be considered. First, the specific farming activity need not itself have been ongoing as long as it is introduced as part of an ongoing farming operation. For example, if crops have been grown and harvested on a regular basis, the mere addition or change of a cultivation technique (e.g., discing between crop rows to control weeds rather than using herbicides) is considered to be part of the established farming operation. Second, the planting of different agricultural crops as part of an established rotation (e.g., soybeans to rice) is exempt. Similarly, the rotation of rice and crawfish production is also exempt (construction of fish ponds is not an exempt activity and is addressed on page 5 of this memorandum). Third, the resumption of agricultural production in areas laying fallow as part of a normal rotational cycle are considered to be part of an established operation and would be exempted under Section 404(f).

However, if a wetland area has not been used for farming for so long that it would require hydrological modifications (modifications to the surface or groundwater flow) that would result in a discharge of dredged or fill material, the farming operation would no longer be established or ongoing.

As explained earlier, normal farming operations include cultivating, harvesting, minor drainage, plowing, and seeding. While these terms all have common, everyday definitions, it is important to recognize that these terms have specific, regulatory meanings in relation to the Section 404(f) exemptions. For example, plowing that is exempt under Section 404(f) means all mechanical means of manipulating soil, including land levelling, to prepare it for the planting of crops. However, grading activities that would change any area of waters of the United States, including wetlands, into dry land are not exempt. Minor drainage that is exempt under Section 404(f) is limited to discharges associated with the continuation of established wetland crop production (e.g., building rice levees) or the connection of upland crop drainage facilities to waters of the United States. In addition, minor drainage also refers to the emergency removal of blockages that close or constrict existing drainageways used as part of an established crop production. Minor drainage is defined such that it does not include discharges associated with the construction of ditches which drain or significantly modify any wetlands or aquatic areas considered as waters of the United States. Seeding that is exempt under Section 404(f) includes not only the placement of seeds themselves, but also the placement of soil beds for seeds or seedlings on established farm or forest lands. Cultivating under Section 404(f) includes physical methods of soil treatment to aid and improve the growth, quality, or yield of established crops. Except as provided under Section 404(f)(2) as explained below, construction or maintenance of irrigation ditches or maintenance of drainage ditches is also exempt.

Recognizing area and regional differences in normal farming practices, EPA and the Corps agree to develop additional definitions of normal farming practices in consultation with the designated Land Grant Colleges and the Cooperative Extension Services. We also further encourage our field staffs to utilize the expertise in these colleges and agricultural services in the ongoing implementation of the Section 404 program.

When the normal farming activity exemptions do not apply

Section 404(f)(2) provides that discharges related to activities that change the use of the waters of the United States, including wetlands, and reduce the reach, or impair the flow or circulation of waters of the United States are not exempted. This "recapture" provision involves a two-part test that results in an activity being considered not exempt when both parts are met: 1) does the activity represent a "new use" of the wetland and, 2) would the activity result in a "reduction in reach/impairment of flow or

circulation" of waters of the United States? Consequently, any discharge of dredged or fill material that results in the destruction of the wetlands character of an area (e.g., its conversion to uplands due to new or expanded drainage) is considered a change in use of the waters of the United States, and by definition, a reduction of their reach, and is not exempt under Section 404(f). In addition, Section 404(f)(1) of the Act provides that discharges that contain toxic pollutants listed under Section 307 are not exempted and must be permitted.

However, discharges that are not exempt are not necessarily prohibited. Non-exempted discharges must first be authorized either through a general or individual Section 404 permit before they are initiated.

What are General Permits?

Even if a farming activity is one that does not fall under an exemption and a permit is required, some farming activities are eligible for General Permits. Section 404(e) of the Act authorizes the Corps, after notice and opportunity for public hearing, to issue General Permits on a State, regional or nationwide basis for certain categories of activities involving a discharge of dredged or fill material in waters of the United States. Such activities must be similar in nature and cause only minimal adverse environmental effects. Discharges authorized under a General Permit may proceed without applying to the Corps for an individual permit. However, in some circumstances, conditions associated with a General Permit may require that persons wishing to discharge under that permit must notify the Corps or other designated State or local agency before the discharge takes place. A list of current General Permits is available from each Corps District Office, as well as information regarding notification requirements or other relevant conditions.

Rice farming

Questions have arisen regarding the relationship of the Section 404 program to rice farming. We understand these concerns, and recently have initiated actions that will allow farmers to understand better the regulatory program and provide more efficient and equitable mechanisms for implementing provisions of the Section 404 program.

In an April 19, 1990 letter responding to a request from Senator Patrick J. Leahy, Chairman, and 11 members of the Senate Committee on Agriculture, Nutrition, and Forestry, we stated our position that discharges of dredged material associated with the construction of rice levees for rice farming in wetlands which are in established agricultural crop production are "normal farming activities" within the meaning of

Section 404(f)(1)(A) and are therefore exempt from Section 404 regulation under the following conditions:

- 1) the purpose of these levees is limited to the maintenance and manipulation of shallow water levels for the production of rice crops; and
- 2) consistent with current agricultural practices associated with rice cultivation,
 - the height of the rice levees should generally not exceed 24 inches above their base; and
 - the material to be discharged for levee construction should generally be derived exclusively from the distribution of soil immediately adjacent to the constructed levee.

Land levelling for rice farming in wetlands which are in established crop production also is a "normal farming activity" within the meaning of Section 404(f)(1)(A) and is therefore exempt from Section 404 regulation.

Fish ponds

We are developing a General Permit authorizing discharges of dredged or fill material associated with the construction of levees and ditches for the construction of fish ponds in wetlands that were in agricultural crop production prior to December 23, 1985. A draft General Permit has been developed by the Vicksburg District, Army Corps of Engineers and should be issued by June 1, 1990. This General Permit should serve as a model permit for other areas of the country and this activity will be considered for a nationwide General Permit.

It should be made clear, however, that the Section 404(f) exemption for "normal farming activities" and the General Permit being developed for fish ponds apply only to the use of wetlands which are already in use for agricultural crop production. These provisions do not apply to 1) wetlands that were once in use for agricultural crop production but have lain idle so long that modifications to the hydrologic regime are necessary to resume crop production or, 2) the conversion of naturally vegetated wetlands to agriculture, such as the conversion of bottomland hardwood wetlands to agriculture.

Limitations of the Section 404(f) Exemptions

It should be emphasized that the use of Section 404(f) exemptions does not affect Section 404 jurisdiction. For example, the fact that an activity in wetlands is

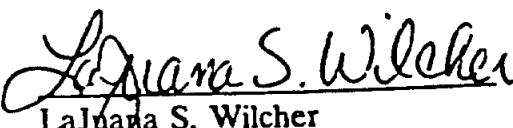
exempted as normal farming practices does not authorize the filling of the wetland for the construction of buildings without a Section 404 permit. Similarly, a Section 404 permit would be required for the discharge of dredged or fill material associated with draining a wetland area and converting it to dry land.

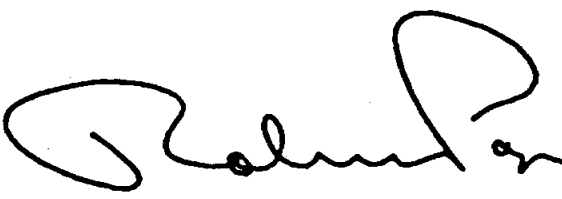
Enforcement

Given that the normal farming practices as described above are exempt from regulation under Section 404, neither EPA nor the Corps will initiate enforcement actions against farmers or other persons for engaging in such normal farming activities. Further, there will be no enforcement against actions that meet the description of activities covered by, and any conditions contained in, general permits issued by the Corps.

Conclusion

Proper implementation of the Section 404 program is an issue of extreme importance to the nation. We encourage you to distribute this memorandum not only to your staffs but to the public at large so that there will be a better general understanding of the program and how it operates. If you have any questions regarding this memorandum, please contact us or have your staff contact Suzanne Schwartz in EPA's Office of Wetlands Protection at 202-475-7799, or John Studt in the Headquarters' Office of the U.S. Army Corps of Engineers at 202-272-1785 (temporary number 202-272-1294).


LaJuana S. Wilcher
Assistant Administrator for Water
U.S. Environmental Protection Agency


Robert W. Page
Assistant Secretary of the Army
(Civil Works)

APPENDIX C

POTYLD PROGRAM

1. General Description
2. Description of Input Data

From: Modeling Reduced Water Yields into Webster Reservoir Due to Changing Land Use Practices, Michael W. Berry, Master's Thesis, Department of Civil Engineering, Kansas State University, Manhattan, Kansas.

CHAPTER 4

DESCRIPTION OF THE COMPUTER MODELS

To assess the impact of land use changes on the hydrology of the watershed, two digital computer models are used. The first program models the hydrology of the watershed and the water budget of a "typical" stockwater pond. The watershed area simulated in each run is broken down into subareas to represent the various land uses encountered. This Potential Yield Model (POTYLD) is an adaptation of the basic continuous simulation model developed at Kansas State University and described by Zovne and Koelliker (1979). Later work by Hayden (1979), Zovne (1980), and Im (1980) modified the original model further, adapting it to use in assessment of weather modification effects, design of systems for the land treatment of wastewater, evaluation and design of evaporative wastewater lagoons, and design of supplemental irrigation systems. The relevant portions of each of these models was retained and combined to produce the POTYLD model. A schematic diagram of the model is given in Figure 7.

The second computer program uses the precipitation excess information from POTYLD and annual land use information to calculate the depletions from the potential yield of the watershed. This program, called DEplete, determines how much of the depletions in water yield can be attributed to terraces, stubble-mulching, and to stockwater ponds.

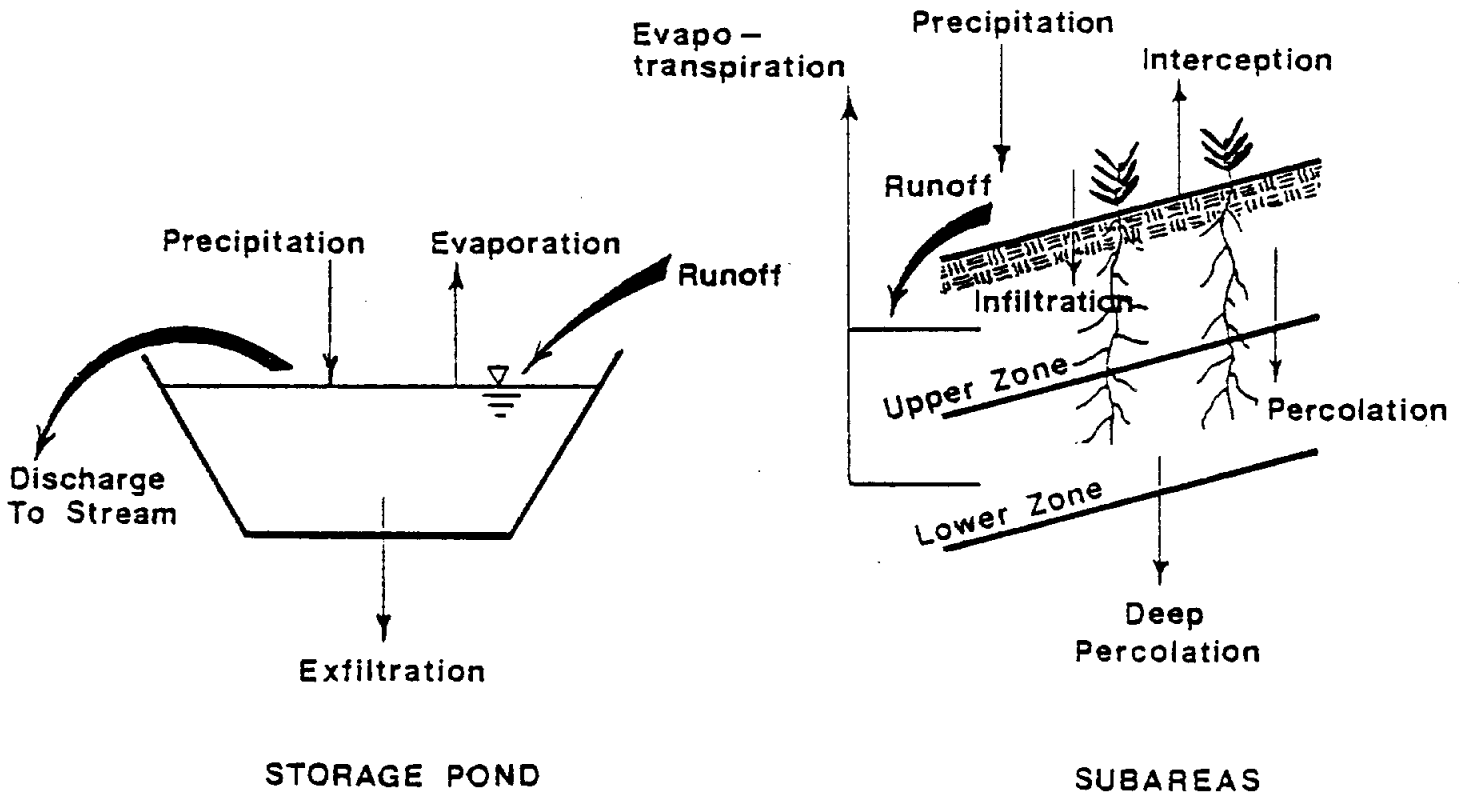


Figure 7. Modeling scheme used in POTYLD program. (Adapted from Zovne and Koelliker, 1979)

POTYLD Program

The basic elements of the POTYLD program have been previously described by Zovne and Koelliker (1979). A short summary of the model will be given here, with detailed explanations of the minor modifications made to the original model.

Potential Evapotranspiration

Potential evapotranspiration (PET) is calculated by the combined energy budget and mass transfer equation developed by Penman (1948) and modified by Jensen, et. al. (1971). This equation is of the form

$$PET = \frac{\Delta}{(\Delta + \gamma)} \cdot (R_n - G) + \frac{\gamma}{(\Delta + \gamma)} \cdot E_a \quad (1)$$

where

PET = the potential evapotranspiration

Δ = slope of the saturation vapor pressure-temperature curve

γ = the psychrometric constant

R_n = daily heat budget at the surface

G = soil heat flux, and

E_a = a function of humidity and wind speed.

The inputs used by the computer model include daily values of maximum temperature, minimum temperature, and precipitation, and long-term monthly average values for relative humidity, wind speed, solar radiation, and percentage of possible sunshine. Geographical constants which must be calibrated for each location

are also necessary (see Zovne and Koelliker, 1979).

Consumptive Use

The actual evapotranspiration for the various crop covers is calculated by means of the modified Blaney-Criddle method as described by the U. S. Soil Conservation Service (1967). The CROPCO subroutine calculates monthly crop coefficients (k) for calculation of consumptive use. Evapotranspiration occurs at the potential rate while the soil is wet, but as the soil dries, soil moisture limits the rate of evapotranspiration. Kanemasu (1975) has developed a simple relation to define the region where soil moisture limits the evapotranspiration rate. He defines the term K_s given by the relation

$$K_s = \frac{\theta_a}{(0.3 \cdot \theta_{\max})} \quad (2)$$

where

θ_a = actual available soil moisture

θ_{\max} = maximum available soil moisture.

The value of K_s varies linearly from unity when the available soil moisture is greater than $0.3\theta_{\max}$ to zero at the permanent wilting point. The consumptive use of the crop (AET) is then determined by the relation

$$AET = PET \times k \times K_s. \quad (3)$$

Inputs required for this calculation include mean monthly average temperatures, crop types, and planting and harvesting dates.

Precipitation Excess

Surface runoff for each type of land use is calculated by the SCS method. This methodology uses runoff curve numbers (CN's) to describe the runoff characteristics of each soil-crop combination. In addition, the CN for any given precipitation event depends upon the antecedent moisture condition (AMC). The SCS equation takes the form

$$Q = \frac{(P - 0.2S)^2}{(P + 0.8S)} \quad (4)$$

where

Q = calculated amount of precipitation excess

P = amount of precipitation

S = $\frac{1000}{CN} - 10$, the maximum potential

difference between rainfall and runoff.

The initial abstraction term (IA=0.2S) takes into account surface storage, interception, and infiltration before precipitation excess begins. This IA term must be satisfied before runoff occurs.

A major change from the previous version of the model should be noted here. Previously, runoff curve numbers for AMC II were programmed into the model for any given soil and crop combina-

tion. Curve numbers for AMC I and AMC III were calculated by use of regression equations. This former method did not prove satisfactory for the purposes of this study. Application of conservation treatments cause a decrease in runoff curve number. To allow the programmer maximum flexibility to define the curve number for a particular region and practice, the curve numbers for AMC I, II, and III are inputs into the model for each type of land use, for both fallow and cropped land. Such flexibility allows the programmer to modify the curve numbers to reflect changing technology and changing practices in the field.

An additional change concerns the method by which runoff curve numbers for cropped and fallow areas are assigned. The model has been changed so that in a year in which wheat is being harvested, the assigned CN for wheat will apply throughout that calendar year. In a year in which the ground lies fallow during the summer and is planted in wheat in the fall, the fallow CN is assumed to apply throughout that calendar year. It is impractical to attempt to model the decreasing CN as the crop grows and matures, and subsequently the increase in CN as the residue cover deteriorates during the fallow period. Using the above approach, the sudden transition in CN occurs during the winter season when precipitation and the potential for runoff are usually low.

Soil Evaporation, Infiltration and Redistribution

As described by Zovne and Koelliker (1979), the model assumes a rooting depth of four feet for the crop, except where

soil profile depth limitations occur. (See Fig. 8.) This growing zone is divided into two zones, the upper one foot of depth and remaining lower portion. Accounting of the soil moisture for each zone is maintained on a daily basis. As precipitation occurs, it is routed through the upper and then the lower zones. All water which percolates below the root zone is considered to be a loss to the surface water supply.

Soil evaporation occurs in two stages (Kanemasu, 1975), the first stage when the soil is wet and evaporation occurs at a constant rate equal to the evapotranspiration rate estimated for a bare soil surface. Second stage evaporation occurs when the hydraulic properties of the soil limit the evaporation rate. This stage occurs when the soil moisture falls below a threshold limit, U. The amount of evaporation for stage 2 can be calculated by the equation (see Ritchie, 1972)

$$E_2 = c't^{0.5} - c'(t - 1)^{0.5} \quad (5)$$

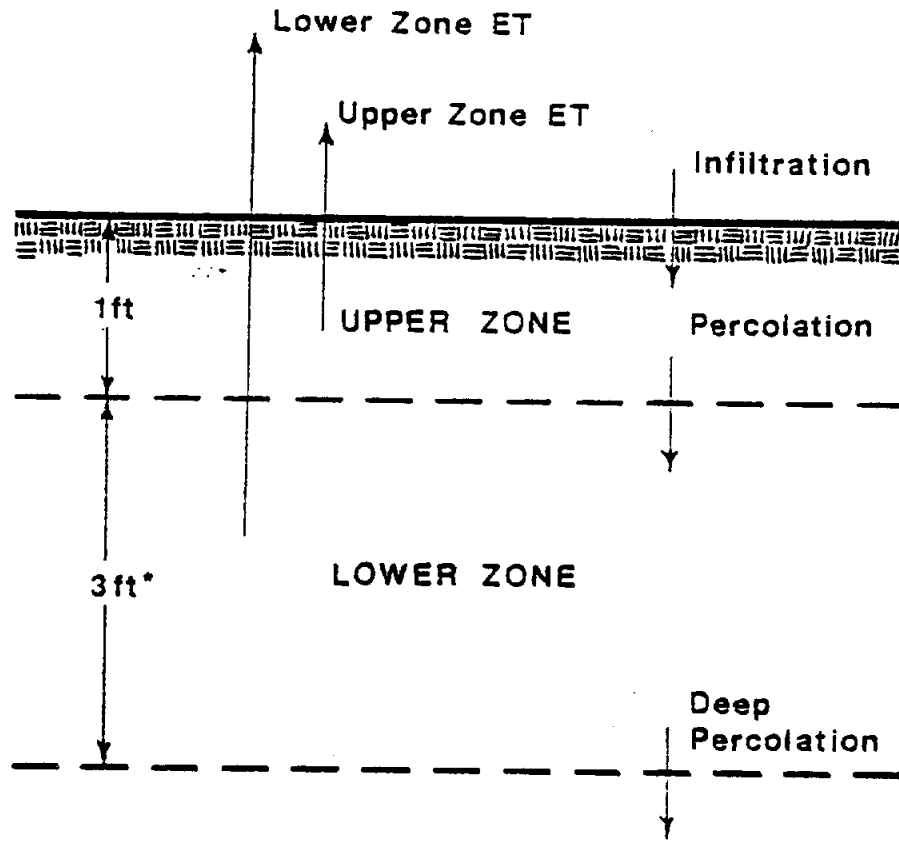
where

E_2 = stage 2 evaporation amount

c' = hydraulic coefficient

t = time after stage 1 evaporation.

Field work by Kanemasu has provided the values of U and c' used in the determination of Stage 2 evaporation. This model uses the method described by Ritchie and by Kanemasu to estimate evaporation from a bare soil surface.



* Lower zone depth is 3 feet except where soil profile limitations occur.

Figure 8. Illustration of soil moisture redistribution in the upper and lower zones of the soil profile (Adapted from Hayden, 1979)

Percolation and redistribution through the soil profile are handled by the procedure described by Zovne and Koelliker, which is a simplified form of the work by Saxton, et. al. (1974). In brief, the upper zone of the soil profile is allowed to drain to field capacity after two days, with the excess water percolated down to the lower zone. The lower zone is allowed to drain to 90% of field capacity when the time between recharges is greater than two days. Zovne and Koelliker report that this procedure results in reasonable estimates of vertical movement through the soil profile. The various soil moisture parameters used in the model are listed in Table 2, with a general description of the twelve SCS soil classes given in Table 3.

Moisture storage in the snowpack

Whenever precipitation occurs and the average daily temperature is 32° F or below, the added moisture is stored in the snowpack. The SNOWRT subroutine calculates the additions and/or deductions from the snowpack each day. A detailed explanation of the method is given in Zovne and Koelliker. Snowmelt is calculated on the degree-day approach (see Gray, 1973, pp. 9.12-9.14). Snowmelt due to rain falling on the snowpack is calculated according to the relation used by Linsley (1943). Sublimation is calculated by the Penman combination equation, using an albedo of 70%. The only inputs required for this routine are daily maximum and minimum temperatures, and the daily precipitation amount.

Table 2: Soil moisture properties used in the model

(1)	(2)	(3)	(4)		(5)		(6)		(7)		(8)	(9)
Irrigation soil class group	SCS soil profile depth ft	Soil profile depth ft	Available water inches	Upper* Lower † zone zone	Field capacity inches	Upper Lower zone zone	Permanent wilting point inches	Upper Lower zone zone	Soil moisture at saturation inches	Upper Lower zone zone	Upper limit stage 2* evapor. in.	Empirical coefficient. $c'_{-1/2}$ in.day
1	D	3.0	2.6	2.7	4.6	9.4	2.0	6.7	5.8	11.8	0.47	0.20
2	D	3.0	1.5	2.9	4.4	9.4	2.9	6.5	6.2	11.5	0.47	0.20
3	C	5.0	2.5	5.7	4.5	14.5	2.0	8.5	5.7	16.3	0.39	0.18
4	C	2.5	2.4	2.5	4.6	7.0	2.2	4.5	5.7	8.2	0.39	0.18
5	B	5.0	2.5	6.7	4.5	13.9	2.0	7.2	5.7	15.8	0.39	0.18
6	B	3.0	2.6	4.2	4.3	9.1	1.7	4.9	5.5	10.4	0.39	0.18
7	B	5.0	2.4	6.6	4.0	13.7	1.6	7.1	5.4	15.4	0.35	0.16
8	B	2.5	2.4	3.3	4.0	6.8	1.6	3.5	5.4	7.7	0.35	0.16
9	B	5.0	2.4	5.2	3.8	9.2	1.4	4.0	5.3	13.9	0.31	0.14
10	B	5.0	2.2	4.1	3.5	7.0	1.3	2.9	5.2	13.2	0.31	0.14
11	B	5.0	1.5	4.1	2.3	7.0	0.8	2.9	4.8	13.2	0.28	0.13
12	B	5.0	1.0	2.5	1.7	4.3	0.7	1.8	4.8	12.9	0.24	0.13

* Upper zone thickness is 1 ft.

† Lower zone thickness is 3 ft except where soil profile depth limitations occur.

Table 3 : SCS Irrigation Soil Class descriptions.

Irrigation Soil Class	Profile Depth (ft.)	Soil Class Description
1	3'	Deep soils with silt loam or silty clay loam surface layers and slowly to very slowly permeable heavy clay and claypan subsoils.
2	3'	Deep soils with silty clay or clay textures throughout. Surface infiltration and subsoil permeability are very slow when the soil is moist. Shrinkage from drying causes extensive cracking, resulting in high infiltration rates until swelling occurs.
3	5'	Deep soils with silt loam, loam, clay loam, or silty clay loam surface layers and clay loam, silty clay loam, or silty clay subsoils. Subsoil permeability is slow to moderately slow. Shrinkage cracks resulting from drying in the soils with more clayey subsoil textures give a relatively high initial infiltration rate.
4	2.5'	Moderately deep soils with silt loam, clay loam, or silty clay loam surface layers and clay loam or silty clay subsoils with predominately moderately slow permeability.
5	5'	Deep soils with silt loam, loam, clay loam, or silty clay loam surface layers and subsoils. Subsoil permeability: moderate to moderately slow.
6	3'	Moderately deep soils with silt loam or loam surface layers and loam, clay loam, or silty clay loam subsoils with moderate to moderately slow permeability.
7	5'	Deep soils with silt loam, loam or very fine sandy loam surface layers and moderately permeable, medium textures subsoils.
8	2.5'	Moderately deep soils with silt loam, loam or very fine sandy loam surface layers and moderately permeable clay loam, loam, or silt loam subsoils.

Table 3: (Continued) SCS Irrigation Soil Class descriptions.

9	5'	Deep soils with fine sandy loam and loam surface layers and subsoils that have moderately rapid permeability. Available water capacity is moderate to low.
10	5'	Soils are moderately deep over sand with sandy loam to loam surface layers and moderately rapid to rapidly permeable subsoils with low available water capacity.
11	5'	Deep soils with loam fine sand or loamy sand surface layers and moderately rapid to rapidly permeable subsoils.
12	5'	Deep rapidly permeable soils with sand or fine sand textures throughout.

Source: USDA, Soil Conservation Service. 1975. Kansas irrigation guide and irrigation planner's handbook. Salina, KS. pp. 3-7 to 3-18.

Modeling a Typical Pond

The original hydrologic model developed by Zovne and Koeliker contained a routine which modeled the daily budget of a waste treatment lagoon. This routine has remained essentially intact, but is now used to model the daily budget of stockwater ponds. Given an average pond watershed, the runoff which flows into the pond is calculated. Daily calculations for the pond include evaporation, exfiltration, direct precipitation, and runoff. The sum of daily discharges from the pond is the predicted yield from a pond watershed.

The pond is modeled as the inverted frustrum of a pyramid, with base width and length, side slopes, and maximum height as inputs. A major change from the previous form of the model is that a pond exfiltration subroutine developed by Im (1980) has been added. Exfiltration is assumed to occur at a constant rate expressed as inches of depth per day. This rate is multiplied by the surface area of the pond to determine the volume of exfiltrated water each day.

Output from POTYLD program

Output from the POTYLD program consists of summaries of the pond's water budget and an accounting of the soil moisture for each subarea. These summaries can be printed on either a monthly or an annual basis, which is a minor modification from the previous versions of the model. In addition, in order to work in tandem with the DEplete program, annual values of precipitation

TABLE D1: DESCRIPTION OF INPUT DATA FOR POTYLD PROGRAM

1. Program identifier literal fields. Punch alphanumeric information exactly as desired on printout.
2. Subarea and pond parameters

NAMELIST/ALPHA

<p>BRUNTA, BRUNTB : Coefficients for Penman equation based on geographical location</p> <p>E : Wind coefficient in Penman equation for calculating potential evapotranspiration</p> <p>OUTPUT : Code for type of printout</p> <p>RCROP : Reflectance coefficient for cropped areas</p>			<p>Usually 0.75</p> <p>1 : Print annual values in pond and subarea accounts</p> <p>2 : Print monthly values in pond and subarea accounts</p> <p>3 : Print annual values and punch cards for DEplete</p> <p>4 : Print monthly values and punch cards for DEplete</p> <p>Ranges from 0.20 to 0.25</p> <p>Usually 0.23</p>		
Location	BRUNTA	BRUNTB	LOCATION	BRUNTA	BRUNTB
Belleville	0.62	0.039	Hays	0.78	0.035
Chanute	0.62	0.039	Hill City	0.79	0.035
Colby	0.81	0.034	Hoxie	0.82	0.034
Dodge City	0.79	0.034	Horton	0.62	0.042
Fort Scott	0.66	0.041	Independence	0.67	0.043
Garden City	0.80	0.034	Topeka	0.66	0.041
Goodland	0.75	0.036			

NAMELIST/BETA	
DSEPRT : Daily exfiltration rate for pond in inches/day	Range from 0.0625 to 0.25 (1/16 - 1/4) in/day
HMAX : Maximum depth in pond in feet	
L : Length of pond base in feet	
NPLOTS : Number of subareas used in simulation	
S : Side slope of pond (ft/ft) expressed as run:rise	
W : Width of pond base in feet	

NAMELIST/OMEGA	
INDST : Station index number	
MSTART : Month in which simulation begins (expressed as numeral between 1 and 12)	
STORM : 25-year, 24-hour storm (inches)	
YEND : Year in which simulation ends	
YSTART : Year in which simulation begins	

Location	INDST	YSTART*	YEND*	STORM
Belleville	0682	1949	1973	5.1
Chanute	1427	1949	1979	6.7
Colby	1699	1900	1978	4.5
Dodge City	2164	1949	1973	4.6
Ellsworth	2459	1905	1970	5.4
Fort Scott	2835	1948	1979	6.6
Garden City	2980	1912	1974	4.5
Goodland	3153	1949	1973	4.3
Hays	3527	1948	1973	4.7
Hill City	3660	1920	1979	4.6
Hoxie	3837	1939	1978	4.5
Horton	3810	1900	1979	5.9
Independence	3954	1900	1979	6.7
Topeka	8167	1949	1978	6.1

* Length of record available at KSU. Any simulation period within these years may be run.

3. Monthly meteorological data

PSUNS : Long-term average percentage of sunshine (%)
 RHD : Long-term average relative humidity (%)
 WIND : Long-term average wind speed (mi/hr)
 RA : Mid-monthly intensity of solar radiation (mm/day)
 MMAT : Mean monthly air temperature (°F)

Location	Month	PSUNS	RHD	RA	WIND	MMAT
Colby	Jan.	0.68	76	6.16	12.4	25.8
	Feb.	0.63	79	8.44	12.5	30.2
	Mar.	0.66	78	11.11	14.4	36.5
	Apr.	0.64	78	13.96	14.1	47.2
	May	0.66	83	15.91	13.6	58.1
	June	0.75	79	16.69	12.9	68.5
	July	0.78	80	16.29	11.9	75.6
	Aug.	0.78	82	14.83	11.5	73.9
	Sep.	0.77	74	12.28	11.9	64.6
	Oct.	0.75	75	9.43	11.6	52.1
	Nov.	0.70	76	6.85	11.9	37.5
	Dec.	0.68	76	5.65	11.3	28.6
Hill City	Jan.	0.66	77	6.16	13.0	28.0
	Feb.	0.63	79	8.44	13.2	32.6
	Mar.	0.66	77	11.11	15.0	39.8
	Apr.	0.64	78	13.96	14.8	51.0
	May	0.66	82	15.91	14.2	60.9
	June	0.75	80	16.69	13.5	71.4
	July	0.79	78	16.29	12.2	78.0
	Aug.	0.78	82	14.83	12.0	76.4
	Sep.	0.78	74	12.28	12.6	67.5
	Oct.	0.74	76	9.43	12.4	55.4
	Nov.	0.70	76	6.85	12.6	40.4
	Dec.	0.68	77	5.65	13.0	31.1
Hoxie	Jan.	0.66	77	6.16	13.0	28.0
	Feb.	0.63	70	8.44	13.2	32.6
	Mar.	0.66	77	11.11	15.0	39.8
	Apr.	0.64	78	13.96	14.8	51.0
	May	0.66	82	15.91	14.2	60.9
	June	0.75	80	16.60	13.5	71.4
	July	0.79	78	16.29	12.2	78.0
	Aug.	0.78	82	14.83	12.0	76.4
	Sep.	0.78	74	12.28	12.6	67.5
	Oct.	0.74	76	9.43	12.4	55.4
	Nov.	0.70	76	6.85	12.6	40.4
	Dec.	0.68	77	5.65	13.0	31.1

4. Subarea parameters

ISOIL : SCS irrigation soil class	
ICROP : Crop code	1 : wheat 2 : sorgnum 3 : corn 4 : soybeans 5 : pasture 6 : alfalfa 7 : fallow
AREA : Area of pond watershed represented by subarea (acres)	
RCNI, RCNII, RCNIII : Runoff curve numbers for cropped area for AMC I, II, and III	
MGSBP : Month growing season begins	1 to 12
DGSBP : Day of month growing season begins	
MGSEP : Month growing season ends	1 to 12
DGSEP : Day of month growing season begins <i>ends</i>	
ROTATE : Indicator for wheat/fallow rotation	1 : no rotation 2 : fallow in first year 3 : wheat in first year
POND : Indicator for subarea which represents part of pond watershed	1 : subarea does not drain into pond 2 : subarea drains into pond

TERR : Indicator for subarea with terraces	1. no terraces
MUL : Indicator for stubble mulch practice	2. terraces
FLRCN1, FLRCN2, FLRCN3 : Runoff curve number for fallow areas for AMC I, II, and III	1. no stubble mulch
	2. stubble mulch

5. Daily meteorological data

KAN : 2-digit state code
STIND : 4-digit state code
YEAR : year (last two digits)
MONTH : month
PREC : 31 values of daily precipitation
TMAX : 31 values of maximum daily temperature
TMIN : 31 values of minimum daily temperature

POTYLD PROGRAM

1. Input Data for Ackerly-Knott Area Simulation (1944-1988)
2. Annual Summary (Note: only the 1944 Annual Summary is included herein for example)
3. Final Summary (Averages of moisture accounts for the simulation period)

Ackerly Area

Pond Vol = 4476 af
(Alternative #1)

Simulation Period 1944 thru 1988

MARTIN COUNTY TX					
LEVEL, OPEN	END				
0.75	0.033	0.75	2.2	0.23	
0.0625	20.00	1500.	75.	1500.	
5158	1	1988	1944	2	2
JAN	0.68	55.	8.0	10.3	44.
FEB	0.70	52.	10.1	10.3	47.
MAR	0.73	42.	12.3	13.8	54.
APR	0.70	45.	14.6	13.8	64.
MAY	0.75	50.	16.0	13.8	74.
JUN	0.83	50.	16.5	11.2	80.
JUL	0.79	50.	16.2	11.2	82.
AUG	0.78	50.	15.2	11.2	82.
SEP	0.75	52.	13.2	8.0	74.
OCT	0.75	52.	10.9	8.0	64.
NOV	0.75	52.	8.6	8.0	51.
DEC	0.65	50.	7.5	10.3	45.
CN	11 2	15489	52. 71. 86.	4 20 9 30	1 2 2 2
PS	11 5	5163.	41. 61. 78.	1 1 12 31	1 2 1 1

DUMP OF INPUT VALUES

MARTIN COUNTY TX					
.7500	.0330	.7500	2.2000	.2300	
.0625	20.0000	1500.0000	75.0000	1500.0000	
5158	1	1988	1944	2	2
	.68	55.	8.00	10.3	44.0
	.70	52.	10.10	10.3	47.0
	.73	42.	12.30	13.8	54.0
	.70	45.	14.60	13.8	64.0
	.75	50.	16.00	13.8	74.0
	.83	50.	16.50	11.2	80.0
	.79	50.	16.20	11.2	82.0
	.78	50.	15.20	11.2	82.0
	.75	52.	13.20	8.0	74.0
	.75	52.	10.90	8.0	64.0
	.75	52.	8.60	8.0	51.0
	.65	50.	7.50	10.3	45.0
11 2	*****	52. 71. 86.	4 20 9 30	1 2 2 2	0. 0. 0.
11 5	5163.	41. 61. 78.	1 1 12 31	1 2 1 1	0. 0. 0.

STATION: MARTNTY 1944 TO 1988

SIZE OF CRITICAL EVENT: 2.20 INCHES

POND VARIABLES:

(A) BASE DIMENSIONS-- 1500.00 FEET BY 1500.00 FEET

(B) SIDE SLOPE-- RUN:RISE = 75. : 1

(C) MAXIMUM DEPTH-- 20.00 FEET

(D) MAXIMUM POND VOLUME-- 53719.01 ACRE-INCHES

4476 af

(E) MAXIMUM POND SURFACE AREA-- 464.88 ACRES

(F) DAILY SEEPAGE RATE-- .06250 INCHES/DAY

(G) DRAINAGE AREA-- 20652.00 ACRES

AREA VARIABLES:

SUBAREA 1

- (A) AREA-- ^{15,489} ***** ACRES
- (B) CROP-- COTTON
- (C) SOIL TYPE-- 11 (SCS SOIL TYPE)
- (D) CONSERVATION PRACTICES-- FLOW INTO POND TERRACES--LEVEL, OPEN END STUBBLE MULCHED
- (E) RUNOFF CURVE NUMBERS: ANTECEDENT MOISTURE CONDITION I 52.
 ANTECEDENT MOISTURE CONDITION II 71.
 ANTECEDENT MOISTURE CONDITION III 86.

SUBAREA 2

- (A) AREA-- ⁵¹⁶³ ***** ACRES
- (B) CROP-- PASTUR E
- (C) SOIL TYPE-- 11 (SCS SOIL TYPE)
- (D) CONSERVATION PRACTICES-- FLOW INTO POND TERRACES--NONE
- (E) RUNOFF CURVE NUMBERS: ANTECEDENT MOISTURE CONDITION I 41.
 ANTECEDENT MOISTURE CONDITION II 61.
 ANTECEDENT MOISTURE CONDITION III 78.

**** ANNUAL SUMMARY ****

9/25/44 CRITICAL EVENT EXCEEDED 2.25 INCH STORM

WATER ACCOUNT FOR THE POND IN ACRE-INCHES - 1944

MONTH	INFLOWS		OUTFLOWS				
	PRECIPITATION	PRECIP. EXCESS	SURFACE EVAP.	EXFILTRATION	DISCHARGE	VOL. CHANGE	HEIGHT
JAN.	67.3	1359.5	175.0	124.2	.0	1127.5	1.58
FEB.	116.1	32.1	256.9	122.4	.0	-231.1	1.29
MAR.	.0	.0	364.1	120.2	.0	-484.4	.64
APR.	.0	.0	328.1	84.0	.0	-412.0	.02
MAY	80.9	.0	70.6	10.3	.0	.0	.00
JUNE	44.0	.0	44.0	.0	.0	.0	.01
JULY	31.1	.0	27.8	3.3	.0	.0	.02
AUG.	36.8	.0	36.8	.0	.0	.0	.02
SEPT	161.4	262.2	94.1	27.7	.0	301.8	.49
OCT.	24.8	.0	238.3	88.3	.0	-301.8	.00
NOV.	117.4	290.7	84.8	53.2	.0	270.2	.43
DEC.	69.5	.0	138.7	105.8	.0	-175.0	.16
TOT.	749.2	1944.5	1859.2	739.3	.0	95.2	.16

SNOW MOISTURE INFORMATION:

MOISTURE STORED IN SNOW PACK ON DEC. 31--- .00 CHANGE IN SNOW STORAGE DURING 1944--- .00

CHANGE IN SOIL MOISTURE = (INPUTS) - (OUTPUTS) - (CHANGE IN SNOW STORAGE)

SUBAREA NO. 1

AREA-- 15489. ACRES SOIL TYPE--11 CROP--COTTON RUNOFF CURVE NUMBERS: AMCI--52. AMCII--71. AMCIIII--86.
 FLOW INTO POND TERRACES--LEVEL, OPEN END STUBBLE MULCHED
 WATER BALANCE (INCHES) IN THE SUBAREA - 1944

MONTH	INPUTS		OUTPUTS				CHANGE IN SM	SOIL MOISTURE
	PRECIPITATION	INTERCEPTION	PRECIP. EXCESS	PERCOLATION	AET			
JAN.	1.16	.20	.09	4.29	1.17	-4.60	8.00	
FEB.	1.73	.50	.00	.13	.95	.15	8.15	
MAR.	.00	.00	.00	.00	.37	-.37	7.78	
APR.	.00	.00	.00	.00	.61	-.61	7.18	
MAY	1.56	.30	.00	.00	3.68	-2.42	4.75	
JUNE	.85	.40	.00	.00	1.41	-.96	3.79	
JULY	.60	.10	.00	.00	.58	-.08	3.70	
AUG.	.71	.40	.00	.00	.21	.10	3.80	
SEPT	3.12	.20	.02	.00	1.31	1.59	5.40	
OCT.	.44	.10	.00	.00	1.00	-.66	4.74	
NOV.	2.25	.50	.02	.00	1.01	.72	5.46	
DEC.	1.28	.30	.00	.00	.82	.16	5.62	
TOT.	13.70	3.00	.13	4.42	13.14	-6.98	5.62	

SUBAREA NO. 2

AREA-- 5163. ACRES SOIL TYPE--11 CROP--PASTUR E RUNOFF CURVE NUMBERS: AMCI--41. AMCII--61. AMCIIII--78.
 FLOW INTO POND TERRACES--NONE
 WATER BALANCE (INCHES) IN THE SUBAREA - 1944

MONTH	INPUTS		OUTPUTS				CHANGE IN SM	SOIL MOISTURE
	PRECIPITATION	INTERCEPTION	PRECIP. EXCESS	PERCOLATION	AET			
JAN.	1.16	.20	.00	4.59	.58	-4.20	8.40	
FEB.	1.73	.50	.00	.31	1.01	-.09	8.31	
MAR.	.00	.00	.00	.00	2.48	-2.48	5.83	
APR.	.00	.00	.00	.00	1.66	-1.66	4.17	
MAY	1.56	.30	.00	.00	1.59	-.33	3.84	
JUNE	.85	.40	.00	.00	.57	-.12	3.72	
JULY	.60	.10	.00	.00	.52	-.02	3.70	
AUG.	.71	.40	.00	.00	.21	.10	3.80	
SEPT	3.12	.20	.00	.00	1.51	1.41	5.21	
OCT.	.44	.10	.00	.00	1.56	-1.22	3.99	
NOV.	2.25	.50	.00	.00	.47	1.28	5.27	
DEC.	1.28	.30	.00	.00	.54	.44	5.70	
TOT.	13.70	3.00	.00	4.90	12.70	-6.90	5.70	

MONTH	INFLOWS		OUTFLOWS				VOL. CHANGE	HEIGHT
	PRECIPITATION	PRECIP. EXCESS	SURFACE EVAP.	EXFILTRATION	DISCHARGE			
JAN.	61.4	284.2	133.6	85.4	.0	126.7	.36	
FEB.	24.9	.0	165.6	81.2	.0	-221.8	.01	
MAR.	45.5	.0	.0	.0	.0	45.5	.01	
APR.	21.3	.0	56.2	10.6	.0	-45.5	.01	
MAY	9.3	.0	9.3	.0	.0	.0	.02	
JUNE	68.4	.0	58.5	9.8	.0	.0	.01	
JULY	343.6	.0	290.9	52.7	.0	.0	.02	
AUG.	63.8	.0	59.2	4.5	.0	.0	.03	
SEPT	168.4	225.4	38.1	10.4	.0	345.3	.54	
OCT.	232.3	3312.0	453.3	179.8	.0	2911.2	3.73	
NOV.	33.3	.0	322.4	176.8	.0	-465.9	3.31	
DEC.	54.5	.0	232.0	173.4	.0	-350.8	2.98	
TOT.	1126.8	3821.6	1819.2	784.5	.0	2344.6	2.98	

SNOW MOISTURE INFORMATION:

MOISTURE STORED IN SNOW PACK ON DEC. 31--- .00 CHANGE IN SNOW STORAGE DURING 1945--- .00

CHANGE IN SOIL MOISTURE = (INPUTS) - (OUTPUTS) - (CHANGE IN SNOW STORAGE)

***** FINAL SUMMARY *****

METEOROLOGICAL SUMMARY

STATION: MARTNTY 1944 TO 1988 45 TOTAL YEARS

AVERAGE ANNUAL LAKE EVAPORATION= 73.28 INCHES

AVERAGE ANNUAL PRECIPITATION= 16.82 INCHES

PRECIPITATION RANGE= 36.12 INCHES (FROM A LOW OF 5.29 INCHES TO A HIGH OF 41.41 INCHES)

AVERAGE MOISTURE DEFICIT= 56.46 INCHES

SUMMARY OF POND OPERATIONS

NUMBER OF YEARS HAVING A DISCHARGE = 1

AVERAGE NUMBER OF DISCHARGES PER YEAR HAVING A DISCHARGE = 6.00

AVERAGE DAILY DISCHARGE VOLUME = 4099.13 ACRE-INCHES

MAXIMUM DAILY DISCHARGE VOLUME = 15430.47 ACRE-INCHES

AVERAGE DISCHARGE VOLUME PER YEAR HAVING A DISCHARGE = 24594.80 ACRE-INCHES

TOTAL DISCHARGE VOLUME= 24594.80 ACRE-INCHES

AVERAGE ANNUAL DIRECT PRECIPITATION VOLUME= 1784.20 ACRE-INCHES

AVERAGE ANNUAL PRECIPITATION EXCESS VOLUME FLOWING INTO POND= 6302.11 ACRE-INCHES

AVERAGE ANNUAL EVAPORATION VOLUME= 5526.52 ACRE-INCHES

AVERAGE ANNUAL EXFILTRATION= 1795.10 ACRE-INCHES

AVERAGE ANNUAL DISCHARGE VOLUME = 546.55 ACRE-INCHES

Total loss 7321 ac
O-A 1/3 2440 ac
M-S 2/3 4880 ac

SUMMARY OF WATERSHED SUBAREAS

SUBAREA NO. 1

AVERAGE ANNUAL PRECIPITATION EXCESS = .39 INCHES

AVERAGE ANNUAL PERCOLATION = .67 INCHES

AVERAGE ANNUAL INTERCEPTION = 3.23 INCHES

AVERAGE ANNUAL EVAPOTRANSPIRATION = 12.68 INCHES

AVERAGE ANNUAL CHANGE IN SOIL MOISTURE = -.14 INCHES

SUBAREA NO. 2

AVERAGE ANNUAL PRECIPITATION EXCESS = .07 INCHES

AVERAGE ANNUAL PERCOLATION = .49 INCHES

AVERAGE ANNUAL INTERCEPTION = 3.23 INCHES

AVERAGE ANNUAL EVAPOTRANSPIRATION = 13.21 INCHES

AVERAGE ANNUAL CHANGE IN SOIL MOISTURE = -.18 INCHES

SUMMARY OF STATISTICAL DATA

PRECIPITATION FREQUENCY DATA

INTENSITY (IN.)	FREQUENCY (%)	FREQUENCY (DAYS)	RUNOFF FREQ. (DAYS)
>0.0	100.00	1757.00	107.00
>0.1	68.13	1197.00	107.00
>0.2	54.98	966.00	107.00
>0.3	43.77	769.00	107.00
>0.4	34.26	602.00	102.00
>0.5	28.51	501.00	99.00
>0.6	23.51	413.00	94.00
>0.7	19.24	338.00	90.00
>0.8	15.08	265.00	88.00
>0.9	13.03	229.00	80.00
>1.0	10.87	191.00	68.00
>1.1	9.05	159.00	66.00
>1.2	8.03	141.00	61.00
>1.3	6.60	116.00	57.00
>1.4	5.58	98.00	56.00
>1.5	4.61	81.00	55.00
>1.6	3.76	66.00	51.00
>1.7	3.53	62.00	50.00
>1.8	2.79	49.00	48.00
>1.9	2.79	49.00	48.00
>2.0	2.56	45.00	44.00
>3.0	.57	10.00	10.00
>4.0	.17	3.00	3.00
>5.0	.11	2.00	2.00
>10.	.00	.00	.00

RUNOFF FREQUENCY DATA

INTENSITY (IN.)	FREQUENCY (%)				FREQUENCY (DAYS)			
	PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 1	PLOT 2	PLOT 3	PLOT 4
>0.0	100.00	100.00	.00	.00	110.00	17.00	.00	.00
>0.1	30.00	29.41	.00	.00	33.00	5.00	.00	.00
>0.2	14.55	23.53	.00	.00	16.00	4.00	.00	.00
>0.3	12.73	23.53	.00	.00	14.00	4.00	.00	.00
>0.4	10.00	11.76	.00	.00	11.00	2.00	.00	.00
>0.5	9.09	11.76	.00	.00	10.00	2.00	.00	.00
>0.6	8.18	11.76	.00	.00	9.00	2.00	.00	.00
>0.7	7.27	5.88	.00	.00	8.00	1.00	.00	.00
>0.8	7.27	5.88	.00	.00	8.00	1.00	.00	.00
>0.9	6.36	5.88	.00	.00	7.00	1.00	.00	.00
>1.0	5.45	5.88	.00	.00	6.00	1.00	.00	.00
>1.1	3.64	.00	.00	.00	4.00	.00	.00	.00
>1.2	2.73	.00	.00	.00	3.00	.00	.00	.00
>1.3	2.73	.00	.00	.00	3.00	.00	.00	.00
>1.4	1.82	.00	.00	.00	2.00	.00	.00	.00
>1.5	1.82	.00	.00	.00	2.00	.00	.00	.00
>1.6	1.82	.00	.00	.00	2.00	.00	.00	.00
>1.7	.91	.00	.00	.00	1.00	.00	.00	.00
>1.8	.91	.00	.00	.00	1.00	.00	.00	.00
>1.9	.91	.00	.00	.00	1.00	.00	.00	.00
>2.0	.91	.00	.00	.00	1.00	.00	.00	.00
>3.0	.00	.00	.00	.00	.00	.00	.00	.00
>4.0	.00	.00	.00	.00	.00	.00	.00	.00
>5.0	.00	.00	.00	.00	.00	.00	.00	.00
>10.	.00	.00	.00	.00	.00	.00	.00	.00

APPENDIX D

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*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
*   FEBRUARY 1981                 *
*   REVISED 02 AUG 88             *
*
* RUN DATE 09/13/1990 TIME 12:58:23 *
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*
* U.S. ARMY CORPS OF ENGINEERS *
* THE HYDROLOGIC ENGINEERING CENTER *
*   609 SECOND STREET           *
*   DAVIS, CALIFORNIA 95616     *
*
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X   X  XXXXXXX  XXXXX      X
X   X  X      X   X      XX
X   X  X      X           X
XXXXXXX XXXX  X      XXXXX  X
X   X  X      X           X
X   X  X      X   X      X
X   X  XXXXXXX  XXXXX      XXX
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:: Full Microcomputer Implementation ::
::           by                       ::
::           Haestad Methods, Inc.    ::
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37 Brookside Road * Waterbury, Connecticut 06708 * (203) 755-1666

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

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

LINE	ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
1	ID MARTIN COUNTY FLOOD CONTROL STUDY JOB NO. 06901-001-036
2	ID HYDROLOGIC ANALYSIS OF SULPHUR SPRINGS DRAW WATERSHED FOR
3	ID 10-YR, 25-YR, 50-YR, 100-YR AND PMP STORMS.
4	ID
5	ID
6	IT 60 300
7	IO 5 0
8	JP 5
9	KK UP-STH
10	KM COMPUTE RUNOFF HYDROGRAPH FOR UPPER SULPHUR SPRINGS DRAW SOUTH
11	KM SUBBASIN.
12	KP 1
13	KM PLAN 1: 10-YR STORM
14	PH 10 380.9 0.51 1.07 2.10 2.30 2.50 3.00 3.40 4.00
15	PH 5.10 5.65
16	BA 150.4
17	LS 0 74
18	UD 28.5
19	KP 2
20	KM PLAN 2: 25-YR STORM
21	PH 4 380.9 0.60 1.28 2.56 2.70 2.90 3.30 4.00 4.40
22	PH 5.85 6.40
23	KP 3
24	KM PLAN 3: 50-YR STORM
25	PH 2 380.9 0.68 1.44 2.90 3.10 3.30 4.00 4.40 5.00
26	PH 6.70 7.40
27	KP 4
28	KM PLAN 4: 100-YR STORM
29	PH 1 380.9 0.75 1.60 3.25 3.50 3.60 4.30 5.00 5.80
30	PH 7.60 8.45
31	KP 5
32	KM PLAN 5: PROBABLE MAXIMUM STORM
33	IN 30
34	PI 0.034 0.034 0.034 0.034 0.034 0.034 0.034 0.034 0.034 0.034
35	PI 0.034 0.034 0.042 0.042 0.042 0.042 0.042 0.042 0.042 0.042
36	PI 0.042 0.042 0.042 0.042 0.053 0.053 0.053 0.053 0.053 0.053
37	PI 0.053 0.053 0.053 0.053 0.053 0.053 0.072 0.072 0.072 0.072
38	PI 0.072 0.072 0.072 0.072 0.072 0.072 0.072 0.072 0.101 0.103
39	PI 0.105 0.108 0.110 0.113 0.116 0.119 0.122 0.126 0.130 0.134
40	PI 0.214 0.224 0.235 0.247 0.260 0.274 0.289 0.306 0.324 0.343
41	PI 0.363 0.384 0.451 0.626 0.722 0.852 0.971 1.722 2.444 1.136
42	PI 0.968 0.741 0.684 0.548 0.205 0.196 0.187 0.179 0.171 0.164
43	PI 0.158 0.153 0.148 0.144 0.140 0.137 0.089 0.089 0.089 0.089
44	PI 0.089 0.089 0.089 0.089 0.089 0.089 0.089 0.089 0.061 0.061
45	PI 0.061 0.061 0.061 0.061 0.061 0.061 0.061 0.061 0.061 0.061
46	PI 0.046 0.046 0.046 0.046 0.046 0.046 0.046 0.046 0.046 0.046
47	PI 0.046 0.046 0.038 0.038 0.038 0.038 0.038 0.038 0.038 0.038
48	PI 0.038 0.038 0.038 0.038
49	BA 150.4
50	LS 0 88
51	UD 28.5

LINE	ID	1	2	3	4	5	6	7	8	9	10
52	KK	UP-NTH									
53	KM	COMPUTE RUNOFF HYDROGRAPH FRO UPPER SULPHUR SPRINGS DRAW NORTH									
54	KM	SUBBASIN									
55	KP	1									
56	KM	PLAN 1: 10-YR STORM									
57	PH	10	380.9	0.51	1.07	2.10	2.30	2.50	3.00	3.40	4.00
58	PH	5.10	5.65								
59	BA	141.3									
60	LS	0	74								
61	UD	27.8									
62	KP	2									
63	KM	PLAN 2: 25-YR STORM									
64	PH	4	380.9	0.60	1.28	2.56	2.70	2.90	3.30	4.00	4.40
65	PH	5.85	6.40								
66	KP	3									
67	KM	PLAN 3: 50-YR STORM									
68	PH	2	380.9	0.68	1.44	2.90	3.10	3.30	4.00	4.40	5.00
69	PH	6.70	7.40								
70	KP	4									
71	KM	PLAN 4: 100-YR STORM									
72	PH	1	380.9	0.75	1.60	3.25	3.50	3.60	4.30	5.00	5.80
73	PH	7.60	8.45								
74	KP	5									
75	KM	PLAN 5: PROBABLE MAXIMUM STORM									
76	IN	30									
77	PI	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
78	PI	0.035	0.035	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042
79	PI	0.042	0.042	0.042	0.042	0.054	0.054	0.054	0.054	0.054	0.054
80	PI	0.054	0.054	0.054	0.054	0.054	0.054	0.074	0.074	0.074	0.074
81	PI	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.103	0.105
82	PI	0.107	0.109	0.112	0.115	0.118	0.121	0.125	0.128	0.132	0.137
83	PI	0.221	0.231	0.243	0.255	0.269	0.285	0.301	0.319	0.338	0.359
84	PI	0.381	0.404	0.477	0.672	0.779	0.925	1.056	1.931	2.776	1.245
85	PI	1.056	0.800	0.737	0.586	0.211	0.201	0.192	0.183	0.175	0.168
86	PI	0.162	0.156	0.151	0.147	0.143	0.140	0.091	0.091	0.091	0.091
87	PI	0.091	0.091	0.091	0.091	0.091	0.091	0.091	0.091	0.062	0.062
88	PI	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062
89	PI	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047
90	PI	0.047	0.047	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038
91	PI	0.038	0.038	0.038	0.038						
92	BA	141.3									
93	LS	0	88								
94	UD	27.8									
95	KK	UPPER									
96	KM	COMBINE HYDROGRAPHS AT CONFLUENCE									
97	HC	2									
98	KK	ROUTE2									
99	KM	ROUTE COMBINED HYDROGRAPHS TO CONFLUENCE (138,000 FEET)									
100	RM	19	15.3	0.2							

LINE	ID	1	2	3	4	5	6	7	8	9	10
101	KK	PLAINS									
102	KM	COMPUTE RUNOFF HYDROGRAPH FOR SUBBASIN CONTAINING PLAINS, TX									
103	KP	1									
104	KM	PLAN 1: 10-YR STORM									
105	PH	10	380.9	0.56	1.14	2.15	2.50	2.70	3.20	3.70	4.30
106	PH	5.10	5.65								
107	BA	133.9									
108	LS	6.0	74								
109	UD	28.8									
110	KP	2									
111	KM	PLAN 2: 25-YR STORM									
112	PH	4	380.9	0.65	1.35	2.58	2.80	3.10	3.60	4.40	4.90
113	PH	5.85	6.40								
114	KP	3									
115	KM	PLAN 3: 50-YR STORM									
116	PH	2	380.9	0.72	1.52	2.92	3.30	3.60	4.20	4.90	5.60
117	PH	6.70	7.40								
118	KP	4									
119	KM	PLAN 4: 100-YR STORM									
120	PH	1	380.9	0.80	1.68	3.25	3.70	4.00	4.80	5.40	6.30
121	PH	7.60	8.45								
122	KP	5									
123	KM	PLAN 5: PROBABLE MAXIMUM STORM									
124	IN	30									
125	PI	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
126	PI	0.035	0.035	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043
127	PI	0.043	0.043	0.043	0.043	0.054	0.054	0.054	0.054	0.054	0.054
128	PI	0.054	0.054	0.054	0.054	0.054	0.054	0.075	0.075	0.075	0.075
129	PI	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.104	0.106
130	PI	0.108	0.111	0.113	0.116	0.119	0.122	0.126	0.130	0.134	0.138
131	PI	0.225	0.236	0.248	0.261	0.276	0.292	0.309	0.328	0.349	0.370
132	PI	0.394	0.418	0.498	0.710	0.826	0.985	1.126	2.097	3.041	1.333
133	PI	1.127	0.848	0.780	0.616	0.215	0.205	0.195	0.186	0.178	0.170
134	PI	0.164	0.158	0.153	0.148	0.145	0.142	0.092	0.092	0.092	0.092
135	PI	0.092	0.092	0.092	0.092	0.092	0.092	0.092	0.092	0.063	0.063
136	PI	0.063	0.063	0.063	0.063	0.063	0.063	0.063	0.063	0.063	0.063
137	PI	0.048	0.048	0.048	0.048	0.048	0.048	0.048	0.048	0.048	0.048
138	PI	0.048	0.048	0.039	0.039	0.039	0.039	0.039	0.039	0.039	0.039
139	PI	0.039	0.039	0.039	0.039						
140	BA	133.9									
141	LS	6.0	88								
142	UD	28.8									
143	KK	CNTRL1									
144	KM	COMBINE ROUTED HYDROGRAPH WITH PLAINS HYDROGRAPH AT CONFLUENCE									
145	HC	2									
146	KK	ROUTE3									
147	KM	ROUTE COMBINED HYDROGRAPH TO CENTRL CONFLUENCE (43,000 FEET)									
148	RM	6	4.8	0.2							

LINE	ID	1	2	3	4	5	6	7	8	9	10
149	KK	CENTRL									
150	KM	COMPUTE RUNOFF HYDROGRAPH FOR CENTRAL SULPHUR SPRINGS SUBBASIN									
151	KP	1									
152	KM	PLAN 1: 10-YR STORM									
153	PH	10	380.9	0.56	1.14	2.15	2.50	2.70	3.20	3.70	4.30
154	PH	5.10	5.65								
155	BA	187.7									
156	LS	6.0	74								
157	UD	34.4									
158	KP	2									
159	KM	PLAN 2: 25-YR STORM									
160	PH	4	380.9	0.65	1.35	2.58	2.80	3.10	3.60	4.40	4.90
161	PH	5.85	6.40								
162	KP	3									
163	KM	PLAN 3: 50-YR STORM									
164	PH	2	380.9	0.72	1.52	2.92	3.30	3.60	4.20	4.90	5.60
165	PH	6.70	7.40								
166	KP	4									
167	KM	PLAN 4: 100-YR STORM									
168	PH	1	380.9	0.80	1.68	3.25	3.70	4.00	4.80	5.40	6.30
169	PH	7.60	8.45								
170	KP	5									
171	KM	PLAN 5: PROBABLE MAXIMUM STORM									
172	IN	30									
173	PI	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034
174	PI	0.034	0.034	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041
175	PI	0.041	0.041	0.041	0.041	0.053	0.053	0.053	0.053	0.053	0.053
176	PI	0.053	0.053	0.053	0.053	0.053	0.053	0.072	0.072	0.072	0.072
177	PI	0.072	0.072	0.072	0.072	0.072	0.072	0.072	0.072	0.101	0.103
178	PI	0.105	0.107	0.110	0.113	0.116	0.119	0.122	0.126	0.130	0.134
179	PI	0.214	0.224	0.234	0.246	0.259	0.273	0.289	0.306	0.324	0.343
180	PI	0.363	0.385	0.453	0.631	0.729	0.860	0.979	1.723	2.438	1.143
181	PI	0.977	0.748	0.690	0.552	0.205	0.196	0.187	0.179	0.171	0.164
182	PI	0.158	0.153	0.148	0.144	0.140	0.137	0.089	0.089	0.089	0.089
183	PI	0.089	0.089	0.089	0.089	0.089	0.089	0.089	0.089	0.061	0.061
184	PI	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.061
185	PI	0.046	0.046	0.046	0.046	0.046	0.046	0.046	0.046	0.046	0.046
186	PI	0.046	0.046	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037
187	PI	0.037	0.037	0.037	0.037						
188	BA	187.7									
189	LS	6.0	88								
190	UD	34.4									
191	KK	CNTRL2									
192	KM	COMBINE ROUTED HYDROGRAPH WITH CENTRAL SULPHUR SPRINGS SUBBASIN									
193	HC	2									
194	KK	ROUTE4									
195	KM	ROUTE COMBINED HYDROGRAPH TO UPPER WELCH BASIN CONFLUENCE (81,600 FT)									
196	RM	12	9.1	0.2							

LINE	ID	1	2	3	4	5	6	7	8	9	10
197	KK	UP-WCH									
198	KM	COMPUTE RUNOFF HYDROGRAPH FOR UPPER WELCH OIL FIELD SUBBASIN									
199	KP	1									
200	KM	PLAN 1: 10-YR STORM									
201	PH	10	380.9	0.56	1.14	2.15	2.50	2.70	3.20	3.70	4.30
202	PH	5.10	5.65								
203	BA	51.9									
204	LS	9.4	74								
205	UD	11.9									
206	KP	2									
207	KM	PLAN 2: 25-YR STORM									
208	PH	4	380.9	0.65	1.35	2.58	2.80	3.10	3.60	4.40	4.90
209	PH	5.85	6.40								
210	KP	3									
211	KM	PLAN 3: 50-YR STORM									
212	PH	2	380.9	0.72	1.52	2.92	3.30	3.60	4.20	4.90	5.60
213	PH	6.70	7.40								
214	KP	4									
215	KM	PLAN 4: 100-YR STORM									
216	PH	1	380.9	0.80	1.68	3.25	3.70	4.00	4.80	5.40	6.30
217	PH	7.60	8.45								
218	KP	5									
219	KM	PLAN 5: PROBABLE MAXIMUM STORM									
220	IN	30									
221	PI	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025
222	PI	0.025	0.025	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031
223	PI	0.031	0.031	0.031	0.031	0.039	0.039	0.039	0.039	0.039	0.039
224	PI	0.039	0.039	0.039	0.039	0.039	0.039	0.053	0.053	0.053	0.053
225	PI	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.075	0.076
226	PI	0.077	0.079	0.081	0.083	0.085	0.087	0.090	0.093	0.095	0.098
227	PI	0.153	0.159	0.165	0.173	0.181	0.190	0.200	0.211	0.223	0.235
228	PI	0.249	0.264	0.309	0.423	0.478	0.534	0.590	0.649	0.687	0.613
229	PI	0.583	0.483	0.458	0.374	0.148	0.142	0.136	0.131	0.126	0.121
230	PI	0.117	0.113	0.110	0.106	0.104	0.101	0.065	0.065	0.065	0.065
231	PI	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.045	0.045
232	PI	0.045	0.045	0.045	0.045	0.045	0.045	0.045	0.045	0.045	0.045
233	PI	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034
234	PI	0.034	0.034	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028
235	PI	0.028	0.028	0.028	0.028						
236	BA	51.9									
237	LS	9.4	88								
238	UD	11.9									
239	KK	NECK									
240	KM	COMBINE UPPER WELCH RUNOFF HYDROGRAPH WITH ROUTED HYDROGRAPH									
241	HC	2									
242	KK	ROUTE5									
243	KM	ROUTE COMBINED HYDROGRAPH TO WELCH FIELD CONFLUENCE (92,000 FEET)									
244	RM	13	10.2	0.2							

LINE	ID	1	2	3	4	5	6	7	8	9	10
245	KK	WLCH-S									
246	KM	COMPUTE RUNOFF HYDROGRAPH FOR WELCH FIELD SOUTH SUBBASIN									
247	KP	1									
248	KM	PLAN 1: 10-YR STORM									
249	PH	10	380.9	0.58	1.16	2.18	2.60	2.80	3.40	3.90	4.60
250	PH	5.10	5.65								
251	BA	40.3									
252	LS	9.4	74								
253	UD	16.7									
254	KP	2									
255	KM	PLAN 2: 25-YR STORM									
256	PH	4	380.9	0.67	1.37	2.62	3.10	3.30	3.80	4.70	5.30
257	PH	5.85	6.40								
258	KP	3									
259	KM	PLAN 3: 50-YR STORM									
260	PH	2	380.9	0.75	1.54	2.96	3.40	3.70	4.40	5.30	6.10
261	PH	6.70	7.40								
262	KP	4									
263	KM	PLAN 4: 100-YR STORM									
264	PH	1	380.9	0.82	1.70	3.30	3.80	4.20	5.10	5.90	6.90
265	PH	7.60	8.45								
266	KP	5									
267	KM	PLAN 5: PROBABLE MAXIMUM STORM									
268	IN	30									
269	PI	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
270	PI	0.016	0.016	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
271	PI	0.020	0.020	0.020	0.020	0.025	0.025	0.025	0.025	0.025	0.025
272	PI	0.025	0.025	0.025	0.025	0.025	0.025	0.035	0.035	0.035	0.035
273	PI	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.048	0.049
274	PI	0.050	0.051	0.053	0.054	0.055	0.057	0.058	0.060	0.062	0.064
275	PI	0.099	0.103	0.107	0.112	0.117	0.122	0.127	0.133	0.138	0.144
276	PI	0.151	0.157	0.176	0.223	0.246	0.268	0.291	0.304	0.308	0.298
277	PI	0.287	0.248	0.238	0.203	0.095	0.091	0.088	0.085	0.082	0.079
278	PI	0.076	0.074	0.072	0.069	0.067	0.066	0.042	0.042	0.042	0.042
279	PI	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.029	0.029
280	PI	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029
281	PI	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022
282	PI	0.022	0.022	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
283	PI	0.018	0.018	0.018	0.018						
284	BA	40.3									
285	LS	9.4	88								
286	UD	16.7									
287	KK	WLCH-N									
288	KM	COMPUTE RUNOFF HYDROGRAPH FOR WELCH FIELD NORTH SUBBASIN									
289	KP	1									
290	KM	PLAN 1: 10-YR STORM									
291	PH	10	380.9	0.58	1.16	2.18	2.60	2.80	3.40	3.90	4.60
292	PH	5.10	5.65								
293	BA	38.7									
294	LS	9.4	74								
295	UD	15.2									
296	KP	2									
297	KM	PLAN 2: 25-YR STORM									


```

*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1)
*   FEBRUARY 1981
*   REVISED 02 AUG 88
*
* RUN DATE 09/13/1990 TIME 12:58:23
*
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*****
*
* U.S. ARMY CORPS OF ENGINEERS
* THE HYDROLOGIC ENGINEERING CENTER
*   609 SECOND STREET
*   DAVIS, CALIFORNIA 95616
*
*****

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MARTIN COUNTY FLOOD CONTROL STUDY JOB NO. 06901-001-036
HYDROLOGIC ANALYSIS OF SULPHUR SPRINGS DRAW WATERSHED FOR
10-YR, 25-YR, 50-YR, 100-YR AND PMP STORMS.

7 IO OUTPUT CONTROL VARIABLES

```

      IPRNT            5   PRINT CONTROL
      IPLOT            0   PLOT CONTROL
      QSCAL            0.   HYDROGRAPH PLOT SCALE

```

IT HYDROGRAPH TIME DATA

```

      NMIN            60   MINUTES IN COMPUTATION INTERVAL
      IDATE           1   0   STARTING DATE
      ITIME           0000   STARTING TIME
      NQ              300   NUMBER OF HYDROGRAPH ORDINATES
      NDDATE          13   0   ENDING DATE
      NDTIME          1100   ENDING TIME
      ICENT           19   CENTURY MARK

```

```

COMPUTATION INTERVAL    1.00 HOURS
TOTAL TIME BASE        299.00 HOURS

```

ENGLISH UNITS

```

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

```

JP MULTI-PLAN OPTION

```

      NPLAN            5   NUMBER OF PLANS

```

JR MULTI-RATIO OPTION

```

      RATIOS OF RUNOFF
      1.00

```


PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
 FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
 TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS	
				RATIO 1	
					1.00
HYDROGRAPH AT	UP-STH	150.40	1	FLOW	5254.
				TIME	81.00
			2	FLOW	6549.
				TIME	81.00
			3	FLOW	8117.
				TIME	81.00
			4	FLOW	9901.
				TIME	80.00
			5	FLOW	47726.
				TIME	68.00
HYDROGRAPH AT	UP-NTH	141.30	1	FLOW	5026.
				TIME	81.00
			2	FLOW	6262.
				TIME	80.00
			3	FLOW	7762.
				TIME	80.00
			4	FLOW	9464.
				TIME	80.00
			5	FLOW	46098.
				TIME	67.00
2 COMBINED AT	UPPER	291.70	1	FLOW	10281.
				TIME	81.00
			2	FLOW	12810.
				TIME	81.00
			3	FLOW	15875.
				TIME	80.00
			4	FLOW	19365.
				TIME	80.00
			5	FLOW	93777.
				TIME	68.00
ROUTED TO	ROUTE2	291.70	1	FLOW	10165.
				TIME	97.00
			2	FLOW	12670.
				TIME	97.00
			3	FLOW	15693.
				TIME	96.00
			4	FLOW	19127.
				TIME	96.00
			5	FLOW	92626.
				TIME	83.00
HYDROGRAPH AT	PLAINS	133.90	1	FLOW	0.
				TIME	1.00
			2	FLOW	1.
				TIME	123.00
			3	FLOW	390.

TIME 107.00
4 FLOW 1200.
TIME 99.00
5 FLOW 33047.
TIME 71.00

2 COMBINED AT CNTRL1 425.60

1 FLOW 10165.
TIME 97.00
2 FLOW 12670.
TIME 97.00
3 FLOW 16023.
TIME 97.00
4 FLOW 20316.
TIME 96.00
5 FLOW 119986.
TIME 81.00

ROUTED TO ROUTE3 425.60

1 FLOW 10129.
TIME 102.00
2 FLOW 12625.
TIME 102.00
3 FLOW 15967.
TIME 102.00
4 FLOW 20247.
TIME 101.00
5 FLOW 119487.
TIME 85.00

HYDROGRAPH AT CENTRL 187.70

1 FLOW 0.
TIME 1.00
2 FLOW 2.
TIME 129.00
3 FLOW 489.
TIME 113.00
4 FLOW 1516.
TIME 105.00
5 FLOW 39621.
TIME 77.00

2 COMBINED AT CNTRL2 613.30

1 FLOW 10129.
TIME 102.00
2 FLOW 12625.
TIME 102.00
3 FLOW 16387.
TIME 102.00
4 FLOW 21734.
TIME 101.00
5 FLOW 156308.
TIME 84.00

ROUTED TO ROUTE4 613.30

1 FLOW 10067.
TIME 111.00
2 FLOW 12551.
TIME 111.00
3 FLOW 16293.
TIME 111.00
4 FLOW 21602.
TIME 110.00
5 FLOW 155242.
TIME 93.00

HYDROGRAPH AT	UP-WCH	51.90	1	FLOW	0.
				TIME	1.00
			2	FLOW	0.
				TIME	1.00
			3	FLOW	0.
				TIME	1.00
			4	FLOW	0.
				TIME	1.00
			5	FLOW	18810.
				TIME	53.00

2 COMBINED AT	NECK	665.20	1	FLOW	10067.
				TIME	111.00
			2	FLOW	12551.
				TIME	111.00
			3	FLOW	16293.
				TIME	111.00
			4	FLOW	21602.
				TIME	110.00
			5	FLOW	156098.
				TIME	93.00

ROUTED TO	ROUTE5	665.20	1	FLOW	9993.
				TIME	121.00
			2	FLOW	12462.
				TIME	121.00
			3	FLOW	16181.
				TIME	121.00
			4	FLOW	21457.
				TIME	121.00
			5	FLOW	154922.
				TIME	103.00

HYDROGRAPH AT	WLCH-S	40.30	1	FLOW	0.
				TIME	1.00
			2	FLOW	0.
				TIME	1.00
			3	FLOW	0.
				TIME	1.00
			4	FLOW	0.
				TIME	1.00
			5	FLOW	11084.
				TIME	59.00

HYDROGRAPH AT	WLCH-N	38.70	1	FLOW	0.
				TIME	1.00
			2	FLOW	0.
				TIME	1.00
			3	FLOW	0.
				TIME	1.00
			4	FLOW	0.
				TIME	1.00
			5	FLOW	11338.
				TIME	58.00

HYDROGRAPH AT	DIRECT	27.00	1	FLOW	3157.
				TIME	55.00
			2	FLOW	4047.
				TIME	55.00

			3	FLOW	5031.
				TIME	55.00
			4	FLOW	6107.
				TIME	55.00
			5	FLOW	19395.
				TIME	45.00
4 COMBINED AT	WELCH	771.20	1	FLOW	9994.
				TIME	121.00
			2	FLOW	12463.
				TIME	121.00
			3	FLOW	16182.
				TIME	121.00
			4	FLOW	21458.
				TIME	121.00
			5	FLOW	156151.
				TIME	103.00
ROUTED TO	ROUTE6	771.20	1	FLOW	9878.
				TIME	138.00
			2	FLOW	12319.
				TIME	138.00
			3	FLOW	16007.
				TIME	138.00
			4	FLOW	21226.
				TIME	137.00
			5	FLOW	154355.
				TIME	119.00
HYDROGRAPH AT	PLAYA	353.20	1	FLOW	0.
				TIME	1.00
			2	FLOW	0.
				TIME	1.00
			3	FLOW	0.
				TIME	1.00
			4	FLOW	0.
				TIME	1.00
			5	FLOW	60963.
				TIME	78.00
HYDROGRAPH AT	LAMESA	62.20	1	FLOW	5196.
				TIME	59.00
			2	FLOW	6718.
				TIME	59.00
			3	FLOW	8344.
				TIME	59.00
			4	FLOW	10072.
				TIME	59.00
			5	FLOW	31665.
				TIME	49.00
3 COMBINED AT	INFLOW	1186.60	1	FLOW	9879.
				TIME	138.00
			2	FLOW	12320.
				TIME	138.00
			3	FLOW	16008.
				TIME	138.00
			4	FLOW	21228.
				TIME	137.00
			5	FLOW	168725.

			TIME	118.00
ROUTED TO	DAM	1186.60	1 FLOW	9101.
			TIME	145.00
			2 FLOW	12097.
			TIME	141.00
			3 FLOW	15889.
			TIME	140.00
			4 FLOW	21100.
			TIME	139.00
			5 FLOW	168494.
			TIME	119.00

** PEAK STAGES IN FEET **

1	STAGE	2661.40
	TIME	145.00
2	STAGE	2661.88
	TIME	141.00
3	STAGE	2662.43
	TIME	140.00
4	STAGE	2663.12
	TIME	139.00
5	STAGE	2674.97
	TIME	119.00

SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION DAM

PLAN 1

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	2630.00	2659.30	2675.00
STORAGE	1446.	22114.	42452.
OUTFLOW	0.	859.	169027.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	2661.40	.00	24833.	9101.	.00	145.00	.00

PLAN 2

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	2630.00	2659.30	2675.00
STORAGE	1446.	22114.	42452.
OUTFLOW	0.	859.	169027.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	2661.88	.00	25458.	12097.	.00	141.00	.00

PLAN 3

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	2630.00	2659.30	2675.00
STORAGE	1446.	22114.	42452.
OUTFLOW	0.	859.	169027.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	2662.43	.00	26175.	15889.	.00	140.00	.00

PLAN 4

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	2630.00	2659.30	2675.00
STORAGE	1446.	22114.	42452.
OUTFLOW	0.	859.	169027.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	2663.12	.00	27067.	21100.	.00	139.00	.00

PLAN 5

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	2630.00	2659.30	2675.00
STORAGE	1446.	22114.	42452.
OUTFLOW	0.	859.	169027.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	2674.97	.00	42409.	168494.	.00	119.00	.00

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

APPENDIX E


```
*****  
* WATER SURFACE PROFILES *  
* VERSION OF SEPTEMBER 1988 *  
* * * * *  
* UPDATED: 4 APRIL 1989 *  
* RUN DATE 2/27/90 TIME 15:48:11 *  
*****
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```
*****  
* U.S. ARMY CORPS OF ENGINEERS *  
* THE HYDROLOGIC ENGINEERING CENTER *  
* 609 SECOND STREET, SUITE D *  
* DAVIS, CALIFORNIA 95616-4687 *  
* * * * *  
*****
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  X  X  XXXXXXXX  XXXXX  XXXXX  
  X  X  X      X  X      X  X  
  X  X  X      X      X  
  XXXXXXXX  XXXX  X      XXXXX  XXXXX  
  X  X  X      X      X  
  X  X  X      X  X      X  
  X  X  XXXXXXXX  XXXXX  XXXXXXXX
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:::~::~  
:::~::~  
:::~::~  
::: FULL MICRO-COMPUTER IMPLEMENTATION :::~::~  
:::~::~  
:::~::~  
:::~::~  
:::~::~
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=====
H A E S T A D M E T H O D S
=====

37 Brookside Road * Waterbury, Connecticut 06708 * (203) 755-1666

---END OF BANNER

THIS RUN EXECUTED 2/27/90 15:48:11

 HEC2 RELEASE DATED SEP 88 UPDATED APR 1989

ERROR CORR - 01,02
 MODIFICATION -

 T1 MARTIN COUNTY FLOOD STUDY HDR ENGINEERING, INC.
 T2 JOB # 06901-001-036 AUSTIN, TEXAS
 T3 SULPHUR SPRINGS DRAW
 T4 WATER SURFACE PROFILE FOR SULPHUR SPRINGS DRAW FROM MARTIN COUNTY/
 T5 HOWARD COUNTY LINE TO MARTIN COUNTY/DAWSON COUNTY LINE (32.6 MILES).

JOB CONTROL

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0	2	0	0	.0013000	0	0.0155	0	2480	
J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	1	0	-1							
J3	VARIABLE CODES FOR SUMMARY PRINTOUT									
	38	43	1	42	8	25	26	4	37	13
	14	15	66							

J5 LPRNT NUMSEC *****REQUESTED SECTION NUMBERS*****

-10 -10

DISCHARGE

QT	14	500	1000	2000	3000	4000	5000	7500	10000	12500
QT	15000	17500	20000	25000	30000					

BEGIN CROSS SECTION DATA

CROSS SECTION DATA TAKEN FROM USGS 7 1/2 MINUTE QUADRANGLE MAPS AT A SCALE OF 1 INCH = 2000 FEET AND A CONTOUR INTERVAL OF 5 FEET.

CROSS SECTION I.D. NUMBER EQUALS DISTANCE IN FEET UPSTREAM OF MARTIN COUNTY/HOWARD COUNTY LINE MINUS 1000 FEET.

 NC .045 .045 .04 .1 .3

CROSS SECTION 1000 EQUALS SECTION TAKEN ACROSS SULPHUR SPRINGS DRAW
AT MARTIN COUNTY/HOWARD COUNTY LINE

X1	1000	20	4100	4720	0	0	0			
GR	2490	3000	2490	3900	2485	3950	2480	4000	2475	4100
GR	2470	4275	2467	4412	2470	4550	2475	4720	2480	4880
GR	2485	4950	2490	5050	2495	5150	2500	5300	2500	6150
GR	2500	6700	2505	8400	2510	9700	2515	11500	2525	15100
X1	2200	31	5520	6600	1200	1200	1200			
GR	2525	1000	2525	1300	2525	1900	2520	2050	2515	2200
GR	2510	2350	2505	2600	2500	2750	2495	2900	2490	3000
GR	2485	3110	2480	3300	2475	3500	2475	3850	2480	4800
GR	2480	5400	2475	5520	2470	6000	2468.5	6200	2470	6400
GR	2475	6600	2480	6720	2485	6850	2490	7000	2495	7180
GR	2500	7300	2505	7420	2505	7800	2500	10000	2505	10600
GR	2525	17400								
X1	4200	15	4250	5850	2000	2000	2000			
GR	2540	1000	2525	1700	2510	2850	2505	3050	2505	3800
GR	2500	3900	2485	4250	2475	4550	2470	4925	2475	5300
GR	2480	5850	2495	6250	2500	7100	2505	8300	2525	15000
X1	6200	14	2850	4800	2000	2000	2000			
GR	2540	1000	2525	1550	2500	2500	2495	2600	2485	2850
GR	2480	3200	2475	3400	2475	3600	2480	4400	2495	4800
GR	2500	5450	2505	5850	2515	8700	2525	12100		
X1	8200	15	5350	6200	2000	2000	2000			
GR	2540	1000	2525	2100	2500	2800	2495	4250	2485	5350
GR	2480	5550	2478	5600	2480	5650	2485	6200	2500	6700
GR	2510	7300	2515	9100	2525	12500	2535	16200	2540	17400
X1	10200	11	4900	6550	2000	2000	2000			
GR	2540	1000	2525	2100	2500	2800	2495	4900	2485	5500
GR	2481	5850	2485	6200	2500	6550	2510	6700	2525	11200
GR	2540	14800								
X1	12200	11	4600	6500	2000	2000	2000			
GR	2540	1000	2525	2100	2500	2800	2495	4600	2485	4900
GR	2483	5500	2485	6100	2500	6500	2505	7600	2525	9900
GR	2540	13300								
X1	14200	11	2400	3750	2000	2000	2000			
GR	2540	1000	2530	1500	2525	1700	2500	2400	2490	2650
GR	2485	3050	2490	3450	2500	3750	2505	5800	2525	9600
GR	2540	12400								
X1	16200	13	5100	6550	2000	2000	2000			
GR	2540	1000	2525	1600	2515	2900	2510	3200	2500	4600
GR	2495	5100	2490	5400	2487	5750	2490	6100	2500	6550
GR	2505	7900	2525	11700	2540	14500				

CROSS SECTION 17600 LOCATED JUST DOWNSTREAM OF RED LAKE CONFLUENCE

X1	36100	9	1800	3700	2000	2000	2000			
GR	2550	1000	2525	1600	2520	1800	2515	2000	2515	3400
GR	2525	3700	2535	4000	2540	4700	2550	5600		
X1	40000	11	1500	2600	3900	3900	3900			
GR	2550	1000	2525	1350	2520	1500	2515	2100	2514	2200
GR	2515	2300	2520	2600	2525	2700	2540	3000	2545	5600
GR	2550	7000								
X1	42500	12	2400	4200	2500	2500	2500			
GR	2550	1000	2545	1250	2545	1900	2540	2100	2535	2400
GR	2525	2600	2520	3200	2520	3300	2525	3900	2535	4200
GR	2540	4750	2550	9400						
X1	48300	11	4300	5200	5800	5800	5800			
GR	2550	1000	2540	1200	2530	4300	2525	4800	2523.8	4900
GR	2525	5000	2530	5200	2540	5400	2545	6300	2545	9800
GR	2550	10400								
X1	51300	11	3000	4150	3000	3000	3000			
GR	2550	1000	2545	1200	2540	1800	2530	3000	2530	3200
GR	2530	3950	2525	4000	2525	4050	2530	4150	2535	5450
GR	2550	5800								
X1	53100	14	4650	7200	1800	1800	1800			
GR	2575	1000	2565	1200	2560	1800	2555	2100	2550	2400
GR	2550	3800	2550	4400	2540	4650	2535	5400	2530	5450
GR	2535	5500	2540	7200	2550	7650	2575	13600		
X1	54100	12	3100	6200	1000	1000	1000			
GR	2575	1000	2555	2100	2550	3100	2540	3500	2535	4200
GR	2535	4300	2540	5400	2545	5500	2550	6200	2555	6400
GR	2560	7600	2575	11500						
X1	58100	14	4300	7650	4000	4000	4000			
GR	2575	1000	2565	1600	2560	2100	2560	3250	2560	3600
GR	2555	4200	2550	4300	2545	4500	2545	5000	2540	6000
GR	2540	6100	2545	7100	2550	7650	2570	8500		
X1	61100	11	2800	6000	3000	3000	3000			
GR	2575	1000	2565	1600	2560	2800	2550	4500	2545	4900
GR	2545	5000	2555	5800	2560	6000	2550	6700	2550	7300
GR	2575	8800								
X1	64300	14	2900	6550	3200	3200	3200			
GR	2575	1000	2565	2300	2560	2900	2555	3150	2550	6050
GR	2550	6150	2555	6250	2560	6550	2565	6800	2565	8100
GR	2565	9000	2570	10500	2570	14500	2575	15400		

X1	66700	9	3100	4550	2400	2400	2400				
GR	2575	1000	2570	1600	2565	2100	2560	3100	2555	4000	
GR	2552.5	4105	2555	4210	2560	4550	2575	4900			
X1	68800	9	2800	3700	2100	2100	2100				
GR	2575	1000	2570	1850	2570	2400	2565	2500	2560	2800	
GR	2555	3200	2555	3300	2560	3700	2575	4050			
X1	71500	8	2100	4100	2700	2700	2700				
GR	2590	1000	2575	2100	2560	2750	2557	2925	2560	3100	
GR	2565	3950	2575	4100	2590	6100					
X1	75000	12	4000	5700	3500	3500	3500				
GR	2600	1000	2595	1300	2575	4000	2570	4250	2565	4300	
GR	2560	4400	2560	4500	2560	5000	2565	5500	2575	5700	
GR	2595	6300	2600	7200							
X1	78500	9	2900	4200	3500	3500	3500				
GR	2600	1000	2595	1600	2575	2900	2570	3000	2565	3850	
GR	2565	3900	2570	4000	2595	4200	2600	5400			
X1	80500	10	2400	3200	2000	2000	2000				
GR	2600	1000	2590	1300	2580	1900	2575	2400	2570	2600	
GR	2570	2700	2570	3000	2570	3100	2575	3200	2600	3800	
X1	84000	11	4000	6400	3500	3500	3500				
GR	2625	1000	2605	3300	2605	3900	2600	4000	2580	4300	
GR	2575	5300	2575	5450	2580	5500	2585	5700	2600	6400	
GR	2625	9600									
X1	87500	11	3700	4650	3500	3500	3500				
GR	2625	1000	2615	2500	2600	3200	2585	3700	2580	4300	
GR	2580	4400	2585	4650	2590	5000	2600	5200	2620	6200	
GR	2625	6900									
X1	89600	9	1800	4000	2100	2100	2100				
GR	2625	1000	2600	1800	2590	2050	2585	2200	2585	2900	
GR	2590	3500	2595	3850	2600	4000	2625	5400			
X1	92000	11	5200	6650	2400	2400	2400				
GR	2650	1000	2630	2700	2625	4700	2600	5200	2595	5350	
GR	2590	5700	2590	6450	2595	6600	2600	6650	2610	6750	
GR	2625	8200									
X1	93800	9	3450	7100	1800	1800	1800				
GR	2645	1000	2625	2250	2615	3450	2600	4800	2595	5400	
GR	2595	6300	2600	6550	2625	7100	2645	7900			

X1	96200	11	3300	4450	2400	2400	2400			
GR	2650	1000	2645	1400	2625	2500	2615	2900	2610	3300
GR	2600	3900	2598	4175	2600	4450	2625	5200	2640	6700
GR	2650	9100								
X1	97700	11	5250	5600	1500	1500	1500			
GR	2650	1000	2635	2100	2625	4400	2620	4900	2605	5250
GR	2600	5400	2600	5500	2605	5600	2625	5800	2640	6500
GR	2650	9000								
X1	101000	12	4850	6200	3300	3300	3300			
GR	2650	1000	2640	2500	2635	4400	2625	4850	2610	4950
GR	2610	5050	2608	5150	2610	5250	2610	5750	2625	6200
GR	2645	6700	2650	7100						
X1	103650	13	5300	6750	2650	2650	2650			
GR	2660	1000	2650	3700	2645	4450	2640	4650	2625	4950
GR	2625	5300	2610	5600	2610	5975	2610	6350	2615	6600
GR	2625	6750	2650	7100	2660	7350				
X1	106250	13	4400	5650	2600	2600	2600			
GR	2675	1000	2665	1750	2650	3100	2650	3950	2650	4200
GR	2625	4400	2615	4800	2610	5350	2610	5400	2615	5500
GR	2625	5650	2650	5900	2675	7200				

CROSS SECTION 107800 LOCATED AT POTENTIAL STRUCTURE LOCATION

X1	107800	20	3300	4500	1550	1550	1550			
GR	2680	1000	2675	1900	2670	2100	2665	2600	2660	2750
GR	2655	3150	2650	3300	2630	3400	2625	3450	2620	3650
GR	2615	3750	2613.5	3825	2615	3900	2620	4150	2625	4300
GR	2630	4400	2650	4500	2660	4700	2675	5400	2680	6800
X1	109900	16	5150	5850	2100	2100	2100			
GR	2700	1000	2675	3200	2670	3400	2665	3850	2665	4200
GR	2665	4700	2650	4900	2625	5150	2620	5400	2617.5	5500
GR	2620	5600	2625	5850	2650	6350	2670	6800	2675	7200
GR	2700	9900								
X1	111700	11	3600	4750	1800	1800	1800			
GR	2695	1000	2680	2400	2675	2950	2670	3300	2650	3600
GR	2625	3900	2620.3	4100	2625	4300	2650	4750	2675	5500
GR	2690	7000								
X1	115300	14	3700	6100	3600	3600	3600			
GR	2700	1000	2685	2500	2685	3200	2675	3400	2650	3700
GR	2640	3900	2635	4000	2635	4800	2630	5100	2627	5375
GR	2630	5650	2650	6100	2675	6250	2700	8000		

X1	117400	17	3200	5400	2100	2100	2100			
GR	2700	1000	2690	1700	2685	2400	2675	2650	2650	3200
GR	2645	3300	2640	3500	2640	3700	2635	3900	2630	4500
GR	2630	4550	2630	4600	2635	5050	2650	5400	2675	5850
GR	2680	6000	2700	8100						

CROSS SECTION 120100 LOCATED UPSTREAM OF ALKALI LAKE TRIBUTARY CONFLUENCE

X1	120100	14	1800	4900	2700	2700	2700			
GR	2700	1000	2675	1600	2650	1800	2645	1900	2640	2100
GR	2635	2900	2634	4500	2635	4700	2640	4800	2650	4900
GR	2675	5400	2680	5600	2685	6600	2700	8300		

X1	122500	11	2650	4200	2400	2400	2400			
GR	2700	1000	2675	2150	2650	2650	2645	2800	2640	3000
GR	2639	3200	2640	3400	2645	4100	2650	4200	2675	4800
GR	2700	7100								

X1	125500	14	1450	4300	3000	3000	3000			
X3	10							2680	2680	
GR	2700	1000	2675	1450	2655	1900	2650	2300	2645	2800
GR	2650	3300	2675	3700	2680	4300	2675	4800	2655	5800
GR	2651	6100	2655	6300	2675	6700	2700	9700		

X1	129500	19	4600	6000	4000	4000	4000			
X3	10							2680	2680	
GR	2700	1000	2690	1700	2685	2700	2685	3600	2685	4100
GR	2685	4600	2675	4900	2660	5250	2655	5500	2655	5600
GR	2660	5700	2675	5900	2680	6000	2660	6700	2657.5	6950
GR	2660	7200	2690	7800	2695	9500	2700	10600		

X1	131200	19	5800	7500	1700	1700	1700			
X3	10							2690	2690	
GR	2700	1000	2695	1600	2690	3000	2685	3850	2675	4050
GR	2675	5800	2665	6050	2660	6250	2660	6350	2665	6800
GR	2670	7050	2675	7200	2690	7500	2675	8450	2670	8550
GR	2668.5	8625	2670	8700	2695	9350	2700	10500		

X1	132800	16	6500	8000	1600	1600	1600			
X3	10							2690	2690	
GR	2700	1000	2695	1400	2695	2600	2690	3700	2685	4600
GR	2675	5200	2675	6500	2665	6900	2662	7075	2665	7250
GR	2675	7500	2685	7700	2690	8000	2676	8400	2695	9200
GR	2700	10000								

X1	137500	12	4250	5100	4700	4700	4700			
GR	2700	1000	2695	1800	2690	2300	2685	2900	2675	4250
GR	2670	4350	2668	4500	2670	5000	2675	5100	2690	5450
GR	2695	5700	2700	7500						

X1	141900	16	10300	11700	4400	4400	4400			
GR	2715	1000	2710	1250	2705	1700	2705	7600	2700	9300
GR	2695	9750	2675	10300	2670	10700	2670	10750	2670	10800
GR	2675	11200	2680	11700	2680	12200	2680	12400	2700	13100
GR	2715	14700								
X1	144400	13	8200	10750	2500	2500	2500			
GR	2715	1000	2705	1400	2705	6800	2700	8200	2690	8750
GR	2685	9500	2675	9900	2675	10000	2700	10750	2705	11200
GR	2710	13300	2710	14500	2715	15200				
X1	152100	11	4000	5900	7700	7700	7700			
GR	2715	1000	2710	2600	2705	3650	2700	4000	2695	4600
GR	2690	4700	2690	4800	2695	5000	2700	5900	2705	6600
GR	2715	7500								
X1	156600	8	2600	3500	4500	4500	4500			
GR	2725	1000	2720	2200	2705	2600	2700	2900	2700	3000
GR	2705	3500	2710	4200	2715	4400				
X1	159600	11	6500	7400	3000	3000	3000			
GR	2735	1000	2730	3700	2725	6400	2720	6500	2715	6700
GR	2710	6800	2710	6900	2715	7200	2720	7400	2725	7600
GR	2725	10200								
X1	163100	12	5900	6400	3500	3500	3500			
GR	2750	1000	2740	2100	2735	4100	2730	5700	2725	5900
GR	2720	6100	2719	6150	2720	6200	2725	6400	2730	6800
GR	2735	11200	2750	12700						
X1	165500	10	4100	5500	2400	2400	2400			
GR	2750	1000	2740	3400	2735	4100	2730	4700	2726	5200
GR	2730	5300	2735	5500	2740	5650	2740	10100	2750	11000
X1	168200	12	6200	6900	2700	2700	2700			
GR	2765	1000	2760	1700	2755	2100	2750	4800	2745	5600
GR	2735	6200	2730	6700	2730	6800	2735	6900	2745	7400
GR	2750	7700	2765	7900						
X1	170800	12	8000	9100	2600	2600	2600			
GR	2775	1000	2765	2700	2765	4900	2760	6000	2750	8000
GR	2740	8400	2735	8600	2735	8700	2740	8800	2750	9100
GR	2755	9900	2775	11500						

CROSS SECTION 172900 LOCATED AT MARTIN COUNTY/DAWSON COUNTY LINE

X1	172900	12	4400	5150	2100	2100	2100			
GR	2775	1000	2770	1400	2770	3500	2765	4100	2750	4400
GR	2745	4500	2741	4700	2745	5000	2750	5150	2755	5400
GR	2760	6100	2775	8100						

| END CROSS SECTION DATA |

T1 MARTIN COUNTY FLOOD STUDY HDR ENGINEERING, INC.
T2 JOB 06901-001-036 AUSTIN, TEXAS

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FO
	0	3	0	0	.0013000	0	0.0155	0	2480	

MULTIPLE PROFILE RUN WITH INTERPOLATED CROSS SECTIONS

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	2	0	-1							

T1 MARTIN COUNTY FLOOD STUDY HDR ENGINEERING, INC.
T2 JOB 06901-001-036 AUSTIN, TEXAS

J1	ICHECK	INO	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0	4	0	0	.0013000	0	0.0155	0	2480	

MULTIPLE PROFILE RUN WITH INTERPOLATED CROSS SECTIONS

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	3	0	-1							

T1 MARTIN COUNTY FLOOD STUDY HDR ENGINEERING, INC.
T2 JOB 06901-001-036 AUSTIN, TEXAS

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0	5	0	0	.0013000	0	0.0155	0	2480	

MULTIPLE PROFILE RUN WITH INTERPOLATED CROSS SECTIONS

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	4	0	-1							

T1 MARTIN COUNTY FLOOD STUDY HDR ENGINEERING, INC.
T2 JOB 06901-001-036 AUSTIN, TEXAS

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FO
	0	6	0	0	.0013000	0	0.0155	0	2480	

MULTIPLE PROFILE RUN WITH INTERPOLATED CROSS SECTIONS

J2	NPROF	IPLT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	5	0	-1							

T1 MARTIN COUNTY FLOOD STUDY HDR ENGINEERING, INC.
T2 JOB 06901-001-036 AUSTIN, TEXAS

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0	7	0	0	.0013000	0	0.0155	0	2480	

MULTIPLE PROFILE RUN WITH INTERPOLATED CROSS SECTIONS

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	6	0	-1							

T1 MARTIN COUNTY FLOOD STUDY HDR ENGINEERING, INC.
T2 JOB 06901-001-036 AUSTIN, TEXAS

J1	ICHECK	INO	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0	8	0	0	.0013000	0	0.0155	0	2480	

MULTIPLE PROFILE RUN WITH INTERPOLATED CROSS SECTIONS

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	7	0	-1							

T1 MARTIN COUNTY FLOOD STUDY HDR ENGINEERING, INC.
T2 JOB 06901-001-036 AUSTIN, TEXAS

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0	9	0	0	.0013000	0	0.0155	0	2480	

MULTIPLE PROFILE RUN WITH INTERPOLATED CROSS SECTIONS

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	8	0	-1							

T1 MARTIN COUNTY FLOOD STUDY HDR ENGINEERING, INC.
T2 JOB 06901-001-036 AUSTIN, TEXAS

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0	10	0	0	.0013000	0	0.0155	0	2480	

MULTIPLE PROFILE RUN WITH INTERPOLATED CROSS SECTIONS

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	9	0	-1							

T1 MARTIN COUNTY FLOOD STUDY HDR ENGINEERING, INC.
T2 JOB 06901-001-036 AUSTIN, TEXAS

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0	11	0	0	.0013000	0	0.0155	0	2480	

MULTIPLE PROFILE RUN WITH INTERPOLATED CROSS SECTIONS

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	10	0	-1							

T1 MARTIN COUNTY FLOOD STUDY HDR ENGINEERING, INC.
T2 JOB 06901-001-036 AUSTIN, TEXAS

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0	12	0	0	.0013000	0	0.0155	0	2480	

MULTIPLE PROFILE RUN WITH INTERPOLATED CROSS SECTIONS

J2	NPROF	IPLT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	11	0	-1							

T1 MARTIN COUNTY FLOOD STUDY HDR ENGINEERING, INC.
T2 JOB 06901-001-036 AUSTIN, TEXAS

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FG
	0	13	0	0	.0013000	0	0.0155	0	2480	

MULTIPLE PROFILE RUN WITH INTERPOLATED CROSS SECTIONS

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	12	0	-1							

T1 MARTIN COUNTY FLOOD STUDY HDR ENGINEERING, INC.
T2 JOB 06901-001-036 AUSTIN, TEXAS

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0	14	0	0	.0013000	0	0.0155	0	2480	

MULTIPLE PROFILE RUN WITH INTERPOLATED CROSS SECTIONS

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	13	0	-1							

T1 MARTIN COUNTY FLOOD STUDY HDR ENGINEERING, INC.
T2 JOB 06901-001-036 AUSTIN, TEXAS

J1	ICHECK	INO	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0	15	0	0	.0013000	0	0.0155	0	2480	

MULTIPLE PROFILE RUN WITH INTERPOLATED CROSS SECTIONS

J2	NPROF	IPLT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	15	0	-1							

THIS RUN EXECUTED 2/27/90 15:51:48

HEC2 RELEASE DATED SEP 88 UPDATED APR 1989

ERROR CORR - 01,02

MODIFICATION -

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

SULPHUR SPRINGS DRAW

SUMMARY PRINTOUT

SECTNO	Q	CWSEL	ELMIN	DEPTH	AREA	VCH	TOPWID	TWA	QLOB	QCH	QROB	CUMDS
1000.000	500.00	2469.61	2467.00	2.61	313.12	1.60	239.60	.00	.00	500.00	.00	.00
1000.000	1000.00	2470.37	2467.00	3.37	520.18	1.92	300.81	.00	.00	1000.00	.00	.00
1000.000	2000.00	2471.38	2467.00	4.38	858.92	2.33	370.45	.00	.00	2000.00	.00	.00
1000.000	3000.00	2472.12	2467.00	5.12	1148.86	2.61	421.00	.00	.00	3000.00	.00	.00
1000.000	4000.00	2472.72	2467.00	5.72	1417.09	2.82	462.88	.00	.00	4000.00	.00	.00
1000.000	5000.00	2473.26	2467.00	6.26	1676.51	2.98	500.06	.00	.00	5000.00	.00	.00
1000.000	7500.00	2474.34	2467.00	7.34	2253.21	3.33	574.15	.00	.00	7500.00	.00	.00
1000.000	10000.00	2475.18	2467.00	8.18	2764.70	3.62	629.55	.00	.08	9999.79	.13	.00
1000.000	12500.00	2475.81	2467.00	8.81	3171.88	3.96	662.33	.00	4.33	12488.75	6.92	.00
1000.000	15000.00	2476.42	2467.00	9.42	3584.97	4.23	694.00	.00	19.02	14950.52	30.45	.00
1000.000	17500.00	2476.94	2467.00	9.94	3950.96	4.51	720.90	.00	43.76	17386.20	70.05	.00
1000.000	20000.00	2477.43	2467.00	10.43	4312.08	4.76	746.50	.00	80.16	19791.52	128.32	.00
1000.000	25000.00	2478.32	2467.00	11.32	4992.33	5.21	792.47	.00	184.66	24519.72	295.61	.00
1000.000	30000.00	2479.18	2467.00	12.18	5696.64	5.55	837.41	.00	339.74	29116.40	543.86	.00
* 2200.000	500.00	2470.47	2468.50	1.97	502.55	.99	463.78	9.75	.00	500.00	.00	1200.00
* 2200.000	1000.00	2471.18	2468.50	2.68	866.10	1.15	560.34	11.89	.00	1000.00	.00	1200.00
* 2200.000	2000.00	2472.19	2468.50	3.69	1500.39	1.33	697.50	14.77	.00	2000.00	.00	1200.00
* 2200.000	3000.00	2472.94	2468.50	4.44	2062.15	1.45	799.57	16.90	.00	3000.00	.00	1200.00
* 2200.000	4000.00	2473.56	2468.50	5.06	2583.70	1.55	883.84	18.65	.00	4000.00	.00	1200.00
* 2200.000	5000.00	2474.10	2468.50	5.60	3083.64	1.62	957.68	20.19	.00	5000.00	.00	1200.00
* 2200.000	7500.00	2475.15	2468.50	6.65	4220.72	1.80	1472.28	31.05	10.20	7489.76	.03	1200.00
* 2200.000	10000.00	2475.97	2468.50	7.47	5511.61	1.93	1698.63	35.83	248.15	9747.61	4.24	1200.00
* 2200.000	12500.00	2476.62	2468.50	8.12	6677.48	2.06	1879.78	39.56	642.31	11841.32	16.38	1200.00
* 2200.000	15000.00	2477.23	2468.50	8.73	7885.10	2.15	2050.61	43.11	1175.30	13787.20	37.50	1200.00
* 2200.000	17500.00	2477.77	2468.50	9.27	9033.59	2.24	2200.81	46.20	1790.52	15643.89	65.59	1200.00
* 2200.000	20000.00	2478.28	2468.50	9.78	10196.18	2.31	2343.07	49.13	2493.95	17405.05	101.00	1200.00
* 2200.000	25000.00	2479.21	2468.50	10.71	12487.66	2.42	2600.78	54.42	4092.30	20718.14	189.56	1200.00
* 2200.000	30000.00	2480.09	2468.50	11.59	14925.84	2.50	3425.63	68.88	5979.81	23715.26	304.93	1200.00

SECNO	Q	CWSEL	ELMIN	DEPTH	AREA	VCH	TOPWID	TWA	QLOB	QCH	QROB	CUMDS
4200.000	500.00	2472.19	2470.00	2.19	360.81	1.39	329.00	27.95	.00	500.00	.00	3200.00
* 4200.000	1000.00	2472.94	2470.00	2.94	646.63	1.55	440.44	35.31	.00	1000.00	.00	3200.00
* 4200.000	2000.00	2473.82	2470.00	3.82	1094.19	1.83	572.94	45.05	.00	2000.00	.00	3200.00
* 4200.000	3000.00	2474.47	2470.00	4.47	1499.53	2.00	670.71	51.94	.00	3000.00	.00	3200.00
* 4200.000	4000.00	2475.01	2470.00	5.01	1886.19	2.12	752.08	57.61	.00	4000.00	.00	3200.00
* 4200.000	5000.00	2475.48	2470.00	5.48	2249.92	2.22	816.99	62.41	.00	5000.00	.00	3200.00
* 4200.000	7500.00	2476.45	2470.00	6.45	3112.42	2.41	953.40	82.11	.00	7500.00	.00	3200.00
* 4200.000	10000.00	2477.24	2470.00	7.24	3895.06	2.57	1062.13	92.32	.00	10000.00	.00	3200.00
* 4200.000	12500.00	2477.90	2470.00	7.90	4627.31	2.70	1154.62	100.32	.00	12500.00	.00	3200.00
* 4200.000	15000.00	2478.50	2470.00	8.50	5354.78	2.80	1239.69	107.68	.00	15000.00	.00	3200.00
* 4200.000	17500.00	2479.05	2470.00	9.05	6045.63	2.89	1315.40	114.06	.00	17500.00	.00	3200.00
* 4200.000	20000.00	2479.55	2470.00	9.55	6737.08	2.97	1387.04	120.02	.00	20000.00	.00	3200.00
* 4200.000	25000.00	2480.43	2470.00	10.43	8017.32	3.12	1474.89	129.07	.00	24999.17	.83	3200.00
* 4200.000	30000.00	2481.23	2470.00	11.23	9203.56	3.27	1519.78	149.15	.00	29987.39	12.61	3200.00
* 6200.000	500.00	2476.07	2475.00	1.07	327.21	1.53	413.38	43.83	.00	500.00	.00	5200.00
* 6200.000	1000.00	2476.53	2475.00	1.53	545.92	1.83	508.30	55.28	.00	1000.00	.00	5200.00
* 6200.000	2000.00	2477.17	2475.00	2.17	906.08	2.21	634.37	70.89	.00	2000.00	.00	5200.00
* 6200.000	3000.00	2477.65	2475.00	2.65	1230.58	2.44	729.54	81.99	.00	3000.00	.00	5200.00
* 6200.000	4000.00	2478.04	2475.00	3.04	1533.38	2.61	808.30	91.34	.00	4000.00	.00	5200.00
* 6200.000	5000.00	2478.39	2475.00	3.39	1822.19	2.74	876.86	99.33	.00	5000.00	.00	5200.00
* 6200.000	7500.00	2479.11	2475.00	4.11	2503.34	3.00	1020.46	125.32	.00	7500.00	.00	5200.00
* 6200.000	10000.00	2479.69	2475.00	4.69	3136.15	3.19	1137.74	139.86	.00	10000.00	.00	5200.00
* 6200.000	12500.00	2480.19	2475.00	5.19	3722.24	3.36	1217.77	150.93	.00	12500.00	.00	5200.00
* 6200.000	15000.00	2480.65	2475.00	5.65	4290.13	3.50	1262.04	160.98	.00	15000.00	.00	5200.00
* 6200.000	17500.00	2481.09	2475.00	6.09	4854.39	3.60	1304.55	169.81	.00	17500.00	.00	5200.00
* 6200.000	20000.00	2481.51	2475.00	6.51	5403.17	3.70	1344.60	178.12	.00	20000.00	.00	5200.00
* 6200.000	25000.00	2482.27	2475.00	7.27	6454.73	3.87	1418.18	191.11	.00	25000.00	.00	5200.00
* 6200.000	30000.00	2482.97	2475.00	7.97	7478.68	4.01	1486.34	214.35	.00	30000.00	.00	5200.00
* 8200.000	500.00	2480.67	2478.00	2.67	199.09	2.51	199.32	62.06	.00	500.00	.00	7200.00
* 8200.000	1000.00	2481.37	2478.00	3.37	376.83	2.65	305.04	80.33	.00	1000.00	.00	7200.00
* 8200.000	2000.00	2482.07	2478.00	4.07	628.90	3.18	410.69	110.83	.00	2000.00	.00	7200.00
* 8200.000	3000.00	2482.61	2478.00	4.61	872.32	3.44	491.63	127.51	.00	3000.00	.00	7200.00
* 8200.000	4000.00	2483.05	2478.00	5.05	1101.76	3.63	557.25	139.96	.00	4000.00	.00	7200.00
* 8200.000	5000.00	2483.43	2478.00	5.43	1320.08	3.79	613.21	150.25	.00	5000.00	.00	7200.00
* 8200.000	7500.00	2484.19	2478.00	6.19	1829.98	4.10	727.32	180.74	.00	7500.00	.00	7200.00
* 8200.000	10000.00	2484.79	2478.00	6.79	2299.64	4.35	818.47	199.04	.00	10000.00	.00	7200.00
* 8200.000	12500.00	2485.28	2478.00	7.28	2717.12	4.61	889.89	213.21	2.16	12497.18	.66	7200.00
* 8200.000	15000.00	2485.68	2478.00	7.68	3083.07	4.91	947.00	225.71	22.77	14970.33	6.90	7200.00
* 8200.000	17500.00	2486.04	2478.00	8.04	3429.73	5.19	998.09	236.58	69.87	17408.96	21.17	7200.00
* 8200.000	20000.00	2486.36	2478.00	8.36	3761.11	5.46	1044.60	246.56	144.39	19811.86	43.74	7200.00
* 8200.000	25000.00	2486.96	2478.00	8.96	4411.58	5.92	1130.33	262.50	379.95	24504.94	115.11	7200.00
* 8200.000	30000.00	2487.48	2478.00	9.48	5025.82	6.34	1205.71	289.06	716.80	29066.05	217.15	7200.00

SECNO	Q	CWSEL	ELMIN	DEPTH	AREA	VCH	TOPWID	TWA	QLOB	QCH	QROB	CUMDS
* 10200.000	500.00	2483.10	2481.00	2.10	383.40	1.30	366.32	75.35	.00	500.00	.00	9200.00
* 10200.000	1000.00	2483.75	2481.00	2.75	662.54	1.51	481.55	98.27	.00	1000.00	.00	9200.00
* 10200.000	2000.00	2484.61	2481.00	3.61	1137.60	1.76	631.00	134.14	.00	2000.00	.00	9200.00
* 10200.000	3000.00	2485.18	2481.00	4.18	1529.57	1.96	715.26	153.58	.00	3000.00	.00	9200.00
* 10200.000	4000.00	2485.65	2481.00	4.65	1872.16	2.14	754.12	168.06	.00	4000.00	.00	9200.00
* 10200.000	5000.00	2486.06	2481.00	5.06	2185.78	2.29	788.01	180.11	.00	5000.00	.00	9200.00
* 10200.000	7500.00	2486.90	2481.00	5.90	2882.85	2.60	858.57	214.26	.00	7500.00	.00	9200.00
* 10200.000	10000.00	2487.59	2481.00	6.59	3496.16	2.86	916.17	235.55	.00	10000.00	.00	9200.00
* 10200.000	12500.00	2488.18	2481.00	7.18	4048.94	3.09	965.14	252.19	.00	12500.00	.00	9200.00
* 10200.000	15000.00	2488.71	2481.00	7.71	4568.99	3.28	1009.04	266.71	.00	15000.00	.00	9200.00
* 10200.000	17500.00	2489.19	2481.00	8.19	5060.35	3.46	1048.84	279.37	.00	17500.00	.00	9200.00
* 10200.000	20000.00	2489.63	2481.00	8.63	5531.96	3.62	1085.66	290.95	.00	20000.00	.00	9200.00
* 10200.000	25000.00	2490.43	2481.00	9.43	6426.65	3.89	1152.29	309.73	.00	25000.00	.00	9200.00
* 10200.000	30000.00	2491.14	2481.00	10.14	7270.17	4.13	1211.76	338.73	.00	30000.00	.00	9200.00
* 12200.000	500.00	2484.43	2483.00	1.43	611.32	.82	856.49	105.67	.00	500.00	.00	11200.00
* 12200.000	1000.00	2484.90	2483.00	1.90	1078.72	.93	1137.74	135.26	.00	1000.00	.00	11200.00
* 12200.000	2000.00	2485.55	2483.00	2.55	1862.32	1.07	1230.88	174.58	.00	2000.00	.00	11200.00
* 12200.000	3000.00	2486.09	2483.00	3.09	2535.92	1.18	1261.51	196.20	.00	3000.00	.00	11200.00
* 12200.000	4000.00	2486.54	2483.00	3.54	3113.99	1.28	1287.21	211.81	.00	4000.00	.00	11200.00
* 12200.000	5000.00	2486.95	2483.00	3.95	3647.99	1.37	1310.51	225.16	.00	5000.00	.00	11200.00
* 12200.000	7500.00	2487.83	2483.00	4.83	4818.05	1.56	1360.16	261.95	.00	7500.00	.00	11200.00
* 12200.000	10000.00	2488.56	2483.00	5.56	5825.35	1.72	1401.50	285.38	.00	10000.00	.00	11200.00
* 12200.000	12500.00	2489.19	2483.00	6.19	6719.73	1.86	1437.21	303.82	.00	12500.00	.00	11200.00
* 12200.000	15000.00	2489.75	2483.00	6.75	7541.06	1.99	1469.24	319.96	.00	15000.00	.00	11200.00
* 12200.000	17500.00	2490.27	2483.00	7.27	8303.98	2.11	1498.37	334.07	.00	17500.00	.00	11200.00
* 12200.000	20000.00	2490.74	2483.00	7.74	9021.87	2.22	1525.28	346.99	.00	20000.00	.00	11200.00
* 12200.000	25000.00	2491.60	2483.00	8.60	10351.28	2.42	1573.89	368.19	.00	25000.00	.00	11200.00
* 12200.000	30000.00	2492.36	2483.00	9.36	11572.51	2.59	1617.27	399.35	.00	30000.00	.00	11200.00
* 14200.000	500.00	2487.00	2485.00	2.00	319.06	1.57	319.53	132.28	.00	500.00	.00	13200.00
* 14200.000	1000.00	2487.54	2485.00	2.54	516.44	1.94	406.52	169.79	.00	1000.00	.00	13200.00
* 14200.000	2000.00	2488.25	2485.00	3.25	841.20	2.38	518.83	216.86	.00	2000.00	.00	13200.00
* 14200.000	3000.00	2488.76	2485.00	3.76	1129.69	2.66	601.25	243.15	.00	3000.00	.00	13200.00
* 14200.000	4000.00	2489.19	2485.00	4.19	1398.56	2.86	668.98	262.26	.00	4000.00	.00	13200.00
* 14200.000	5000.00	2489.55	2485.00	4.55	1655.70	3.02	727.89	278.45	.00	5000.00	.00	13200.00
* 14200.000	7500.00	2490.31	2485.00	5.31	2247.70	3.34	816.85	320.65	.00	7500.00	.00	13200.00
* 14200.000	10000.00	2490.89	2485.00	5.89	2729.55	3.66	848.68	345.90	.00	10000.00	.00	13200.00
* 14200.000	12500.00	2491.39	2485.00	6.39	3167.39	3.95	876.59	364.74	.00	12500.00	.00	13200.00
* 14200.000	15000.00	2491.87	2485.00	6.87	3587.42	4.18	902.56	381.54	.00	15000.00	.00	13200.00
* 14200.000	17500.00	2492.31	2485.00	7.31	3991.40	4.38	926.85	396.45	.00	17500.00	.00	13200.00
* 14200.000	20000.00	2492.72	2485.00	7.72	4383.60	4.56	949.84	410.21	.00	20000.00	.00	13200.00
* 14200.000	25000.00	2493.50	2485.00	8.50	5135.18	4.87	992.41	433.11	.00	25000.00	.00	13200.00
* 14200.000	30000.00	2494.21	2485.00	9.21	5851.34	5.13	1031.33	465.93	.00	30000.00	.00	13200.00

SECNO	Q	CWSEL	ELMIN	DEPTH	AREA	VCH	TOPWID	TWA	QLOB	QCH	QROB	CUMDS
* 16200.000	500.00	2488.98	2487.00	1.98	460.76	1.09	463.70	151.00	.00	500.00	.00	15200.00
* 16200.000	1000.00	2489.59	2487.00	2.59	784.14	1.28	604.92	193.99	.00	1000.00	.00	15200.00
* 16200.000	2000.00	2490.34	2487.00	3.34	1295.75	1.54	735.94	245.85	.00	2000.00	.00	15200.00
* 16200.000	3000.00	2490.89	2487.00	3.89	1714.69	1.75	793.46	274.79	.00	3000.00	.00	15200.00
* 16200.000	4000.00	2491.35	2487.00	4.35	2089.12	1.91	841.56	296.18	.00	4000.00	.00	15200.00
* 16200.000	5000.00	2491.75	2487.00	4.75	2431.68	2.06	883.26	314.38	.00	5000.00	.00	15200.00
* 16200.000	7500.00	2492.57	2487.00	5.57	3191.33	2.35	969.37	360.58	.00	7500.00	.00	15200.00
* 16200.000	10000.00	2493.24	2487.00	6.24	3870.13	2.58	1040.30	388.72	.00	10000.00	.00	15200.00
* 16200.000	12500.00	2493.84	2487.00	6.84	4507.93	2.77	1102.80	410.00	.00	12500.00	.00	15200.00
* 16200.000	15000.00	2494.37	2487.00	7.37	5106.63	2.94	1158.40	429.00	.00	15000.00	.00	15200.00
* 16200.000	17500.00	2494.85	2487.00	7.85	5683.59	3.08	1209.57	445.90	.00	17500.00	.00	15200.00
* 16200.000	20000.00	2495.28	2487.00	8.28	6217.40	3.22	1266.31	461.82	1.08	19998.92	.00	15200.00
* 16200.000	25000.00	2496.06	2487.00	9.06	7244.22	3.47	1378.89	489.05	35.93	24964.07	.00	15200.00
* 16200.000	30000.00	2496.76	2487.00	9.76	8249.23	3.69	1480.80	525.84	139.00	29861.00	.00	15200.00
17600.000	500.00	2489.95	2488.00	1.95	573.06	.87	586.38	167.88	.00	500.00	.00	16600.00
17600.000	1000.00	2490.53	2488.00	2.53	943.64	1.06	695.49	214.88	.00	1000.00	.00	16600.00
17600.000	2000.00	2491.29	2488.00	3.29	1522.18	1.31	831.86	271.04	.00	2000.00	.00	16600.00
17600.000	3000.00	2491.85	2488.00	3.85	2013.79	1.49	932.18	302.52	.00	3000.00	.00	16600.00
* 17600.000	4000.00	2492.30	2488.00	4.30	2460.86	1.63	1014.84	326.19	.00	4000.00	.00	16600.00
* 17600.000	5000.00	2492.71	2488.00	4.71	2889.58	1.73	1088.23	346.37	.00	5000.00	.00	16600.00
* 17600.000	7500.00	2493.56	2488.00	5.56	3882.15	1.93	1241.60	396.63	.00	7500.00	.00	16600.00
* 17600.000	10000.00	2494.27	2488.00	6.27	4802.65	2.08	1368.56	428.30	.00	10000.00	.00	16600.00
* 17600.000	12500.00	2494.88	2488.00	6.88	5672.57	2.20	1478.55	452.49	.00	12500.00	.00	16600.00
* 17600.000	15000.00	2495.39	2488.00	7.39	6438.29	2.33	1546.35	473.49	1.96	14997.65	.39	16600.00
* 17600.000	17500.00	2495.85	2488.00	7.85	7165.38	2.45	1601.78	492.02	15.68	17481.19	3.13	16600.00
* 17600.000	20000.00	2496.27	2488.00	8.27	7845.76	2.57	1651.96	509.51	45.26	19945.70	9.04	16600.00
* 17600.000	25000.00	2497.03	2488.00	9.03	9142.31	2.79	1743.60	539.68	157.48	24811.04	31.47	16600.00
* 17600.000	30000.00	2497.72	2488.00	9.72	10379.64	2.98	1826.78	579.17	341.91	29589.77	68.33	16600.00
* 20300.000	500.00	2494.45	2492.00	2.45	250.54	2.00	204.35	190.27	.00	500.00	.00	19300.00
* 20300.000	1000.00	2495.13	2492.00	3.13	411.30	2.43	262.74	243.20	.00	1000.00	.00	19300.00
* 20300.000	2000.00	2496.03	2492.00	4.03	676.99	2.95	341.85	306.78	.00	2000.00	.00	19300.00
* 20300.000	3000.00	2496.65	2492.00	4.65	909.20	3.30	398.32	343.67	.00	3000.00	.00	19300.00
* 20300.000	4000.00	2497.15	2492.00	5.15	1119.17	3.57	443.23	371.62	.00	4000.00	.00	19300.00
* 20300.000	5000.00	2497.57	2492.00	5.57	1314.99	3.80	481.35	395.43	.00	5000.00	.00	19300.00
* 20300.000	7500.00	2498.43	2492.00	6.43	1761.47	4.26	558.63	453.04	.00	7500.00	.00	19300.00
* 20300.000	10000.00	2499.12	2492.00	7.12	2166.35	4.62	620.44	490.62	.00	10000.00	.00	19300.00
* 20300.000	12500.00	2499.70	2492.00	7.70	2543.03	4.92	672.86	519.86	.00	12500.00	.00	19300.00
* 20300.000	15000.00	2500.19	2492.00	8.19	2890.59	5.20	756.00	545.16	1.83	14997.95	.21	19300.00
* 20300.000	17500.00	2500.62	2492.00	8.62	3237.91	5.48	879.20	567.73	40.30	17455.05	4.65	19300.00
* 20300.000	20000.00	2500.98	2492.00	8.98	3569.23	5.78	982.42	590.04	135.97	19848.35	15.68	19300.00
* 20300.000	25000.00	2501.61	2492.00	9.61	4246.15	6.31	1165.23	635.22	517.60	24422.70	59.70	19300.00
* 20300.000	30000.00	2502.15	2492.00	10.15	4928.36	6.75	1324.18	689.96	1139.03	28729.59	131.38	19300.00

SECNO	Q	CWSEL	ELMIN	DEPTH	AREA	VCH	TOPWID	TWA	QLOB	QCH	OROB	CUMDS
* 22300.000	500.00	2497.54	2495.80	1.74	363.47	1.38	416.03	205.26	.00	500.00	.00	21300.00
* 22300.000	1000.00	2498.09	2495.80	2.29	621.80	1.61	544.15	262.89	.00	1000.00	.00	21300.00
* 22300.000	2000.00	2498.82	2495.80	3.02	1084.73	1.84	718.71	332.75	.00	2000.00	.00	21300.00
* 22300.000	3000.00	2499.37	2495.80	3.57	1512.97	1.98	848.81	374.09	.00	3000.00	.00	21300.00
* 22300.000	4000.00	2499.82	2495.80	4.02	1921.09	2.08	956.46	405.43	.00	4000.00	.00	21300.00
* 22300.000	5000.00	2500.21	2495.80	4.41	2308.24	2.17	1040.82	432.02	.00	5000.00	.00	21300.00
* 22300.000	7500.00	2501.03	2495.80	5.23	3236.69	2.32	1206.10	495.35	.00	7500.00	.00	21300.00
* 22300.000	10000.00	2501.72	2495.80	5.92	4116.22	2.43	1344.04	537.62	.00	10000.00	.00	21300.00
* 22300.000	12500.00	2502.32	2495.80	6.52	4958.80	2.52	1464.06	570.89	.00	12500.00	.00	21300.00
* 22300.000	15000.00	2502.85	2495.80	7.05	5761.23	2.60	1569.87	599.91	.00	15000.00	.00	21300.00
* 22300.000	17500.00	2503.33	2495.80	7.53	6534.11	2.68	1665.43	626.01	.00	17500.00	.00	21300.00
* 22300.000	20000.00	2503.76	2495.80	7.96	7274.18	2.75	1752.05	651.40	.00	20000.00	.00	21300.00
* 22300.000	25000.00	2504.52	2495.80	8.72	8665.38	2.89	1904.25	701.63	.00	25000.00	.00	21300.00
* 22300.000	30000.00	2505.18	2495.80	9.38	9962.10	3.01	2030.55	760.48	.00	29999.85	.15	21300.00
24100.000	500.00	2499.66	2498.00	1.66	516.32	.97	622.28	226.71	.00	500.00	.00	23100.00
* 24100.000	1000.00	2500.05	2498.00	2.05	789.25	1.27	752.61	289.23	.00	1000.00	.00	23100.00
* 24100.000	2000.00	2500.64	2498.00	2.64	1240.35	1.61	782.01	362.25	.00	2000.00	.00	23100.00
24100.000	3000.00	2501.23	2498.00	3.23	1711.69	1.75	811.58	408.39	.00	3000.00	.00	23100.00
24100.000	4000.00	2501.64	2498.00	3.64	2047.35	1.95	832.01	442.38	.00	4000.00	.00	23100.00
24100.000	5000.00	2502.00	2498.00	4.00	2345.64	2.13	849.74	471.08	.00	5000.00	.00	23100.00
24100.000	7500.00	2502.76	2498.00	4.76	3000.70	2.50	887.45	538.61	.00	7500.00	.00	23100.00
* 24100.000	10000.00	2503.28	2498.00	5.28	3473.86	2.88	913.72	580.24	.00	10000.00	.00	23100.00
* 24100.000	12500.00	2503.82	2498.00	5.82	3977.81	3.14	940.89	614.66	.00	12500.00	.00	23100.00
* 24100.000	15000.00	2504.31	2498.00	6.31	4448.84	3.37	965.60	645.13	.00	15000.00	.00	23100.00
* 24100.000	17500.00	2504.77	2498.00	6.77	4897.54	3.57	988.56	673.24	.00	17500.00	.00	23100.00
* 24100.000	20000.00	2505.19	2498.00	7.19	5319.29	3.76	1009.67	700.46	.00	20000.00	.00	23100.00
* 24100.000	25000.00	2505.95	2498.00	7.95	6094.44	4.10	1047.35	753.97	.00	25000.00	.00	23100.00
* 24100.000	30000.00	2506.61	2498.00	8.61	6799.13	4.41	1080.47	815.63	.00	30000.00	.00	23100.00
26100.000	500.00	2501.46	2500.00	1.46	399.07	1.25	346.14	248.94	.00	500.00	.00	25100.00
26100.000	1000.00	2502.10	2500.00	2.10	641.14	1.56	410.16	315.92	.00	1000.00	.00	25100.00
* 26100.000	2000.00	2502.82	2500.00	2.82	960.94	2.08	481.86	389.68	.00	2000.00	.00	25100.00
* 26100.000	3000.00	2503.41	2500.00	3.41	1262.43	2.38	540.82	438.36	.00	3000.00	.00	25100.00
* 26100.000	4000.00	2503.90	2500.00	3.90	1539.29	2.60	589.79	474.61	.00	4000.00	.00	25100.00
* 26100.000	5000.00	2504.32	2500.00	4.32	1798.56	2.78	632.23	505.27	.00	5000.00	.00	25100.00
* 26100.000	7500.00	2505.22	2500.00	5.22	2414.41	3.11	760.78	576.97	.00	7500.00	.00	25100.00
* 26100.000	10000.00	2506.08	2500.00	6.08	3164.52	3.16	991.89	626.78	.00	10000.00	.00	25100.00
* 26100.000	12500.00	2506.75	2500.00	6.75	3889.30	3.21	1172.70	667.84	.00	12500.00	.00	25100.00
* 26100.000	15000.00	2507.29	2500.00	7.29	4552.32	3.30	1316.53	701.73	.00	15000.00	.00	25100.00
26100.000	17500.00	2507.51	2500.00	7.51	4850.80	3.61	1376.38	727.53	.00	17500.00	.00	25100.00
26100.000	20000.00	2507.94	2500.00	7.94	5471.52	3.66	1493.19	757.92	.00	20000.00	.00	25100.00
* 26100.000	25000.00	2509.03	2500.00	9.03	7255.28	3.45	1786.85	828.85	.00	25000.00	.00	25100.00
* 26100.000	30000.00	2509.72	2500.00	9.72	8569.24	3.50	1975.45	898.15	.00	30000.00	.00	25100.00

SECNO	Q	CWSEL	ELMIN	DEPTH	AREA	VCH	TOPWID	TWA	QLOB	QCH	QROB	CUMDS
28100.000	500.00	2503.93	2502.50	1.43	409.78	1.22	572.56	270.03	.00	500.00	.00	27100.00
28100.000	1000.00	2504.42	2502.50	1.92	739.66	1.35	769.24	343.00	.00	1000.00	.00	27100.00
* 28100.000	2000.00	2505.11	2502.50	2.61	1358.46	1.47	1010.25	426.40	.00	2000.00	.00	27100.00
* 28100.000	3000.00	2505.54	2502.50	3.04	1806.97	1.66	1051.58	476.66	.00	3000.00	.00	27100.00
* 28100.000	4000.00	2505.94	2502.50	3.44	2225.52	1.80	1088.74	514.32	.00	4000.00	.00	27100.00
* 28100.000	5000.00	2506.29	2502.50	3.79	2622.65	1.91	1122.85	546.35	.00	5000.00	.00	27100.00
* 28100.000	7500.00	2507.10	2502.50	4.60	3553.44	2.11	1199.02	621.48	.00	7500.00	.00	27100.00
* 28100.000	10000.00	2507.80	2502.50	5.30	4425.24	2.26	1266.21	675.51	.00	10000.00	.00	27100.00
* 28100.000	12500.00	2508.40	2502.50	5.90	5200.91	2.40	1323.13	720.26	.00	12500.00	.00	27100.00
* 28100.000	15000.00	2508.92	2502.50	6.42	5902.82	2.54	1372.60	757.29	.00	15000.00	.00	27100.00
* 28100.000	17500.00	2509.31	2502.50	6.81	6447.62	2.71	1409.81	784.89	.00	17500.00	.00	27100.00
* 28100.000	20000.00	2509.72	2502.50	7.22	7033.49	2.84	1448.75	818.38	.00	20000.00	.00	27100.00
* 28100.000	25000.00	2510.53	2502.50	8.03	8244.64	3.04	1567.84	898.13	7.04	24992.96	.00	27100.00
* 28100.000	30000.00	2511.20	2502.50	8.70	9327.25	3.24	1684.35	975.16	61.55	29938.45	.00	27100.00
30100.000	500.00	2506.38	2504.50	1.88	435.31	1.15	426.17	292.96	.00	500.00	.00	29100.00
30100.000	1000.00	2506.90	2504.50	2.40	682.67	1.46	529.69	372.82	.00	1000.00	.00	29100.00
* 30100.000	2000.00	2507.53	2504.50	3.03	1060.31	1.89	656.98	464.11	.00	2000.00	.00	29100.00
* 30100.000	3000.00	2508.04	2504.50	3.54	1415.84	2.12	757.52	518.92	.00	3000.00	.00	29100.00
* 30100.000	4000.00	2508.45	2504.50	3.95	1744.59	2.29	839.84	560.27	.00	4000.00	.00	29100.00
* 30100.000	5000.00	2508.81	2504.50	4.31	2057.77	2.43	911.38	595.83	.00	5000.00	.00	29100.00
* 30100.000	7500.00	2509.55	2504.50	5.05	2793.67	2.68	1060.64	677.46	.00	7500.00	.00	29100.00
* 30100.000	10000.00	2510.17	2504.50	5.67	3479.38	2.87	1161.62	736.60	.16	9999.78	.06	29100.00
* 30100.000	12500.00	2510.63	2504.50	6.13	4020.21	3.12	1193.77	783.08	5.43	12492.40	2.17	29100.00
* 30100.000	15000.00	2511.04	2504.50	6.54	4522.30	3.34	1222.85	821.29	20.98	14970.63	8.39	29100.00
* 30100.000	17500.00	2511.42	2504.50	6.92	4986.10	3.55	1249.12	850.06	47.65	17433.30	19.05	29100.00
* 30100.000	20000.00	2511.77	2504.50	7.27	5436.40	3.73	1274.10	884.82	86.57	19878.83	34.60	29100.00
* 30100.000	25000.00	2512.45	2504.50	7.95	6318.57	4.05	1321.68	967.44	203.54	24715.10	81.36	29100.00
* 30100.000	30000.00	2513.06	2504.50	8.56	7137.64	4.33	1364.38	1047.13	366.29	29487.29	146.41	29100.00
* 32100.000	500.00	2509.02	2507.00	2.02	371.88	1.34	369.26	311.08	.00	500.00	.00	31100.00
32100.000	1000.00	2509.52	2507.00	2.52	580.44	1.72	461.33	395.57	.00	1000.00	.00	31100.00
32100.000	2000.00	2510.31	2507.00	3.31	997.74	2.00	582.04	492.55	.00	2000.00	.00	31100.00
32100.000	3000.00	2510.84	2507.00	3.84	1326.13	2.26	638.54	550.97	.00	3000.00	.00	31100.00
32100.000	4000.00	2511.29	2507.00	4.29	1618.38	2.47	684.92	595.27	.00	4000.00	.00	31100.00
* 32100.000	5000.00	2511.64	2507.00	4.64	1865.66	2.68	721.83	632.84	.00	5000.00	.00	31100.00
* 32100.000	7500.00	2512.41	2507.00	5.41	2456.53	3.05	803.19	719.36	.00	7500.00	.00	31100.00
* 32100.000	10000.00	2513.04	2507.00	6.04	2984.34	3.35	869.46	781.92	.00	10000.00	.00	31100.00
* 32100.000	12500.00	2513.59	2507.00	6.59	3473.04	3.60	926.60	830.88	.00	12500.00	.00	31100.00
* 32100.000	15000.00	2514.07	2507.00	7.07	3937.52	3.81	977.82	871.38	.00	15000.00	.00	31100.00
* 32100.000	17500.00	2514.52	2507.00	7.52	4382.87	3.99	1024.53	902.14	.00	17500.00	.00	31100.00
* 32100.000	20000.00	2514.93	2507.00	7.93	4814.00	4.15	1067.80	938.71	.00	20000.00	.00	31100.00
32100.000	25000.00	2515.73	2507.00	8.73	6132.80	4.08	1733.46	1037.57	.00	24988.43	11.57	31100.00
32100.000	30000.00	2516.23	2507.00	9.23	7025.99	4.29	1774.20	1119.18	.00	29954.20	45.80	31100.00

SECNO	Q	CWSEL	ELMIN	DEPTH	AREA	VCH	TOPWID	TWA	QLOB	QCH	QROB	CUMDS
* 34100.000	500.00	2510.80	2509.00	1.80	488.49	1.02	430.35	329.44	.00	500.00	.00	33100.00
* 34100.000	1000.00	2511.32	2509.00	2.32	720.86	1.39	481.32	416.30	.00	1000.00	.00	33100.00
* 34100.000	2000.00	2512.16	2509.00	3.16	1161.05	1.72	565.43	517.81	.00	2000.00	.00	33100.00
* 34100.000	3000.00	2512.78	2509.00	3.78	1530.92	1.96	627.44	579.10	.00	3000.00	.00	33100.00
* 34100.000	4000.00	2513.28	2509.00	4.28	1863.26	2.15	678.34	625.72	.00	4000.00	.00	33100.00
* 34100.000	5000.00	2513.71	2509.00	4.71	2158.86	2.32	720.61	664.85	.00	5000.00	.00	33100.00
* 34100.000	7500.00	2514.61	2509.00	5.61	2850.80	2.63	810.96	755.48	.00	7500.00	.00	33100.00
* 34100.000	10000.00	2515.31	2509.00	6.31	3453.12	2.90	903.91	821.93	.00	9998.19	1.81	33100.00
* 34100.000	12500.00	2515.90	2509.00	6.90	4004.10	3.15	1002.20	875.24	.00	12470.73	29.27	33100.00
* 34100.000	15000.00	2516.43	2509.00	7.43	4549.84	3.36	1090.85	919.65	.00	14899.58	100.42	33100.00
* 34100.000	17500.00	2516.89	2509.00	7.89	5090.44	3.54	1172.07	954.02	.00	17280.83	219.17	33100.00
* 34100.000	20000.00	2517.32	2509.00	8.32	5610.67	3.71	1245.24	993.93	.00	19619.02	380.98	33100.00
* 34100.000	25000.00	2518.04	2509.00	9.04	6551.27	4.04	1367.64	1103.94	.00	24198.36	801.64	33100.00
* 34100.000	30000.00	2518.64	2509.00	9.64	7397.21	4.34	1469.03	1191.39	.00	28671.01	1328.99	33100.00
* 36100.000	500.00	2515.34	2515.00	.34	466.62	1.07	1423.14	369.39	.00	500.00	.00	35100.00
* 36100.000	1000.00	2515.58	2515.00	.58	828.11	1.21	1440.81	457.91	.00	1000.00	.00	35100.00
* 36100.000	2000.00	2515.73	2515.00	.73	1042.39	1.92	1451.18	562.23	.00	2000.00	.00	35100.00
* 36100.000	3000.00	2515.89	2515.00	.89	1262.86	2.38	1461.78	625.21	.00	3000.00	.00	35100.00
* 36100.000	4000.00	2516.21	2515.00	1.21	1758.60	2.27	1485.33	675.40	.00	4000.00	.00	35100.00
* 36100.000	5000.00	2516.48	2515.00	1.48	2153.77	2.32	1503.84	715.92	.00	5000.00	.00	35100.00
* 36100.000	7500.00	2516.73	2515.00	1.73	2536.01	2.96	1521.53	807.11	.00	7500.00	.00	35100.00
* 36100.000	10000.00	2517.29	2515.00	2.29	3386.94	2.95	1560.18	875.14	.00	10000.00	.00	35100.00
* 36100.000	12500.00	2517.75	2515.00	2.75	4108.86	3.04	1592.24	930.65	.00	12500.00	.00	35100.00
* 36100.000	15000.00	2518.19	2515.00	3.19	4822.86	3.11	1623.33	976.31	.00	15000.00	.00	35100.00
* 36100.000	17500.00	2518.60	2515.00	3.60	5498.20	3.18	1652.19	1012.42	.00	17500.00	.00	35100.00
* 36100.000	20000.00	2519.00	2515.00	4.00	6159.59	3.25	1679.98	1053.89	.00	20000.00	.00	35100.00
* 36100.000	25000.00	2519.71	2515.00	4.71	7362.35	3.40	1729.37	1166.58	.00	25000.00	.00	35100.00
* 36100.000	30000.00	2520.35	2515.00	5.35	8472.04	3.54	1773.72	1256.30	.78	29999.22	.00	35100.00
* 40000.000	500.00	2515.84	2514.00	1.84	332.65	1.50	351.79	691.08	.00	500.00	.00	39000.00
* 40000.000	1000.00	2516.44	2514.00	2.44	575.49	1.74	459.54	727.52	.00	1000.00	.00	39000.00
* 40000.000	2000.00	2517.11	2514.00	3.11	922.33	2.17	579.69	838.15	.00	2000.00	.00	39000.00
* 40000.000	3000.00	2517.64	2514.00	3.64	1256.51	2.39	675.53	897.79	.00	3000.00	.00	39000.00
* 40000.000	4000.00	2518.20	2514.00	4.20	1661.75	2.41	776.03	924.10	.00	4000.00	.00	39000.00
* 40000.000	5000.00	2518.68	2514.00	4.68	2050.97	2.44	861.60	942.13	.00	5000.00	.00	39000.00
* 40000.000	7500.00	2519.39	2514.00	5.39	2724.24	2.75	992.33	1053.79	.00	7500.00	.00	39000.00
* 40000.000	10000.00	2520.15	2514.00	6.16	3520.32	2.84	1107.71	1109.49	.08	9999.88	.05	39000.00
* 40000.000	12500.00	2520.76	2514.00	6.76	4196.28	2.99	1137.82	1160.55	4.89	12491.85	3.26	39000.00
* 40000.000	15000.00	2521.30	2514.00	7.30	4818.61	3.13	1164.84	1193.59	19.77	14967.06	13.17	39000.00
* 40000.000	17500.00	2521.85	2514.00	7.85	5466.60	3.24	1192.33	1210.24	48.41	17419.33	32.26	39000.00
* 40000.000	20000.00	2522.69	2514.00	8.69	6490.43	3.14	1234.52	1184.36	115.18	19808.06	76.75	39000.00
* 40000.000	25000.00	2523.36	2514.00	9.36	7323.73	3.50	1267.82	1300.76	215.21	24641.38	143.41	39000.00
* 40000.000	30000.00	2523.63	2514.00	9.63	7676.65	4.02	1281.67	1435.14	296.65	29505.67	197.68	39000.00

SECNO	Q	CWSEL	ELMIN	DEPTH	AREA	VCH	TOPWID	TWA	QLOB	QCH	QROB	CUMDS
42500.000	500.00	2521.24	2520.00	1.24	307.15	1.63	396.78	712.56	.00	500.00	.00	41500.00
42500.000	1000.00	2521.68	2520.00	1.68	504.44	1.98	502.13	755.11	.00	1000.00	.00	41500.00
42500.000	2000.00	2522.35	2520.00	2.35	895.98	2.23	663.38	873.82	.00	2000.00	.00	41500.00
42500.000	3000.00	2522.80	2520.00	2.80	1218.58	2.46	771.31	939.31	.00	3000.00	.00	41500.00
* 42500.000	4000.00	2523.22	2520.00	3.22	1567.46	2.55	873.14	969.88	.00	4000.00	.00	41500.00
* 42500.000	5000.00	2523.53	2520.00	3.53	1846.72	2.71	946.80	992.01	.00	5000.00	.00	41500.00
* 42500.000	7500.00	2524.18	2520.00	4.18	2513.27	2.98	1102.89	1112.13	.00	7500.00	.00	41500.00
* 42500.000	10000.00	2524.70	2520.00	4.70	3120.14	3.20	1227.87	1173.67	.00	10000.00	.00	41500.00
* 42500.000	12500.00	2525.11	2520.00	5.11	3648.22	3.43	1305.69	1227.10	.00	12500.00	.00	41500.00
* 42500.000	15000.00	2525.47	2520.00	5.47	4109.05	3.65	1323.22	1261.48	.00	15000.00	.00	41500.00
* 42500.000	17500.00	2525.80	2520.00	5.80	4553.45	3.84	1339.90	1279.39	.00	17500.00	.00	41500.00
* 42500.000	20000.00	2526.13	2520.00	6.13	4998.12	4.00	1356.40	1255.06	.00	20000.00	.00	41500.00
* 42500.000	25000.00	2526.75	2520.00	6.75	5839.03	4.28	1387.05	1373.19	.00	25000.00	.00	41500.00
* 42500.000	30000.00	2527.29	2520.00	7.29	6602.63	4.54	1414.31	1508.75	.00	30000.00	.00	41500.00
* 48300.000	500.00	2525.95	2523.80	2.16	375.38	1.33	333.92	773.45	.00	500.00	.00	47300.00
* 48300.000	1000.00	2526.77	2523.80	2.97	691.23	1.45	447.15	831.56	.00	1000.00	.00	47300.00
* 48300.000	2000.00	2527.65	2523.80	3.85	1144.30	1.75	571.67	969.44	.00	2000.00	.00	47300.00
* 48300.000	3000.00	2528.29	2523.80	4.49	1533.77	1.96	660.20	1049.24	.00	3000.00	.00	47300.00
* 48300.000	4000.00	2528.80	2523.80	5.00	1888.33	2.12	731.53	1091.09	.00	4000.00	.00	47300.00
* 48300.000	5000.00	2529.23	2523.80	5.43	2217.90	2.25	792.09	1122.64	.00	5000.00	.00	47300.00
* 48300.000	7500.00	2530.10	2523.80	6.30	2967.89	2.53	935.21	1262.31	.25	7499.73	.02	47300.00
* 48300.000	10000.00	2530.72	2523.80	6.92	3602.97	2.83	1137.43	1343.71	41.15	9956.19	2.65	47300.00
* 48300.000	12500.00	2531.23	2523.80	7.43	4218.95	3.10	1303.96	1419.15	171.56	12317.38	11.06	47300.00
* 48300.000	15000.00	2531.67	2523.80	7.87	4835.89	3.33	1451.72	1473.87	396.87	14577.55	25.58	47300.00
* 48300.000	17500.00	2532.08	2523.80	8.28	5452.49	3.53	1585.70	1510.02	712.00	16742.10	45.90	47300.00
* 48300.000	20000.00	2532.45	2523.80	8.65	6068.66	3.71	1709.13	1502.18	1109.91	18818.54	71.55	47300.00
* 48300.000	25000.00	2533.12	2523.80	9.32	7277.81	4.01	1928.51	1649.77	2113.01	22750.78	136.21	47300.00
* 48300.000	30000.00	2533.69	2523.80	9.89	8441.15	4.27	2118.25	1811.63	3335.97	26448.98	215.05	47300.00
51300.000	500.00	2528.30	2525.00	3.30	328.39	1.52	149.01	790.08	.00	500.00	.00	50300.00
* 51300.000	1000.00	2529.03	2525.00	4.03	444.33	2.25	170.76	850.74	.00	1000.00	.00	50300.00
* 51300.000	2000.00	2530.53	2525.00	5.53	1281.98	1.60	1349.74	1014.40	9.27	1970.64	20.08	50300.00
* 51300.000	3000.00	2531.19	2525.00	6.19	2275.78	1.41	1605.33	1177.87	53.16	2831.67	115.17	50300.00
* 51300.000	4000.00	2531.40	2525.00	6.40	2607.24	1.66	1681.96	1232.39	88.11	3720.99	190.90	50300.00
* 51300.000	5000.00	2531.74	2525.00	6.74	3197.69	1.73	1810.45	1262.86	146.39	4536.42	317.19	50300.00
* 51300.000	7500.00	2532.42	2525.00	7.42	4523.08	1.90	2070.03	1406.76	326.42	6466.31	707.26	50300.00
* 51300.000	10000.00	2532.96	2525.00	7.96	5685.84	2.06	2273.49	1496.54	540.50	8288.39	1171.10	50300.00
* 51300.000	12500.00	2533.42	2525.00	8.42	6769.96	2.20	2447.99	1581.00	782.17	10023.08	1694.74	50300.00
* 51300.000	15000.00	2533.83	2525.00	8.83	7813.61	2.32	2604.97	1644.44	1047.65	11682.41	2269.94	50300.00
* 51300.000	17500.00	2534.21	2525.00	9.21	8826.59	2.43	2748.76	1688.83	1333.18	13278.20	2888.62	50300.00
* 51300.000	20000.00	2534.56	2525.00	9.56	9815.03	2.53	2882.17	1688.81	1636.02	14819.20	3544.77	50300.00
* 51300.000	25000.00	2535.19	2525.00	10.19	11709.91	2.68	3077.37	1849.96	2272.84	17689.30	5037.85	50300.00
* 51300.000	30000.00	2535.74	2525.00	10.74	13407.35	2.81	3155.44	2017.55	2927.15	20309.93	6762.92	50300.00

SECNO	Q	CWSEL	ELMIN	DEPTH	AREA	VCH	TOPWID	TWA	QLOB	QCH	QROB	CUMDS
* 53100.000	500.00	2533.73	2530.00	3.73	139.16	3.59	74.61	794.83	.00	500.00	.00	52100.00
* 53100.000	1000.00	2534.80	2530.00	4.80	230.24	4.34	95.97	856.60	.00	1000.00	.00	52100.00
* 53100.000	2000.00	2536.34	2530.00	6.34	820.48	2.44	754.37	1050.19	.00	2000.00	.00	52100.00
* 53100.000	3000.00	2536.76	2530.00	6.76	1179.99	2.54	959.89	1226.67	.00	3000.00	.00	52100.00
* 53100.000	4000.00	2537.05	2530.00	7.05	1481.97	2.70	1103.33	1289.31	.00	4000.00	.00	52100.00
* 53100.000	5000.00	2537.31	2530.00	7.31	1793.23	2.79	1233.84	1324.63	.00	5000.00	.00	52100.00
* 53100.000	7500.00	2537.83	2530.00	7.83	2498.57	3.00	1487.81	1477.12	.00	7500.00	.00	52100.00
* 53100.000	10000.00	2538.25	2530.00	8.25	3154.97	3.17	1690.23	1573.28	.00	10000.00	.00	52100.00
* 53100.000	12500.00	2538.60	2530.00	8.60	3787.20	3.30	1864.53	1662.99	.00	12500.00	.00	52100.00
* 53100.000	15000.00	2538.92	2530.00	8.92	4414.01	3.40	2022.56	1730.95	.00	15000.00	.00	52100.00
* 53100.000	17500.00	2539.21	2530.00	9.21	5003.82	3.50	2160.73	1779.38	.00	17500.00	.00	52100.00
* 53100.000	20000.00	2539.48	2530.00	9.48	5606.24	3.57	2293.28	1783.09	.00	20000.00	.00	52100.00
* 53100.000	25000.00	2539.96	2530.00	9.96	6773.29	3.69	2530.38	1950.42	.00	25000.00	.00	52100.00
* 53100.000	30000.00	2540.30	2530.00	10.30	7654.57	3.92	2571.31	2118.81	.55	29998.45	1.00	52100.00
* 54100.000	500.00	2536.03	2535.00	1.03	295.01	1.69	471.60	802.63	.00	500.00	.00	53100.00
* 54100.000	1000.00	2536.31	2535.00	1.31	439.37	2.28	571.27	867.79	.00	1000.00	.00	53100.00
* 54100.000	2000.00	2537.01	2535.00	2.01	924.21	2.16	821.85	1068.57	.00	2000.00	.00	53100.00
* 54100.000	3000.00	2537.47	2535.00	2.47	1347.55	2.23	990.07	1247.95	.00	3000.00	.00	53100.00
* 54100.000	4000.00	2537.83	2535.00	2.83	1726.06	2.32	1119.27	1312.77	.00	4000.00	.00	53100.00
* 54100.000	5000.00	2538.13	2535.00	3.13	2077.50	2.41	1227.11	1349.83	.00	5000.00	.00	53100.00
* 54100.000	7500.00	2538.74	2535.00	3.74	2887.52	2.60	1445.34	1505.64	.00	7500.00	.00	53100.00
* 54100.000	10000.00	2539.21	2535.00	4.21	3596.30	2.78	1612.25	1604.28	.00	10000.00	.00	53100.00
* 54100.000	12500.00	2539.60	2535.00	4.60	4262.11	2.93	1754.63	1695.75	.00	12500.00	.00	53100.00
* 54100.000	15000.00	2539.95	2535.00	4.95	4896.17	3.06	1880.22	1765.32	.00	15000.00	.00	53100.00
* 54100.000	17500.00	2540.25	2535.00	5.25	5484.83	3.19	1915.25	1814.96	.00	17500.00	.00	53100.00
* 54100.000	20000.00	2540.53	2535.00	5.53	6015.01	3.33	1931.79	1819.78	.00	20000.00	.00	53100.00
* 54100.000	25000.00	2541.03	2535.00	6.03	6977.87	3.58	1961.46	1989.12	.00	25000.00	.00	53100.00
* 54100.000	30000.00	2541.45	2535.00	6.45	7796.63	3.85	1986.35	2158.60	.00	30000.00	.00	53100.00
* 58100.000	500.00	2541.33	2540.00	1.33	482.52	1.04	629.30	857.10	.00	500.00	.00	57100.00
* 58100.000	1000.00	2541.73	2540.00	1.73	775.44	1.29	793.95	937.85	.00	1000.00	.00	57100.00
* 58100.000	2000.00	2542.32	2540.00	2.32	1305.04	1.53	1026.66	1159.31	.00	2000.00	.00	57100.00
* 58100.000	3000.00	2542.75	2540.00	2.74	1773.17	1.69	1195.21	1353.40	.00	3000.00	.00	57099.99
* 58100.000	4000.00	2543.08	2540.00	3.08	2198.56	1.82	1329.98	1430.19	.00	4000.00	.00	57100.00
* 58100.000	5000.00	2543.37	2540.00	3.37	2604.66	1.92	1446.97	1477.44	.00	5000.00	.00	57099.99
* 58100.000	7500.00	2543.96	2540.00	3.96	3531.02	2.12	1683.69	1654.18	.00	7500.00	.00	57099.99
* 58100.000	10000.00	2544.44	2540.00	4.44	4393.94	2.28	1877.54	1769.49	.00	10000.00	.00	57100.00
* 58100.000	12500.00	2544.85	2540.00	4.85	5199.17	2.40	2041.89	1875.33	.00	12500.00	.00	57100.00
* 58100.000	15000.00	2545.35	2540.00	5.34	6431.10	2.33	2653.17	1992.14	.00	15000.00	.00	57100.00
* 58100.000	17500.00	2545.61	2540.00	5.61	7112.22	2.46	2691.41	2043.47	.00	17500.00	.00	57100.00
* 58100.000	20000.00	2545.85	2540.00	5.85	7772.44	2.57	2727.95	2049.77	.00	20000.00	.00	57100.00
* 58100.000	25000.00	2546.31	2540.00	6.31	9028.04	2.77	2796.14	2222.20	.00	25000.00	.00	57100.00
* 58100.000	30000.00	2546.73	2540.00	6.73	10209.15	2.94	2858.80	2395.22	.00	30000.00	.00	57100.00

SECNO	Q	CWSEL	ELMIN	DEPTH	AREA	VCH	TOPWID	TWA	QLOB	QCH	QROB	CUMDS
* 61100.000	500.00	2546.45	2545.00	1.45	317.57	1.57	334.10	887.27	.00	500.00	.00	60100.00
* 61100.000	1000.00	2547.02	2545.00	2.02	526.99	1.90	422.66	976.49	.00	1000.00	.00	60100.00
* 61100.000	2000.00	2547.73	2545.00	2.73	868.83	2.30	536.68	1208.86	.00	2000.00	.00	60100.00
* 61100.000	3000.00	2548.23	2545.00	3.23	1158.67	2.59	617.07	1411.09	.00	3000.00	.00	60099.99
* 61100.000	4000.00	2548.64	2545.00	3.64	1417.24	2.82	680.82	1494.46	.00	4000.00	.00	60100.00
* 61100.000	5000.00	2548.98	2545.00	3.98	1663.60	3.01	736.45	1547.38	.00	5000.00	.00	60099.99
* 61100.000	7500.00	2549.67	2545.00	4.67	2212.47	3.39	847.34	1735.73	.00	7500.00	.00	60099.99
* 61100.000	10000.00	2550.24	2545.00	5.24	2862.00	3.65	1589.06	1866.00	.00	9912.11	87.89	60100.00
* 61100.000	12500.00	2550.70	2545.00	5.70	3640.43	3.74	1765.43	1995.19	.00	11942.99	557.01	60100.00
* 61100.000	15000.00	2551.05	2545.00	6.05	4281.79	3.87	1898.46	2166.36	.00	13868.83	1131.17	60100.00
* 61100.000	17500.00	2551.36	2545.00	6.36	4883.76	3.98	2015.36	2229.37	.00	15721.26	1778.74	60100.00
* 61100.000	20000.00	2551.63	2545.00	6.63	5442.32	4.08	2118.06	2245.83	.00	17537.70	2462.30	60100.00
* 61100.000	25000.00	2552.10	2545.00	7.10	6484.76	4.27	2297.48	2435.31	.00	21090.31	3909.68	60100.00
* 61100.000	30000.00	2552.51	2545.00	7.51	7457.85	4.43	2453.15	2622.44	.00	24572.62	5427.38	60100.00
* 64300.000	500.00	2551.08	2550.00	1.08	455.61	1.10	746.14	930.56	.00	500.00	.00	63300.00
* 64300.000	1000.00	2551.49	2550.00	1.49	817.69	1.22	995.61	1032.81	.00	1000.00	.00	63300.00
* 64300.000	2000.00	2551.99	2550.00	1.99	1384.81	1.44	1292.97	1282.23	.00	2000.00	.00	63300.00
* 64300.000	3000.00	2552.35	2550.00	2.35	1898.17	1.58	1512.55	1496.72	.00	3000.00	.00	63299.99
* 64300.000	4000.00	2552.66	2550.00	2.66	2379.84	1.68	1692.87	1590.13	.00	4000.00	.00	63300.00
* 64300.000	5000.00	2552.92	2550.00	2.92	2840.74	1.76	1849.02	1651.77	.00	5000.00	.00	63299.99
* 64300.000	7500.00	2553.47	2550.00	3.47	3941.12	1.90	2177.00	1858.18	.00	7500.00	.00	63299.99
* 64300.000	10000.00	2553.92	2550.00	3.92	4988.57	2.00	2448.73	2007.72	.00	10000.00	.00	63300.00
* 64300.000	12500.00	2554.30	2550.00	4.30	5970.59	2.09	2678.57	2146.69	.00	12500.00	.00	63300.00
* 64300.000	15000.00	2554.64	2550.00	4.64	6913.42	2.17	2882.03	2324.65	.00	15000.00	.00	63300.00
* 64300.000	17500.00	2554.92	2550.00	4.92	7764.12	2.25	3054.00	2391.97	.00	17500.00	.00	63300.00
* 64300.000	20000.00	2555.19	2550.00	5.19	8555.00	2.34	3119.63	2411.55	.00	20000.00	.00	63300.00
* 64300.000	25000.00	2555.67	2550.00	5.67	10066.58	2.48	3172.48	2606.11	.00	25000.00	.00	63300.00
* 64300.000	30000.00	2556.11	2550.00	6.11	11486.30	2.61	3221.33	2797.82	.00	30000.00	.00	63300.00
* 66700.000	500.00	2554.81	2552.50	2.31	223.23	2.24	193.66	961.33	.00	500.00	.00	65700.00
* 66700.000	1000.00	2555.53	2552.50	3.03	405.57	2.47	339.21	1073.32	.00	1000.00	.00	65700.00
* 66700.000	2000.00	2556.30	2552.50	3.80	746.52	2.68	533.08	1336.96	.00	2000.00	.00	65700.00
* 66700.000	3000.00	2556.76	2552.50	4.26	1017.16	2.95	646.85	1568.80	.00	3000.00	.00	65699.99
* 66700.000	4000.00	2557.11	2552.50	4.61	1257.38	3.18	733.19	1678.64	.00	4000.00	.00	65700.00
* 66700.000	5000.00	2557.41	2552.50	4.91	1487.75	3.36	807.36	1751.49	.00	5000.00	.00	65699.99
* 66700.000	7500.00	2558.02	2552.50	5.52	2032.10	3.69	960.12	1975.67	.00	7500.00	.00	65699.99
* 66700.000	10000.00	2558.52	2552.50	6.02	2537.07	3.94	1082.72	2136.87	.00	10000.00	.00	65700.00
* 66700.000	12500.00	2558.94	2552.50	6.44	3011.57	4.15	1186.44	2284.92	.00	12500.00	.00	65700.00
* 66700.000	15000.00	2559.30	2552.50	6.80	3458.95	4.34	1276.53	2470.64	.00	15000.00	.00	65700.00
* 66700.000	17500.00	2559.62	2552.50	7.12	3885.19	4.50	1356.82	2544.76	.00	17500.00	.00	65700.00
* 66700.000	20000.00	2559.92	2552.50	7.42	4297.88	4.65	1430.26	2569.45	.00	20000.00	.00	65700.00
* 66700.000	25000.00	2560.41	2552.50	7.91	5021.50	4.99	1540.95	2771.95	11.16	24987.54	1.30	65700.00
* 66700.000	30000.00	2560.84	2552.50	8.34	5706.24	5.32	1637.18	2970.08	75.26	29915.96	8.78	65700.00

SECNO	Q	CWSEL	ELMIN	DEPTH	AREA	VCH	TOPWID	TWA	QLOB	QCH	OROB	CUMDS
* 68800.000	500.00	2556.78	2555.00	1.78	430.17	1.16	384.26	975.71	.00	500.00	.00	67800.00
* 68800.000	1000.00	2557.49	2555.00	2.49	746.10	1.34	498.75	1092.76	.00	1000.00	.00	67800.00
* 68800.000	2000.00	2558.38	2555.00	3.38	1253.29	1.60	641.13	1363.09	.00	2000.00	.00	67800.00
* 68800.000	3000.00	2559.00	2555.00	4.00	1680.00	1.79	740.00	1599.49	.00	3000.00	.00	67799.99
* 68800.000	4000.00	2559.49	2555.00	4.49	2060.60	1.94	818.16	1712.96	.00	4000.00	.00	67800.00
* 68800.000	5000.00	2559.87	2555.00	4.87	2389.18	2.09	880.08	1788.35	.00	5000.00	.00	67799.99
* 68800.000	7500.00	2560.59	2555.00	5.59	3043.50	2.47	948.99	2016.70	4.49	7493.77	1.74	67799.99
* 68800.000	10000.00	2561.16	2555.00	6.17	3605.09	2.81	997.09	2181.36	28.39	9960.57	11.04	67800.00
* 68800.000	12500.00	2561.66	2555.00	6.66	4105.18	3.11	1038.04	2332.45	74.26	12396.87	28.87	67800.00
* 68800.000	15000.00	2562.09	2555.00	7.09	4561.79	3.38	1074.07	2520.88	140.96	14804.25	54.79	67800.00
* 68800.000	17500.00	2562.47	2555.00	7.47	4981.76	3.64	1106.18	2597.48	226.34	17185.69	87.98	67800.00
* 68800.000	20000.00	2562.83	2555.00	7.83	5376.36	3.87	1135.51	2624.47	329.37	19542.60	128.02	67800.00
* 68800.000	25000.00	2563.45	2555.00	8.45	6099.14	4.32	1187.37	2830.79	581.62	24192.31	226.07	67800.00
* 68800.000	30000.00	2564.01	2555.00	9.01	6774.20	4.71	1233.84	3032.21	893.79	28758.81	347.40	67800.00
71500.000	500.00	2559.43	2557.00	2.43	345.33	1.45	283.86	996.42	.00	500.00	.00	70500.00
* 71500.000	1000.00	2560.22	2557.00	3.22	606.09	1.65	396.35	1121.65	.00	1000.00	.00	70500.00
* 71500.000	2000.00	2561.18	2557.00	4.18	1089.86	1.84	602.92	1403.88	.00	2000.00	.00	70500.00
* 71500.000	3000.00	2561.82	2557.00	4.82	1514.83	1.98	738.13	1648.55	.00	3000.00	.00	70499.99
* 71500.000	4000.00	2562.31	2557.00	5.31	1904.38	2.10	843.23	1768.22	.00	4000.00	.00	70500.00
* 71500.000	5000.00	2562.73	2557.00	5.73	2269.54	2.20	931.04	1848.65	.00	5000.00	.00	70499.99
71500.000	7500.00	2563.38	2557.00	6.38	2930.66	2.56	1071.88	2079.33	.00	7500.00	.00	70499.99
71500.000	10000.00	2564.03	2557.00	7.03	3662.29	2.73	1208.75	2249.73	.00	10000.00	.00	70500.00
* 71500.000	12500.00	2564.80	2557.00	7.80	4646.25	2.69	1371.46	2412.87	.00	12500.00	.00	70500.00
* 71500.000	15000.00	2565.30	2557.00	8.30	5367.26	2.79	1434.08	2608.05	.00	15000.00	.00	70500.00
* 71500.000	17500.00	2565.73	2557.00	8.73	5981.73	2.93	1458.86	2687.44	.00	17500.00	.00	70500.00
* 71500.000	20000.00	2566.11	2557.00	9.11	6550.62	3.05	1481.44	2714.80	.00	20000.00	.00	70500.00
* 71500.000	25000.00	2566.83	2557.00	9.83	7625.27	3.28	1523.16	2921.37	.00	25000.00	.00	70500.00
* 71500.000	30000.00	2567.48	2557.00	10.48	8629.40	3.48	1561.15	3123.44	.00	30000.00	.00	70500.00
* 75000.000	500.00	2560.84	2560.00	.84	552.22	.91	701.81	1035.43	.00	500.00	.00	74000.00
* 75000.000	1000.00	2561.47	2560.00	1.47	1014.48	.99	776.84	1166.50	.00	1000.00	.00	73999.99
* 75000.000	2000.00	2562.40	2560.00	2.40	1788.77	1.12	888.43	1458.83	.00	2000.00	.00	73999.99
* 75000.000	3000.00	2563.08	2560.00	3.08	2414.42	1.24	969.26	1710.65	.00	3000.00	.00	73999.98
* 75000.000	4000.00	2563.63	2560.00	3.63	2964.19	1.35	1035.09	1836.08	.00	4000.00	.00	73999.99
* 75000.000	5000.00	2564.06	2560.00	4.06	3425.61	1.46	1087.27	1919.54	.00	5000.00	.00	73999.99
* 75000.000	7500.00	2564.92	2560.00	4.92	4403.42	1.70	1190.30	2156.32	.00	7500.00	.00	73999.99
* 75000.000	10000.00	2565.62	2560.00	5.62	5251.40	1.90	1218.64	2331.16	.00	10000.00	.00	74000.00
* 75000.000	12500.00	2566.29	2560.00	6.29	6071.50	2.06	1238.66	2499.34	.00	12500.00	.00	74000.00
* 75000.000	15000.00	2566.83	2560.00	6.83	6742.04	2.22	1254.80	2697.57	.00	15000.00	.00	74000.00
* 75000.000	17500.00	2567.30	2560.00	7.30	7344.68	2.38	1269.13	2779.16	.00	17500.00	.00	74000.00
* 75000.000	20000.00	2567.74	2560.00	7.74	7905.92	2.53	1282.32	2808.46	.00	20000.00	.00	74000.00
* 75000.000	25000.00	2568.55	2560.00	8.55	8944.95	2.79	1306.41	3018.46	.00	25000.00	.00	74000.00
* 75000.000	30000.00	2569.27	2560.00	9.27	9903.35	3.03	1328.23	3223.70	.00	30000.00	.00	74000.00

SECNO	Q	CWSEL	ELMIN	DEPTH	AREA	VCH	TOPWID	TWA	QLOB	QCH	QROB	CUMDS
* 78500.000	500.00	2566.62	2565.00	1.62	326.70	1.53	355.87	1089.08	.00	500.00	.00	77500.00
* 78500.000	1000.00	2567.17	2565.00	2.17	549.39	1.82	459.64	1224.64	.00	1000.00	.00	77499.99
* 78500.000	2000.00	2567.87	2565.00	2.87	924.04	2.16	594.67	1525.24	.00	2000.00	.00	77499.99
* 78500.000	3000.00	2568.38	2565.00	3.38	1258.30	2.38	693.29	1783.90	.00	3000.00	.00	77499.98
* 78500.000	4000.00	2568.80	2565.00	3.80	1568.44	2.55	773.63	1915.19	.00	4000.00	.00	77499.99
* 78500.000	5000.00	2569.17	2565.00	4.17	1858.73	2.69	841.91	2003.74	.00	5000.00	.00	77499.99
* 78500.000	7500.00	2569.91	2565.00	4.91	2534.48	2.96	982.65	2250.99	.00	7500.00	.00	77499.99
* 78500.000	10000.00	2570.45	2565.00	5.45	3078.28	3.25	1012.61	2432.03	.00	10000.00	.00	77500.00
* 78500.000	12500.00	2570.90	2565.00	5.90	3535.99	3.54	1025.19	2599.87	.00	12500.00	.00	77500.00
* 78500.000	15000.00	2571.31	2565.00	6.31	3958.84	3.79	1036.68	2798.04	.00	15000.00	.00	77500.00
* 78500.000	17500.00	2571.69	2565.00	6.69	4358.76	4.01	1047.42	2879.83	.00	17500.00	.00	77500.00
* 78500.000	20000.00	2572.06	2565.00	7.06	4739.82	4.22	1057.56	2909.45	.00	20000.00	.00	77500.00
* 78500.000	25000.00	2572.73	2565.00	7.73	5462.21	4.58	1076.51	3120.32	.00	25000.00	.00	77500.00
* 78500.000	30000.00	2573.36	2565.00	8.36	6139.17	4.89	1093.98	3326.55	.00	30000.00	.00	77500.00
80500.000	500.00	2570.71	2570.00	.71	370.37	1.35	542.63	1109.71	.00	500.00	.00	79500.00
80500.000	1000.00	2571.10	2570.00	1.10	584.14	1.71	565.77	1248.18	.00	1000.00	.00	79499.99
80500.000	2000.00	2571.68	2570.00	1.68	921.84	2.17	600.52	1552.67	.00	2000.00	.00	79499.99
80500.000	3000.00	2572.14	2570.00	2.14	1201.80	2.50	627.87	1814.23	.00	3000.00	.00	79499.98
* 80500.000	4000.00	2572.35	2570.00	2.35	1339.64	2.99	640.90	1944.44	.00	4000.00	.00	79499.99
* 80500.000	5000.00	2572.69	2570.00	2.69	1561.56	3.20	661.35	2034.75	.00	5000.00	.00	79499.99
* 80500.000	7500.00	2573.45	2570.00	3.45	2080.83	3.60	706.89	2283.50	.00	7500.00	.00	79499.99
* 80500.000	10000.00	2574.05	2570.00	4.05	2514.75	3.98	742.81	2466.72	.00	10000.00	.00	79500.00
* 80500.000	12500.00	2574.57	2570.00	4.57	2911.98	4.29	774.23	2636.55	.00	12500.00	.00	79500.00
* 80500.000	15000.00	2575.03	2570.00	5.03	3269.96	4.59	803.09	2836.87	.00	15000.00	.00	79500.00
* 80500.000	17500.00	2575.41	2570.00	5.41	3589.39	4.89	850.98	2920.99	4.71	17494.16	1.13	79500.00
* 80500.000	20000.00	2575.77	2570.00	5.77	3904.09	5.16	895.66	2952.78	25.32	19968.61	6.07	79500.00
* 80500.000	25000.00	2576.43	2570.00	6.43	4518.33	5.66	977.01	3167.68	131.44	24837.03	31.53	79500.00
* 80500.000	30000.00	2577.02	2570.00	7.02	5113.88	6.09	1049.88	3377.59	331.48	29589.01	79.51	79500.00
84000.000	500.00	2576.37	2575.00	1.37	403.80	1.24	438.29	1149.12	.00	500.00	.00	83000.00
84000.000	1000.00	2576.87	2575.00	1.87	648.27	1.54	542.93	1292.72	.00	1000.00	.00	82999.99
* 84000.000	2000.00	2577.47	2575.00	2.47	1005.86	1.99	667.05	1611.05	.00	2000.00	.00	82999.99
* 84000.000	3000.00	2577.98	2575.00	2.98	1376.78	2.18	775.08	1878.45	.00	3000.00	.00	82999.98
* 84000.000	4000.00	2578.38	2575.00	3.38	1707.51	2.34	860.03	2018.06	.00	4000.00	.00	82999.99
* 84000.000	5000.00	2578.73	2575.00	3.73	2022.39	2.47	933.76	2112.66	.00	5000.00	.00	82999.99
* 84000.000	7500.00	2579.48	2575.00	4.48	2774.31	2.70	1089.82	2369.97	.00	7500.00	.00	82999.99
* 84000.000	10000.00	2580.08	2575.00	5.08	3466.57	2.88	1204.19	2560.08	.00	10000.00	.00	83000.00
* 84000.000	12500.00	2580.54	2575.00	5.54	4022.66	3.11	1229.33	2730.77	.00	12500.00	.00	83000.00
* 84000.000	15000.00	2580.97	2575.00	5.97	4566.06	3.29	1253.40	2931.24	.00	15000.00	.00	83000.00
* 84000.000	17500.00	2581.37	2575.00	6.37	5067.03	3.45	1275.20	3016.03	.00	17500.00	.00	83000.00
* 84000.000	20000.00	2581.74	2575.00	6.74	5552.26	3.60	1295.95	3048.65	.00	20000.00	.00	83000.00
* 84000.000	25000.00	2582.45	2575.00	7.45	6478.38	3.86	1334.68	3265.35	.00	25000.00	.00	83000.00
* 84000.000	30000.00	2583.10	2575.00	8.10	7359.08	4.08	1370.49	3477.13	.00	30000.00	.00	83000.00

SECNO	Q	CWSEL	ELMIN	DEPTH	AREA	VCH	TOPWID	TWA	QLOB	QCH	QROB	CUMDS
87500.000	500.00	2581.48	2580.00	1.48	333.49	1.50	351.26	1180.84	.00	500.00	.00	86500.00
87500.000	1000.00	2582.07	2580.00	2.07	570.59	1.75	451.66	1332.67	.00	1000.00	.00	86499.99
87500.000	2000.00	2582.88	2580.00	2.88	997.57	2.00	590.91	1661.59	.00	2000.00	.00	86499.99
87500.000	3000.00	2583.41	2580.00	3.41	1329.49	2.26	679.73	1936.89	.00	3000.00	.00	86499.98
87500.000	4000.00	2583.84	2580.00	3.84	1639.10	2.44	753.19	2082.87	.00	4000.00	.00	86499.99
87500.000	5000.00	2584.21	2580.00	4.21	1926.12	2.60	815.40	2182.93	.00	5000.00	.00	86499.99
* 87500.000	7500.00	2584.96	2580.00	4.96	2585.95	2.90	942.99	2452.09	.00	7500.00	.00	86499.99
* 87500.000	10000.00	2585.49	2580.00	5.49	3098.99	3.24	1000.23	2649.28	2.01	9993.76	4.22	86499.99
* 87500.000	12500.00	2585.93	2580.00	5.93	3553.88	3.55	1046.17	2823.79	11.45	12464.50	24.05	86500.00
* 87500.000	15000.00	2586.33	2580.00	6.34	3984.49	3.83	1087.87	3027.86	30.10	14906.66	63.23	86500.00
* 87500.000	17500.00	2586.71	2580.00	6.71	4396.96	4.08	1126.37	3115.95	58.34	17319.11	122.55	86500.00
* 87500.000	20000.00	2587.05	2580.00	7.05	4792.24	4.31	1162.07	3151.74	95.85	19702.83	201.32	86500.00
* 87500.000	25000.00	2587.68	2580.00	7.68	5544.40	4.71	1227.13	3374.42	197.32	24388.21	414.47	86500.00
* 87500.000	30000.00	2588.25	2580.00	8.25	6252.90	5.08	1285.40	3591.78	330.91	28974.03	695.06	86500.00
89600.000	500.00	2585.58	2585.00	.58	430.33	1.16	786.83	1208.27	.00	500.00	.00	88600.00
89600.000	1000.00	2585.89	2585.00	.89	682.72	1.46	833.56	1363.65	.00	1000.00	.00	88599.99
89600.000	2000.00	2586.36	2585.00	1.36	1090.60	1.83	903.98	1697.63	.00	2000.00	.00	88599.99
89600.000	3000.00	2586.77	2585.00	1.77	1480.35	2.03	966.49	1976.57	.00	3000.00	.00	88599.98
* 89600.000	4000.00	2586.94	2585.00	1.94	1636.34	2.44	990.41	2123.16	.00	4000.00	.00	88599.99
* 89600.000	5000.00	2587.23	2585.00	2.23	1938.49	2.58	1035.16	2225.71	.00	5000.00	.00	88599.99
* 89600.000	7500.00	2587.89	2585.00	2.89	2649.01	2.83	1133.45	2500.11	.00	7500.00	.00	88599.99
* 89600.000	10000.00	2588.45	2585.00	3.45	3306.44	3.02	1217.35	2699.87	.00	10000.00	.00	88599.99
* 89600.000	12500.00	2588.93	2585.00	3.93	3907.08	3.20	1289.23	2876.74	.00	12500.00	.00	88600.00
* 89600.000	15000.00	2589.36	2585.00	4.37	4481.50	3.35	1354.42	3083.17	.00	15000.00	.00	88600.00
* 89600.000	17500.00	2589.76	2585.00	4.76	5036.86	3.47	1414.59	3173.18	.00	17500.00	.00	88600.00
* 89600.000	20000.00	2590.13	2585.00	5.13	5561.63	3.60	1462.18	3210.57	.00	20000.00	.00	88600.00
* 89600.000	25000.00	2590.80	2585.00	5.80	6569.94	3.81	1526.28	3435.96	.00	25000.00	.00	88600.00
* 89600.000	30000.00	2591.42	2585.00	6.42	7531.59	3.98	1585.01	3655.71	.00	30000.00	.00	88600.00
92000.000	500.00	2590.57	2590.00	.57	448.53	1.11	807.59	1252.19	.00	500.00	.00	91000.00
92000.000	1000.00	2590.84	2590.00	.84	676.15	1.48	835.30	1409.63	.00	1000.00	.00	90999.99
92000.000	2000.00	2591.27	2590.00	1.27	1028.67	1.94	876.49	1746.67	.00	2000.00	.00	90999.99
* 92000.000	3000.00	2591.65	2590.00	1.65	1377.56	2.18	915.43	2027.50	.00	3000.00	.00	90999.98
92000.000	4000.00	2591.96	2590.00	1.96	1662.97	2.41	946.09	2176.50	.00	4000.00	.00	90999.99
92000.000	5000.00	2592.20	2590.00	2.20	1897.87	2.63	970.61	2280.96	.00	5000.00	.00	90999.99
* 92000.000	7500.00	2592.77	2590.00	2.77	2458.91	3.05	1026.78	2558.46	.00	7500.00	.00	90999.99
* 92000.000	10000.00	2593.26	2590.00	3.26	2967.20	3.37	1075.15	2761.17	.00	10000.00	.00	90999.99
* 92000.000	12500.00	2593.69	2590.00	3.69	3444.42	3.63	1118.65	2940.71	.00	12500.00	.00	91000.00
* 92000.000	15000.00	2594.08	2590.00	4.08	3892.97	3.85	1158.06	3149.78	.00	15000.00	.00	91000.00
* 92000.000	17500.00	2594.44	2590.00	4.44	4312.40	4.06	1193.73	3242.25	.00	17500.00	.00	91000.00
* 92000.000	20000.00	2594.77	2590.00	4.77	4715.17	4.24	1227.00	3281.82	.00	20000.00	.00	91000.00
* 92000.000	25000.00	2595.35	2590.00	5.35	5444.09	4.59	1264.13	3509.86	.00	25000.00	.00	91000.00
* 92000.000	30000.00	2595.87	2590.00	5.87	6106.24	4.91	1284.91	3731.44	.00	30000.00	.00	91000.00

SECNO	Q	CWSEL	ELMIN	DEPTH	AREA	VCH	TOPWID	TWA	QLOB	QCH	QROB	CUMDS
93800.000	500.00	2595.42	2595.00	.42	393.16	1.27	971.43	1288.95	.00	500.00	.00	92800.00
93800.000	1000.00	2595.66	2595.00	.66	625.01	1.60	1011.19	1447.78	.00	1000.00	.00	92799.99
93800.000	2000.00	2596.02	2595.00	1.02	997.55	2.00	1071.99	1786.93	.00	2000.00	.00	92799.99
93800.000	3000.00	2596.26	2595.00	1.26	1266.51	2.37	1113.83	2069.43	.00	3000.00	.00	92799.98
93800.000	4000.00	2596.50	2595.00	1.50	1537.59	2.60	1154.46	2219.90	.00	4000.00	.00	92799.99
93800.000	5000.00	2596.73	2595.00	1.73	1813.12	2.76	1194.35	2325.69	.00	5000.00	.00	92799.99
93800.000	7500.00	2597.22	2595.00	2.22	2422.49	3.10	1278.14	2606.09	.00	7500.00	.00	92799.99
93800.000	10000.00	2597.65	2595.00	2.65	2982.77	3.35	1350.61	2811.29	.00	10000.00	.00	92799.99
93800.000	12500.00	2598.03	2595.00	3.03	3513.98	3.56	1415.89	2993.08	.00	12500.00	.00	92800.00
93800.000	15000.00	2598.38	2595.00	3.38	4013.26	3.74	1474.62	3204.17	.00	15000.00	.00	92800.00
* 93800.000	17500.00	2598.77	2595.00	3.77	4593.61	3.81	1540.07	3299.30	.00	17500.00	.00	92800.00
* 93800.000	20000.00	2599.06	2595.00	4.06	5057.92	3.95	1590.50	3340.69	.00	20000.00	.00	92800.00
* 93800.000	25000.00	2599.61	2595.00	4.61	5948.21	4.20	1682.97	3572.30	.00	25000.00	.00	92800.00
* 93800.000	30000.00	2600.09	2595.00	5.09	6786.11	4.42	1760.28	3795.91	.00	30000.00	.00	92800.00
* 96200.000	500.00	2599.80	2598.00	1.80	445.40	1.12	494.95	1329.35	.00	500.00	.00	95200.00
* 96200.000	1000.00	2600.25	2598.00	2.25	685.14	1.46	571.69	1491.38	.00	999.76	.24	95199.99
* 96200.000	2000.00	2600.82	2598.00	2.82	1029.17	1.96	623.50	1833.64	.00	1993.29	6.71	95199.99
* 96200.000	3000.00	2601.29	2598.00	3.29	1332.78	2.28	665.88	2118.46	.00	2977.02	22.98	95199.98
* 96200.000	4000.00	2601.66	2598.00	3.66	1585.40	2.56	699.19	2270.97	.00	3953.55	46.45	95199.99
* 96200.000	5000.00	2601.97	2598.00	3.97	1804.75	2.82	726.88	2378.62	.00	4924.43	75.57	95199.99
* 96200.000	7500.00	2602.19	2598.00	4.19	1973.38	3.87	747.47	2676.28	.00	7366.53	133.47	95199.99
* 96200.000	10000.00	2602.78	2598.00	4.78	2422.31	4.23	799.70	2885.90	.00	9752.58	247.42	95199.99
* 96200.000	12500.00	2603.25	2598.00	5.25	2811.78	4.57	842.39	3070.67	.00	12119.33	380.67	95200.00
* 96200.000	15000.00	2603.68	2598.00	5.68	3181.20	4.86	880.97	3283.30	.00	14466.41	533.59	95200.00
* 96200.000	17500.00	2604.07	2598.00	6.07	3533.98	5.11	916.31	3380.04	.00	16796.59	703.41	95200.00
* 96200.000	20000.00	2604.43	2598.00	6.43	3863.53	5.35	948.12	3423.28	.00	19114.22	885.78	95200.00
* 96200.000	25000.00	2605.06	2598.00	7.06	4480.80	5.79	1005.01	3658.55	.00	23714.45	1285.55	95200.00
* 96200.000	30000.00	2605.62	2598.00	7.62	5056.75	6.17	1055.33	3885.61	.00	28274.55	1725.45	95200.00
* 97700.000	500.00	2601.80	2600.00	1.80	260.82	1.92	189.95	1338.94	.00	500.00	.00	96700.00
* 97700.000	1000.00	2602.50	2600.00	2.50	405.65	2.47	224.87	1502.82	.00	1000.00	.00	96699.99
* 97700.000	2000.00	2603.42	2600.00	3.42	632.80	3.16	270.70	1847.45	.00	2000.00	.00	96699.99
* 97700.000	3000.00	2604.08	2600.00	4.08	823.74	3.64	303.93	2133.91	.00	3000.00	.00	96699.98
* 97700.000	4000.00	2604.62	2600.00	4.62	995.73	4.02	331.02	2287.69	.00	4000.00	.00	96699.99
* 97700.000	5000.00	2605.08	2600.00	5.08	1154.08	4.33	352.76	2396.38	.00	5000.00	.00	96699.99
* 97700.000	7500.00	2605.92	2600.00	5.92	1459.59	5.18	380.53	2695.59	10.40	7485.16	4.44	96699.99
* 97700.000	10000.00	2606.58	2600.00	6.58	1721.01	5.92	402.78	2906.39	46.27	9933.95	19.78	96699.99
* 97700.000	12500.00	2607.16	2600.00	7.16	1958.83	6.56	422.01	3092.07	108.93	12344.52	46.56	96700.00
* 97700.000	15000.00	2607.67	2600.00	7.67	2178.39	7.15	439.01	3305.55	196.52	14719.48	84.00	96700.00
* 97700.000	17500.00	2608.12	2600.00	8.12	2382.51	7.69	454.24	3403.08	306.48	17062.53	130.99	96700.00
* 97700.000	20000.00	2608.54	2600.00	8.54	2574.25	8.19	468.10	3447.08	436.75	19376.58	186.67	96700.00
* 97700.000	25000.00	2609.27	2600.00	9.27	2927.96	9.12	492.64	3683.74	751.07	23927.92	321.01	96700.00
* 97700.000	30000.00	2609.91	2600.00	9.91	3244.50	9.99	513.61	3912.07	1123.41	28396.43	480.16	96700.00

SECNO	Q	CWSEL	ELMIN	DEPTH	AREA	VCH	TOPWID	TWA	QLOB	QCH	QROB	CUMDS
* 101000.000	500.00	2610.31	2608.00	2.31	450.40	1.11	811.40	1367.16	.00	500.00	.00	1000000.00
* 101000.000	1000.00	2610.57	2608.00	2.57	658.61	1.52	820.75	1551.81	.00	1000.00	.00	99999.99
* 101000.000	2000.00	2610.98	2608.00	2.98	1001.39	2.00	835.92	1893.03	.00	2000.00	.00	99999.99
* 101000.000	3000.00	2611.31	2608.00	3.31	1290.69	2.32	848.52	2179.73	.00	3000.00	.00	99999.98
* 101000.000	4000.00	2611.62	2608.00	3.62	1551.35	2.58	859.71	2334.15	.00	4000.00	.00	99999.99
* 101000.000	5000.00	2611.91	2608.00	3.91	1792.04	2.79	869.91	2443.59	.00	5000.00	.00	99999.99
* 101000.000	7500.00	2612.53	2608.00	4.53	2341.59	3.20	892.78	2744.31	.00	7500.00	.00	99999.99
* 101000.000	10000.00	2613.10	2608.00	5.10	2849.80	3.51	913.41	2956.44	.00	10000.00	.00	99999.99
* 101000.000	12500.00	2613.63	2608.00	5.63	3337.04	3.75	932.77	3143.33	.00	12500.00	.00	1000000.00
* 101000.000	15000.00	2614.13	2608.00	6.13	3811.95	3.93	951.25	3357.93	.00	15000.00	.00	1000000.00
* 101000.000	17500.00	2614.62	2608.00	6.62	4278.67	4.09	969.07	3456.52	.00	17500.00	.00	1000000.00
* 101000.000	20000.00	2615.09	2608.00	7.09	4737.92	4.22	986.30	3501.50	.00	20000.00	.00	1000000.00
* 101000.000	25000.00	2615.98	2608.00	7.98	5635.36	4.44	1019.11	3739.99	.00	25000.00	.00	1000000.00
* 101000.000	30000.00	2616.83	2608.00	8.83	6511.62	4.61	1050.17	3969.97	.00	30000.00	.00	1000000.00
* 103650.000	500.00	2611.26	2610.00	1.26	1002.01	.50	838.32	1417.34	.00	500.00	.00	1002650.00
* 103650.000	1000.00	2611.53	2610.00	1.53	1231.97	.81	857.31	1595.31	.00	1000.00	.00	1002650.00
* 103650.000	2000.00	2612.20	2610.00	2.20	1822.23	1.10	904.22	1936.16	.00	2000.00	.00	1002650.00
* 103650.000	3000.00	2612.74	2610.00	2.74	2319.60	1.29	941.94	2225.56	.00	3000.00	.00	1002650.00
* 103650.000	4000.00	2613.19	2610.00	3.19	2752.17	1.45	973.55	2382.14	.00	4000.00	.00	1002650.00
* 103650.000	5000.00	2613.59	2610.00	3.59	3141.96	1.59	1001.19	2493.40	.00	5000.00	.00	1002650.00
* 103650.000	7500.00	2614.42	2610.00	4.42	3997.40	1.88	1059.31	2797.83	.00	7500.00	.00	1002650.00
* 103650.000	10000.00	2615.10	2610.00	5.10	4739.33	2.11	1103.63	3012.44	.00	10000.00	.00	1002650.00
* 103650.000	12500.00	2615.70	2610.00	5.70	5402.42	2.31	1124.46	3201.01	.00	12500.00	.00	1002650.00
* 103650.000	15000.00	2616.25	2610.00	6.25	6022.32	2.49	1143.60	3417.09	.00	15000.00	.00	1002650.00
* 103650.000	17500.00	2616.75	2610.00	6.75	6607.56	2.65	1161.37	3517.02	.00	17500.00	.00	1002650.00
* 103650.000	20000.00	2617.23	2610.00	7.23	7164.43	2.79	1178.03	3563.26	.00	20000.00	.00	1002650.00
* 103650.000	25000.00	2618.12	2610.00	8.12	8226.31	3.04	1209.17	3804.01	.00	25000.00	.00	1002650.00
* 103650.000	30000.00	2618.94	2610.00	8.94	9235.43	3.25	1238.03	4036.04	.00	30000.00	.00	1002650.00
* 106250.000	500.00	2612.15	2610.00	2.15	405.36	1.23	328.47	1460.77	.00	500.00	.00	1005250.00
* 106250.000	1000.00	2612.81	2610.00	2.81	650.02	1.54	414.13	1643.70	.00	1000.00	.00	1005250.00
* 106250.000	2000.00	2613.68	2610.00	3.68	1062.93	1.88	528.07	1993.38	.00	2000.00	.00	1005250.00
* 106250.000	3000.00	2614.34	2610.00	4.34	1437.62	2.09	613.42	2288.40	.00	3000.00	.00	1005250.00
* 106250.000	4000.00	2614.87	2610.00	4.87	1786.01	2.24	683.27	2448.09	.00	4000.00	.00	1005250.00
* 106250.000	5000.00	2615.33	2610.00	5.33	2106.77	2.37	717.98	2561.82	.00	5000.00	.00	1005250.00
* 106250.000	7500.00	2616.23	2610.00	6.23	2776.27	2.70	767.55	2869.40	.00	7500.00	.00	1005250.00
* 106250.000	10000.00	2616.97	2610.00	6.97	3359.13	2.98	808.24	3084.26	.00	10000.00	.00	1005250.00
* 106250.000	12500.00	2617.61	2610.00	7.61	3891.69	3.21	843.70	3273.05	.00	12500.00	.00	1005250.00
* 106250.000	15000.00	2618.20	2610.00	8.20	4392.71	3.41	875.76	3489.72	.00	15000.00	.00	1005250.00
* 106250.000	17500.00	2618.73	2610.00	8.73	4870.13	3.59	905.24	3590.43	.00	17500.00	.00	1005250.00
* 106250.000	20000.00	2619.23	2610.00	9.23	5328.72	3.75	932.69	3637.52	.00	20000.00	.00	1005250.00
* 106250.000	25000.00	2620.15	2610.00	10.15	6207.83	4.03	983.16	3880.09	.00	25000.00	.00	1005250.00
* 106250.000	30000.00	2620.98	2610.00	10.98	7048.91	4.26	1029.14	4113.97	.00	30000.00	.00	1005250.00

SECNO	Q	CWSEL	ELMIN	DEPTH	AREA	VCH	TOPWID	TWA	QLOB	QCH	QROB	CUMDS
* 107800.000	500.00	2615.70	2613.50	2.20	234.15	2.14	198.83	1469.86	.00	500.00		
* 107800.000	1000.00	2616.36	2613.50	2.86	380.90	2.63	245.10	1654.88	.00	1000.00		.00106800.00
* 107800.000	2000.00	2617.23	2613.50	3.73	621.64	3.22	306.24	2007.45	.00	2000.00		.00106800.00
* 107800.000	3000.00	2617.86	2613.50	4.36	827.65	3.62	350.17	2304.62	.00	3000.00		.00106800.00
* 107800.000	4000.00	2618.37	2613.50	4.87	1014.50	3.94	385.72	2466.08	.00	4000.00		.00106800.00
* 107800.000	5000.00	2618.80	2613.50	5.30	1187.92	4.21	416.00	2581.21	.00	5000.00		.00106800.00
* 107800.000	7500.00	2619.70	2613.50	6.20	1589.81	4.72	478.88	2891.40	.00	7500.00		.00106800.00
* 107800.000	10000.00	2620.43	2613.50	6.93	1959.84	5.10	530.22	3108.32	.00	10000.00		.00106800.00
* 107800.000	12500.00	2621.06	2613.50	7.56	2309.24	5.41	574.49	3298.84	.00	12500.00		.00106800.00
* 107800.000	15000.00	2621.63	2613.50	8.13	2643.92	5.67	613.92	3517.04	.00	15000.00		.00106800.00
* 107800.000	17500.00	2622.14	2613.50	8.64	2967.24	5.90	649.74	3619.11	.00	17500.00		.00106800.00
* 107800.000	20000.00	2622.61	2613.50	9.11	3281.66	6.09	682.78	3667.45	.00	20000.00		.00106800.00
* 107800.000	25000.00	2623.46	2613.50	9.96	3890.28	6.43	742.56	3912.26	.00	25000.00		.00106800.00
* 107800.000	30000.00	2624.23	2613.50	10.73	4478.93	6.70	796.12	4148.13	.00	30000.00		.00106800.00
* 109900.000	500.00	2620.01	2617.50	2.51	252.99	1.98	201.49	1480.00	.00	500.00		.00108900.00
* 109900.000	1000.00	2620.80	2617.50	3.30	443.79	2.25	280.64	1668.54	.00	1000.00		.00108900.00
* 109900.000	2000.00	2621.77	2617.50	4.27	760.28	2.63	376.90	2025.43	.00	2000.00		.00108900.00
* 109900.000	3000.00	2622.45	2617.50	4.95	1038.26	2.89	444.58	2325.53	.00	3000.00		.00108900.00
* 109900.000	4000.00	2623.00	2617.50	5.50	1298.41	3.08	499.68	2489.32	.00	4000.00		.00108900.00
* 109900.000	5000.00	2623.47	2617.50	5.97	1543.09	3.24	546.46	2606.41	.00	5000.00		.00108900.00
* 109900.000	7500.00	2624.43	2617.50	6.93	2117.36	3.54	643.02	2920.61	.00	7500.00		.00108900.00
* 109900.000	10000.00	2625.17	2617.50	7.67	2616.45	3.82	704.97	3140.26	.04	9999.89		.07108900.00
* 109900.000	12500.00	2625.72	2617.50	8.22	3010.88	4.16	721.56	3331.53	1.82	12494.52	3.65	108900.00
* 109900.000	15000.00	2626.22	2617.50	8.72	3379.18	4.46	736.72	3550.49	7.50	14977.45	15.05	108900.00
* 109900.000	17500.00	2626.69	2617.50	9.19	3727.63	4.73	750.77	3653.36	17.76	17446.62	35.61	108900.00
* 109900.000	20000.00	2627.13	2617.50	9.63	4056.35	4.99	763.79	3702.50	32.64	19901.92	65.44	108900.00
* 109900.000	25000.00	2627.92	2617.50	10.42	4667.99	5.46	787.45	3948.87	75.91	24771.89	152.20	108900.00
* 109900.000	30000.00	2628.62	2617.50	11.12	5233.23	5.88	808.70	4186.23	136.26	29590.54	273.20	108900.00
* 111700.000	500.00	2622.90	2620.30	2.60	287.13	1.74	221.07	1488.92	.00	500.00		.00110700.00
* 111700.000	1000.00	2623.68	2620.30	3.38	485.70	2.06	287.53	1680.32	.00	1000.00		.00110700.00
* 111700.000	2000.00	2624.68	2620.30	4.38	819.38	2.44	373.45	2040.87	.00	2000.00		.00110700.00
* 111700.000	3000.00	2625.34	2620.30	5.04	1078.71	2.78	410.27	2342.85	.00	3000.00		.00110700.00
* 111700.000	4000.00	2625.96	2620.30	5.66	1340.42	2.98	428.98	2508.51	.00	4000.00		.00110700.00
* 111700.000	5000.00	2626.43	2620.30	6.13	1545.12	3.24	443.07	2626.85	.00	5000.00		.00110700.00
* 111700.000	7500.00	2627.28	2620.30	6.98	1932.66	3.88	468.57	2942.32	.00	7500.00		.00110700.00
* 111700.000	10000.00	2628.05	2620.30	7.75	2299.19	4.35	491.48	3162.81	.00	10000.00		.00110700.00
* 111700.000	12500.00	2628.72	2620.30	8.42	2637.55	4.74	511.72	3355.08	.00	12500.00		.00110700.00
* 111700.000	15000.00	2629.33	2620.30	9.03	2953.14	5.08	529.90	3574.92	.00	15000.00		.00110700.00
* 111700.000	17500.00	2629.89	2620.30	9.59	3253.01	5.38	546.61	3678.55	.00	17500.00		.00110700.00
* 111700.000	20000.00	2630.40	2620.30	10.10	3539.26	5.65	562.10	3728.37	.00	20000.00		.00110700.00
* 111700.000	25000.00	2631.34	2620.30	11.04	4080.13	6.13	590.26	3975.92	.00	25000.00		.00110700.00
* 111700.000	30000.00	2632.19	2620.30	11.89	4588.84	6.54	615.57	4214.30	.00	30000.00		.00110700.00

SECNO	Q	CWSEL	ELMIN	DEPTH	AREA	VCH	TOPWID	TWA	QLOB	QCH	QROB	CUMDS
115300.000	500.00	2628.90	2627.00	1.90	329.69	1.52	347.69	1512.43	.00	500.00		
* 115300.000	1000.00	2629.47	2627.00	2.47	558.79	1.79	452.65	1711.35	.00	1000.00		.00114300.00
* 115300.000	2000.00	2630.16	2627.00	3.16	918.27	2.18	563.82	2078.91	.00	2000.00		.00114300.00
* 115300.000	3000.00	2630.72	2627.00	3.72	1241.47	2.42	609.28	2383.99	.00	3000.00		.00114300.00
* 115300.000	4000.00	2631.16	2627.00	4.16	1518.92	2.63	645.75	2552.39	.00	4000.00		.00114300.00
* 115300.000	5000.00	2631.56	2627.00	4.56	1782.10	2.81	678.54	2673.01	.00	5000.00		.00114300.00
* 115300.000	7500.00	2632.43	2627.00	5.43	2402.28	3.12	750.17	2993.38	.00	7500.00		.00114300.00
* 115300.000	10000.00	2633.18	2627.00	6.18	2987.51	3.35	811.98	3217.98	.00	10000.00		.00114300.00
* 115300.000	12500.00	2634.54	2627.00	7.54	4174.07	2.99	924.71	3452.26	.00	12500.00		.00114300.00
* 115300.000	15000.00	2635.29	2627.00	8.29	5105.36	2.94	1774.49	3680.10	.00	15000.00		.00114300.00
* 115300.000	17500.00	2635.62	2627.00	8.62	5689.91	3.08	1788.44	3783.68	.00	17500.00		.00114300.00
* 115300.000	20000.00	2635.94	2627.00	8.94	6266.27	3.19	1802.08	3833.75	.00	20000.00		.00114300.00
* 115300.000	25000.00	2636.57	2627.00	9.57	7405.79	3.38	1828.76	4082.29	.00	25000.00		.00114300.00
* 115300.000	30000.00	2637.18	2627.00	10.18	8541.21	3.51	1854.96	4321.94	.00	30000.00		.00114300.00
117400.000	500.00	2631.62	2630.00	1.62	435.04	1.15	438.99	1531.39	.00	500.00		
* 117400.000	1000.00	2632.07	2630.00	2.07	657.21	1.52	534.82	1735.01	.00	1000.00		.00116400.00
* 117400.000	2000.00	2632.83	2630.00	2.83	1122.29	1.78	693.80	2109.06	.00	2000.00		.00116400.00
* 117400.000	3000.00	2633.37	2630.00	3.37	1532.14	1.96	808.39	2418.67	.00	3000.00		.00116400.00
* 117400.000	4000.00	2633.82	2630.00	3.82	1916.47	2.09	902.73	2590.69	.00	4000.00		.00116400.00
* 117400.000	5000.00	2634.21	2630.00	4.21	2280.55	2.19	983.78	2714.52	.00	5000.00		.00116400.00
* 117400.000	7500.00	2634.99	2630.00	4.99	3117.70	2.41	1148.67	3039.95	.00	7500.00		.00116400.00
* 117400.000	10000.00	2635.60	2630.00	5.60	3824.48	2.61	1187.90	3266.38	.00	10000.00		.00116400.00
* 117400.000	12500.00	2636.30	2630.00	6.30	4667.26	2.68	1232.01	3503.64	.00	12500.00		.00116400.00
* 117400.000	15000.00	2636.93	2630.00	6.93	5462.99	2.75	1272.26	3740.72	.00	15000.00		.00116400.00
* 117400.000	17500.00	2637.38	2630.00	7.38	6032.96	2.90	1300.32	3849.16	.00	17500.00		.00116400.00
* 117400.000	20000.00	2637.74	2630.00	7.74	6506.62	3.07	1323.19	3900.61	.00	20000.00		.00116400.00
117400.000	25000.00	2638.63	2630.00	8.63	7713.58	3.24	1379.75	4159.63	.00	25000.00		.00116400.00
117400.000	30000.00	2639.21	2630.00	9.21	8539.12	3.51	1417.14	4400.81	.00	30000.00		.00116400.00
120100.000	500.00	2634.83	2634.00	.83	626.34	.80	1501.61	1591.53	.00	500.00		
* 120100.000	1000.00	2635.02	2634.00	1.02	940.03	1.06	1804.00	1806.86	.00	1000.00		.00119100.00
* 120100.000	2000.00	2635.39	2634.00	1.39	1620.05	1.23	1870.62	2186.06	.00	2000.00		.00119100.00
* 120100.000	3000.00	2635.65	2634.00	1.65	2098.01	1.43	1916.06	2500.22	.00	3000.00		.00119100.00
* 120100.000	4000.00	2635.89	2634.00	1.89	2578.82	1.55	1960.71	2676.23	.00	4000.00		.00119100.00
* 120100.000	5000.00	2636.14	2634.00	2.14	3061.41	1.63	2004.52	2803.65	.00	5000.00		.00119100.00
* 120100.000	7500.00	2636.72	2634.00	2.72	4257.04	1.76	2109.16	3135.91	.00	7500.00		.00119100.00
* 120100.000	10000.00	2637.24	2634.00	3.24	5368.50	1.86	2201.97	3367.71	.00	10000.00		.00119100.00
* 120100.000	12500.00	2637.77	2634.00	3.77	6556.97	1.91	2297.07	3610.43	.00	12500.00		.00119100.00
* 120100.000	15000.00	2638.27	2634.00	4.27	7749.58	1.94	2388.69	3852.15	.00	15000.00		.00119100.00
* 120100.000	17500.00	2638.71	2634.00	4.71	8802.21	1.99	2466.74	3963.83	.00	17500.00		.00119100.00
* 120100.000	20000.00	2639.09	2634.00	5.09	9755.37	2.05	2535.34	4017.61	.00	20000.00		.00119100.00
* 120100.000	25000.00	2639.88	2634.00	5.88	11835.49	2.11	2678.95	4280.76	.00	25000.00		.00119100.00
* 120100.000	30000.00	2640.51	2634.00	6.51	13532.20	2.22	2725.48	4524.12	.00	30000.00		.00119100.00

SECNO	Q	CWSEL	ELMIN	DEPTH	AREA	VCH	TOPWID	TWA	QLOB	QCH	QROB	CUMDS
* 122500.000	500.00	2640.25	2639.00	1.25	308.24	1.62	446.05	1645.97	.00	500.00		
* 122500.000	1000.00	2640.66	2639.00	1.66	501.77	1.99	518.30	1871.90	.00	1000.00	.00121500.00	
* 122500.000	2000.00	2641.21	2639.00	2.21	811.38	2.46	616.52	2257.63	.00	2000.00	.00121500.00	
* 122500.000	3000.00	2641.59	2639.00	2.59	1059.24	2.83	685.07	2576.50	.00	3000.00	.00121500.00	
* 122500.000	4000.00	2641.91	2639.00	2.91	1288.27	3.10	742.82	2756.27	.00	4000.00	.00121500.00	
* 122500.000	5000.00	2642.18	2639.00	3.18	1500.44	3.33	792.56	2886.74	.00	5000.00	.00121500.00	
* 122500.000	7500.00	2642.76	2639.00	3.76	1994.63	3.76	897.81	3225.09	.00	7500.00	.00121500.00	
* 122500.000	10000.00	2643.25	2639.00	4.25	2449.18	4.08	984.74	3461.85	.00	10000.00	.00121500.00	
* 122500.000	12500.00	2643.66	2639.00	4.66	2870.54	4.35	1058.96	3709.07	.00	12500.00	.00121500.00	
* 122500.000	15000.00	2644.04	2639.00	5.04	3277.84	4.58	1126.06	3954.95	.00	15000.00	.00121500.00	
* 122500.000	17500.00	2644.38	2639.00	5.38	3667.73	4.77	1186.75	4070.52	.00	17500.00	.00121500.00	
* 122500.000	20000.00	2644.68	2639.00	5.68	4042.53	4.95	1242.30	4127.94	.00	20000.00	.00121500.00	
* 122500.000	25000.00	2645.22	2639.00	6.22	4750.30	5.26	1311.50	4397.70	.00	25000.00	.00121500.00	
* 122500.000	30000.00	2645.69	2639.00	6.69	5345.14	5.61	1333.98	4646.16	.00	30000.00	.00121500.00	
125500.000	500.00	2646.87	2645.00	1.87	348.46	1.43	373.34	1674.19	.00	500.00		
125500.000	1000.00	2647.39	2645.00	2.39	573.26	1.74	478.86	1906.24	.00	1000.00	.00124500.00	
* 125500.000	2000.00	2647.91	2645.00	2.91	846.47	2.36	581.88	2303.54	.00	2000.00	.00124500.00	
* 125500.000	3000.00	2648.45	2645.00	3.45	1191.40	2.52	690.33	2629.86	.00	3000.00	.00124500.00	
* 125500.000	4000.00	2648.84	2645.00	3.84	1472.57	2.72	767.48	2815.43	.00	4000.00	.00124500.00	
* 125500.000	5000.00	2649.17	2645.00	4.17	1739.64	2.87	834.18	2950.35	.00	5000.00	.00124500.00	
* 125500.000	7500.00	2649.86	2645.00	4.86	2360.17	3.18	971.63	3297.75	.00	7500.00	.00124500.00	
* 125500.000	10000.00	2650.38	2645.00	5.38	2887.57	3.46	1036.54	3540.52	.00	10000.00	.00124500.00	
* 125500.000	12500.00	2650.82	2645.00	5.82	3353.40	3.73	1078.82	3790.41	.00	12500.00	.00124500.00	
* 125500.000	15000.00	2651.22	2645.00	6.22	3793.32	3.95	1117.28	4038.85	.00	15000.00	.00124500.00	
* 125500.000	17500.00	2651.59	2645.00	6.59	4210.61	4.16	1152.58	4158.63	.00	17500.00	.00124500.00	
* 125500.000	20000.00	2651.93	2645.00	6.93	4607.56	4.34	1185.18	4220.71	.00	20000.00	.00124500.00	
* 125500.000	25000.00	2652.54	2645.00	7.54	5347.30	4.68	1243.66	4498.68	.00	25000.00	.00124500.00	
* 125500.000	30000.00	2653.09	2645.00	8.09	6042.09	4.97	1296.18	4753.93	.00	30000.00	.00124500.00	
* 129500.000	500.00	2656.57	2655.00	1.57	244.52	2.04	210.31	1695.94	.00	500.00		
* 129500.000	1000.00	2657.22	2655.00	2.22	396.92	2.52	256.06	1934.09	.00	1000.00	.00128500.00	
* 129500.000	2000.00	2658.10	2655.00	3.10	645.84	3.10	316.89	2339.03	.00	2000.00	.00128500.00	
* 129500.000	3000.00	2658.73	2655.00	3.73	862.24	3.48	361.54	2671.52	.00	3000.00	.00128500.00	
* 129500.000	4000.00	2659.25	2655.00	4.25	1057.67	3.78	397.59	2861.96	.00	4000.00	.00128500.00	
* 129500.000	5000.00	2659.69	2655.00	4.69	1238.73	4.04	428.28	3001.09	.00	5000.00	.00128500.00	
* 129500.000	7500.00	2660.54	2655.00	5.54	1625.89	4.61	470.00	3356.70	.00	7500.00	.00128500.00	
* 129500.000	10000.00	2661.22	2655.00	6.22	1951.27	5.12	494.73	3604.07	.00	10000.00	.00128500.00	
* 129500.000	12500.00	2661.81	2655.00	6.81	2249.71	5.56	516.38	3857.16	.00	12500.00	.00128500.00	
* 129500.000	15000.00	2662.34	2655.00	7.34	2528.83	5.93	535.83	4108.44	.00	15000.00	.00128500.00	
* 129500.000	17500.00	2662.83	2655.00	7.83	2791.86	6.27	553.54	4230.79	.00	17500.00	.00128500.00	
* 129500.000	20000.00	2663.27	2655.00	8.27	3041.99	6.57	569.86	4295.22	.00	20000.00	.00128500.00	
* 129500.000	25000.00	2664.08	2655.00	9.08	3512.42	7.12	599.37	4577.39	.00	25000.00	.00128500.00	
* 129500.000	30000.00	2664.80	2655.00	9.80	3951.32	7.59	625.64	4836.37	.00	30000.00	.00128500.00	

SECNO	Q	CWSEL	ELMIN	DEPTH	AREA	VCH	TOPWID	TWA	QLOB	QCH	OROB	CUMDS
131200.000	500.00	2661.35	2660.00	1.35	252.01	1.98	274.81	1705.41	.00	500.00		.00130200.00
131200.000	1000.00	2661.92	2660.00	1.92	430.39	2.32	349.15	1945.90	.00	1000.00		.00130200.00
* 131200.000	2000.00	2662.70	2660.00	2.70	741.63	2.70	450.36	2354.55	.00	2000.00		.00130200.00
* 131200.000	3000.00	2663.25	2660.00	3.25	1013.09	2.96	522.88	2689.50	.00	3000.00		.00130200.00
* 131200.000	4000.00	2663.71	2660.00	3.71	1265.36	3.16	582.23	2881.90	.00	4000.00		.00130200.00
* 131200.000	5000.00	2664.10	2660.00	4.10	1504.88	3.32	633.46	3022.72	.00	5000.00		.00130200.00
* 131200.000	7500.00	2664.91	2660.00	4.91	2061.75	3.64	738.96	3381.16	.00	7500.00		.00130200.00
* 131200.000	10000.00	2665.55	2660.00	5.55	2544.44	3.93	790.83	3630.06	.00	10000.00		.00130200.00
* 131200.000	12500.00	2666.11	2660.00	6.11	3005.42	4.16	833.41	3884.49	.00	12500.00		.00130200.00
* 131200.000	15000.00	2666.63	2660.00	6.63	3450.22	4.35	872.52	4136.99	.00	15000.00		.00130200.00
* 131200.000	17500.00	2667.12	2660.00	7.12	3883.20	4.51	908.97	4260.45	.00	17500.00		.00130200.00
* 131200.000	20000.00	2667.57	2660.00	7.57	4305.31	4.65	943.16	4325.93	.00	20000.00		.00130200.00
* 131200.000	25000.00	2668.41	2660.00	8.41	5123.86	4.88	1006.15	4610.02	.00	25000.00		.00130200.00
* 131200.000	30000.00	2669.18	2660.00	9.18	5912.80	5.07	1063.33	4870.71	.00	30000.00		.00130200.00
* 132800.000	500.00	2664.21	2662.00	2.21	286.41	1.75	258.51	1717.38	.00	500.00		.00131800.00
* 132800.000	1000.00	2664.90	2662.00	2.90	491.54	2.03	338.66	1961.00	.00	1000.00		.00131800.00
* 132800.000	2000.00	2665.74	2662.00	3.74	798.20	2.51	397.51	2371.79	.00	2000.00		.00131800.00
* 132800.000	3000.00	2666.34	2662.00	4.34	1053.04	2.85	437.20	2708.33	.00	3000.00		.00131800.00
* 132800.000	4000.00	2666.84	2662.00	4.84	1279.07	3.13	469.61	2902.13	.00	4000.00		.00131800.00
132800.000	5000.00	2667.39	2662.00	5.39	1549.19	3.23	505.61	3043.64	.00	5000.00		.00131800.00
132800.000	7500.00	2668.27	2662.00	6.27	2016.21	3.72	562.46	3405.07	.00	7500.00		.00131800.00
* 132800.000	10000.00	2668.87	2662.00	6.87	2361.18	4.24	601.00	3656.09	.00	10000.00		.00131800.00
* 132800.000	12500.00	2669.47	2662.00	7.47	2740.12	4.56	640.68	3912.22	.00	12500.00		.00131800.00
* 132800.000	15000.00	2670.02	2662.00	8.02	3099.54	4.84	676.16	4166.24	.00	15000.00		.00131800.00
* 132800.000	17500.00	2670.52	2662.00	8.52	3444.53	5.08	708.55	4291.03	.00	17500.00		.00131800.00
* 132800.000	20000.00	2670.98	2662.00	8.98	3776.95	5.30	738.41	4357.74	.00	20000.00		.00131800.00
* 132800.000	25000.00	2671.81	2662.00	9.81	4412.48	5.67	792.38	4644.06	.00	25000.00		.00131800.00
* 132800.000	30000.00	2672.55	2662.00	10.55	5017.04	5.98	840.52	4906.74	.00	30000.00		.00131800.00
* 137500.000	500.00	2669.67	2668.00	1.67	454.48	1.10	543.52	1761.70	.00	500.00		.00136500.00
* 137500.000	1000.00	2670.13	2668.00	2.13	738.28	1.35	655.41	2012.35	.00	1000.00		.00136500.00
* 137500.000	2000.00	2670.73	2668.00	2.73	1135.64	1.76	679.23	2426.85	.00	2000.00		.00136500.00
* 137500.000	3000.00	2671.23	2668.00	3.23	1480.77	2.03	699.26	2766.38	.00	3000.00		.00136500.00
* 137500.000	4000.00	2671.68	2668.00	3.68	1794.55	2.23	716.98	2962.67	.00	4000.00		.00136500.00
* 137500.000	5000.00	2672.08	2668.00	4.08	2086.26	2.40	733.08	3106.64	.00	5000.00		.00136500.00
* 137500.000	7500.00	2672.98	2668.00	4.98	2758.77	2.72	768.90	3472.67	.00	7500.00		.00136500.00
* 137500.000	10000.00	2673.75	2668.00	5.75	3369.14	2.97	800.02	3727.34	.00	10000.00		.00136500.00
* 137500.000	12500.00	2674.43	2668.00	6.43	3920.53	3.19	827.13	3988.88	.00	12500.00		.00136500.00
* 137500.000	15000.00	2675.02	2668.00	7.02	4415.80	3.40	852.94	4249.91	.00	15000.00		.00136500.00
* 137500.000	17500.00	2675.54	2668.00	7.54	4881.44	3.60	935.39	4382.36	8.20	17490.38	1.42136500.00	
* 137500.000	20000.00	2676.02	2668.00	8.02	5347.41	3.79	1011.19	4456.19	44.54	19947.77	7.69136500.00	
* 137500.000	25000.00	2676.88	2668.00	8.88	6274.31	4.13	1147.18	4755.53	227.30	24733.44	39.26136500.00	
* 137500.000	30000.00	2677.63	2668.00	9.63	7186.65	4.42	1266.86	5029.98	561.08	29342.00	96.92136500.00	

SECNO	Q	CWSEL	ELMIN	DEPTH	AREA	VCH	TOPWID	TWA	QLOB	QCH	QROB	CUMDS
* 141900.000	500.00	2672.18	2670.00	2.18	599.15	.83	449.14	1811.84	.00	500.00		.00140900.00
* 141900.000	1000.00	2672.88	2670.00	2.88	954.36	1.05	561.60	2073.82	.00	1000.00		.00140900.00
* 141900.000	2000.00	2673.62	2670.00	3.62	1410.10	1.42	679.14	2498.80	.00	2000.00		.00140900.00
* 141900.000	3000.00	2674.28	2670.00	4.28	1890.62	1.59	784.22	2846.38	.00	3000.00		.00140900.00
* 141900.000	4000.00	2674.81	2670.00	4.81	2330.67	1.72	869.38	3050.60	.00	4000.00		.00140900.00
* 141900.000	5000.00	2675.26	2670.00	5.26	2741.05	1.82	933.52	3199.98	.19	4999.81		.00140900.00
* 141900.000	7500.00	2676.19	2670.00	6.19	3659.67	2.06	1051.53	3575.85	10.74	7489.26		.00140900.00
* 141900.000	10000.00	2676.97	2670.00	6.97	4520.93	2.23	1151.23	3837.53	41.05	9958.95		.00140900.00
* 141900.000	12500.00	2677.66	2670.00	7.66	5338.92	2.37	1238.52	4105.36	90.38	12409.62		.00140900.00
* 141900.000	15000.00	2678.27	2670.00	8.27	6121.16	2.48	1316.58	4372.10	156.44	14843.56		.00140900.00
* 141900.000	17500.00	2678.82	2670.00	8.82	6869.72	2.59	1387.18	4510.39	236.81	17263.19		.00140900.00
* 141900.000	20000.00	2679.33	2670.00	9.33	7598.03	2.68	1452.58	4589.56	330.33	19669.67		.00140900.00
* 141900.000	25000.00	2680.25	2670.00	10.25	9151.23	2.84	2253.02	4923.97	541.94	24406.20	51.86	140900.00
* 141900.000	30000.00	2680.97	2670.00	10.97	10802.44	2.99	2298.37	5235.05	748.58	28751.02	500.41	140900.00
* 144400.000	500.00	2676.63	2675.00	1.63	256.12	1.95	214.14	1827.63	.00	500.00		.00143400.00
* 144400.000	1000.00	2677.29	2675.00	2.29	413.57	2.42	260.58	2093.61	.00	1000.00		.00143400.00
* 144400.000	2000.00	2678.19	2675.00	3.19	673.65	2.97	322.97	2523.56	.00	2000.00		.00143400.00
* 144400.000	3000.00	2678.82	2675.00	3.82	892.76	3.36	367.41	2875.09	.00	3000.00		.00143400.00
* 144400.000	4000.00	2679.34	2675.00	4.34	1091.02	3.67	403.41	3082.54	.00	4000.00		.00143400.00
* 144400.000	5000.00	2679.78	2675.00	4.77	1274.73	3.92	434.12	3234.62	.00	5000.00		.00143400.00
* 144400.000	7500.00	2680.68	2675.00	5.68	1694.60	4.43	497.24	3615.82	.00	7500.00		.00143400.00
* 144400.000	10000.00	2681.41	2675.00	6.41	2077.17	4.81	548.46	3881.83	.00	10000.00		.00143400.00
* 144400.000	12500.00	2682.04	2675.00	7.04	2434.91	5.13	592.36	4153.37	.00	12500.00		.00143400.00
* 144400.000	15000.00	2682.59	2675.00	7.59	2775.03	5.41	631.27	4423.38	.00	15000.00		.00143400.00
* 144400.000	17500.00	2683.09	2675.00	8.09	3100.71	5.64	666.41	4564.61	.00	17500.00		.00143400.00
* 144400.000	20000.00	2683.55	2675.00	8.55	3415.67	5.86	698.71	4646.47	.00	20000.00		.00143400.00
* 144400.000	25000.00	2684.38	2675.00	9.38	4019.03	6.22	756.75	4990.53	.00	25000.00		.00143400.00
* 144400.000	30000.00	2685.14	2675.00	10.14	4616.70	6.50	825.84	5305.21	.00	30000.00		.00143400.00
152100.000	500.00	2691.75	2690.00	1.75	267.33	1.87	205.13	1864.68	.00	500.00		.00151100.00
152100.000	1000.00	2692.53	2690.00	2.53	443.99	2.25	251.55	2138.88	.00	1000.00		.00151100.00
* 152100.000	2000.00	2693.37	2690.00	3.37	677.30	2.95	302.12	2579.63	.00	2000.00		.00151100.00
* 152100.000	3000.00	2694.20	2690.00	4.20	950.47	3.16	352.22	2939.07	.00	3000.00		.00151100.00
* 152100.000	4000.00	2694.77	2690.00	4.77	1161.39	3.44	386.48	3153.08	.00	4000.00		.00151100.00
* 152100.000	5000.00	2695.66	2690.00	5.66	1581.92	3.16	599.29	3333.84	.00	5000.00		.00151100.00
* 152100.000	7500.00	2696.75	2690.00	6.75	2405.08	3.12	923.61	3770.24	.00	7500.00		.00151100.00
* 152100.000	10000.00	2697.43	2690.00	7.43	3109.03	3.22	1129.35	4067.84	.00	10000.00		.00151100.00
* 152100.000	12500.00	2697.97	2690.00	7.97	3765.51	3.32	1292.02	4362.32	.00	12500.00		.00151100.00
* 152100.000	15000.00	2698.43	2690.00	8.43	4391.17	3.42	1429.93	4650.71	.00	15000.00		.00151100.00
* 152100.000	17500.00	2698.84	2690.00	8.84	4992.30	3.51	1550.93	4807.57	.00	17500.00		.00151100.00
* 152100.000	20000.00	2699.20	2690.00	9.20	5573.89	3.59	1659.62	4903.20	.00	20000.00		.00151100.00
* 152100.000	25000.00	2699.83	2690.00	9.83	6685.09	3.74	1849.61	5266.09	.00	25000.00		.00151100.00
* 152100.000	30000.00	2700.29	2690.00	10.29	7556.56	3.97	1960.55	5591.44	1.13	29996.62	2.25	151100.00

SECNO	Q	CWSEL	ELMIN	DEPTH	AREA	VCH	TOPWID	TWA	QLOB	QCH	QROB	CUMDS
156600.000	500.00	2701.37	2700.00	1.37	284.16	1.76	317.70	1891.69	.00	500.00		
156600.000	1000.00	2701.89	2700.00	1.89	476.40	2.10	403.05	2172.69	.00	1000.00		.00155600.00
* 156600.000	2000.00	2702.70	2700.00	2.70	857.73	2.33	533.36	2625.54	.00	2000.00		.00155600.00
* 156600.000	3000.00	2703.24	2700.00	3.24	1166.97	2.57	619.22	2992.01	.00	3000.00		.00155600.00
* 156600.000	4000.00	2703.68	2700.00	3.68	1452.19	2.75	688.98	3211.80	.00	4000.00		.00155600.00
* 156600.000	5000.00	2704.06	2700.00	4.06	1728.21	2.89	750.35	3401.06	.00	5000.00		.00155600.00
156600.000	7500.00	2704.98	2700.00	4.98	2483.11	3.02	896.99	3864.28	.00	7500.00		.00155600.00
156600.000	10000.00	2705.52	2700.00	5.52	2991.03	3.36	986.75	4177.14	.00	10000.00		.00155600.00
* 156600.000	12500.00	2705.77	2700.00	5.77	3245.69	3.90	1028.87	4469.15	1.99	9987.58	10.43	155600.00
* 156600.000	15000.00	2706.14	2700.00	6.14	3631.26	4.23	1089.53	4765.32	6.30	12460.64	33.07	155600.00
* 156600.000	17500.00	2706.49	2700.00	6.49	4023.47	4.50	1147.97	4931.03	17.89	14888.17	93.94	155600.00
* 156600.000	20000.00	2706.81	2700.00	6.81	4400.02	4.75	1201.39	5034.94	36.82	17269.79	193.39	155600.00
* 156600.000	25000.00	2707.38	2700.00	7.38	5120.22	5.20	1297.46	5413.04	62.35	19610.19	327.47	155600.00
* 156600.000	30000.00	2707.89	2700.00	7.89	5797.87	5.61	1381.77	5750.57	131.96	24174.95	693.09	155600.00
									223.17	28604.66	1172.17	155600.00
* 159600.000	500.00	2711.39	2710.00	1.39	217.24	2.30	211.56	1908.75	.00	500.00		.00158600.00
* 159600.000	1000.00	2712.03	2710.00	2.03	367.07	2.72	262.17	2193.85	.00	1000.00		.00158600.00
* 159600.000	2000.00	2712.83	2710.00	2.83	602.03	3.32	326.07	2652.49	.00	2000.00		.00158600.00
* 159600.000	3000.00	2713.40	2710.00	3.40	805.45	3.72	372.66	3023.13	.00	3000.00		.00158600.00
* 159600.000	4000.00	2713.87	2710.00	3.87	989.22	4.04	410.21	3246.33	.00	4000.00		.00158600.00
* 159600.000	5000.00	2714.28	2710.00	4.28	1160.42	4.31	442.34	3438.56	.00	5000.00		.00158600.00
* 159600.000	7500.00	2715.10	2710.00	5.10	1551.81	4.83	508.22	3908.04	.00	7500.00		.00158600.00
* 159600.000	10000.00	2715.77	2710.00	5.77	1909.82	5.24	561.76	4225.48	.00	10000.00		.00158600.00
* 159600.000	12500.00	2716.35	2710.00	6.35	2244.99	5.57	607.62	4521.08	.00	12500.00		.00158600.00
* 159600.000	15000.00	2716.85	2710.00	6.85	2564.34	5.85	648.30	4820.48	.00	15000.00		.00158600.00
* 159600.000	17500.00	2717.31	2710.00	7.31	2869.65	6.10	684.94	4989.06	.00	17500.00		.00158600.00
* 159600.000	20000.00	2717.74	2710.00	7.74	3165.91	6.32	718.71	5095.55	.00	20000.00		.00158600.00
* 159600.000	25000.00	2718.49	2710.00	8.49	3732.77	6.70	779.26	5478.16	.00	25000.00		.00158600.00
* 159600.000	30000.00	2719.17	2710.00	9.17	4276.83	7.01	833.24	5819.52	.00	30000.00		.00158600.00
* 163100.000	500.00	2721.13	2719.00	2.13	214.75	2.33	190.68	1928.16	.00	500.00		.00162100.00
* 163100.000	1000.00	2721.84	2719.00	2.84	369.33	2.71	247.17	2217.21	.00	1000.00		.00162100.00
* 163100.000	2000.00	2722.80	2719.00	3.80	643.06	3.11	323.87	2682.05	.00	2000.00		.00162100.00
* 163100.000	3000.00	2723.44	2719.00	4.44	867.41	3.46	375.21	3057.12	.00	3000.00		.00162100.00
* 163100.000	4000.00	2723.97	2719.00	4.97	1076.10	3.72	417.34	3283.58	.00	4000.00		.00162100.00
* 163100.000	5000.00	2724.42	2719.00	5.42	1271.87	3.93	453.32	3478.62	.00	5000.00		.00162100.00
* 163100.000	7500.00	2725.29	2719.00	6.29	1698.63	4.43	534.48	3954.03	.79	7497.63	1.58	162100.00
* 163100.000	10000.00	2725.91	2719.00	6.91	2057.01	4.96	609.66	4277.28	17.28	9948.14	34.57	162100.00
* 163100.000	12500.00	2726.46	2719.00	7.46	2406.22	5.41	674.90	4578.09	60.15	12319.54	120.31	162100.00
* 163100.000	15000.00	2726.94	2719.00	7.94	2746.67	5.80	732.94	4882.32	129.47	14611.55	258.98	162100.00
* 163100.000	17500.00	2727.38	2719.00	8.38	3077.47	6.15	785.23	5055.40	222.91	16831.20	445.89	162100.00
* 163100.000	20000.00	2727.77	2719.00	8.77	3398.64	6.46	832.87	5166.11	337.81	18986.46	675.73	162100.00
* 163100.000	25000.00	2728.48	2719.00	9.48	4015.26	7.03	917.42	5556.54	623.09	23130.53	1246.38	162100.00
* 163100.000	30000.00	2729.09	2719.00	10.09	4601.68	7.53	991.16	5905.04	970.33	27088.72	1940.95	162100.00

SECNO	Q	CWSEL	ELMIN	DEPTH	AREA	VCH	TOPWID	TWA	QLOB	QCH	QROB	CUMDS
* 165500.000	500.00	2727.88	2726.00	1.88	268.22	1.86	283.67	1941.68	.00	500.00		.00164500.00
* 165500.000	1000.00	2728.44	2726.00	2.44	451.25	2.22	367.93	2234.69	.00	1000.00		.00164500.00
* 165500.000	2000.00	2729.19	2726.00	3.19	763.41	2.62	478.57	2704.78	.00	2000.00		.00164500.00
* 165500.000	3000.00	2729.72	2726.00	3.72	1037.59	2.89	557.92	3083.67	.00	3000.00		.00164500.00
* 165500.000	4000.00	2730.16	2726.00	4.16	1296.77	3.08	625.27	3313.36	.00	4000.00		.00164500.00
* 165500.000	5000.00	2730.54	2726.00	4.54	1544.34	3.24	685.70	3511.19	.00	5000.00		.00164500.00
* 165500.000	7500.00	2731.31	2726.00	5.31	2122.94	3.53	809.53	3992.30	.00	7500.00		.00164500.00
* 165500.000	10000.00	2731.94	2726.00	5.94	2667.26	3.75	910.78	4320.07	.00	10000.00		.00164500.00
* 165500.000	12500.00	2732.49	2726.00	6.49	3191.22	3.92	998.59	4624.70	.00	12500.00		.00164500.00
* 165500.000	15000.00	2732.98	2726.00	6.98	3701.31	4.05	1077.23	4932.26	.00	15000.00		.00164500.00
* 165500.000	17500.00	2733.43	2726.00	7.43	4199.95	4.17	1148.91	5108.31	.00	17500.00		.00164500.00
* 165500.000	20000.00	2733.85	2726.00	7.85	4691.17	4.26	1215.39	5221.73	.00	20000.00		.00164500.00
* 165500.000	25000.00	2734.57	2726.00	8.57	5615.81	4.45	1331.56	5616.65	.00	25000.00		.00164500.00
* 165500.000	30000.00	2735.15	2726.00	9.15	6403.77	4.69	1424.53	5969.12	.38	29999.54		.08164500.00
* 168200.000	500.00	2731.63	2730.00	1.63	322.31	1.55	295.56	1959.40	.00	500.00		.00167200.00
* 168200.000	1000.00	2732.34	2730.00	2.34	560.90	1.78	380.28	2257.04	.00	1000.00		.00167200.00
* 168200.000	2000.00	2733.20	2730.00	3.20	935.08	2.14	484.17	2733.52	.00	2000.00		.00167200.00
* 168200.000	3000.00	2733.82	2730.00	3.82	1259.90	2.38	558.91	3117.17	.00	3000.00		.00167200.00
* 168200.000	4000.00	2734.33	2730.00	4.33	1555.86	2.57	619.20	3350.76	.00	4000.00		.00167200.00
* 168200.000	5000.00	2734.75	2730.00	4.75	1831.53	2.73	670.50	3551.95	.00	5000.00		.00167200.00
* 168200.000	7500.00	2735.51	2730.00	5.51	2373.71	3.18	756.45	4039.10	4.01	7492.65		3.34167200.00
* 168200.000	10000.00	2736.11	2730.00	6.11	2844.25	3.58	822.03	4371.96	31.66	9941.96		26.38167200.00
* 168200.000	12500.00	2736.63	2730.00	6.63	3290.46	3.92	879.72	4681.57	89.67	12335.61		74.72167200.00
* 168200.000	15000.00	2737.10	2730.00	7.10	3710.14	4.23	930.72	4994.10	176.32	14676.76		146.93167200.00
* 168200.000	17500.00	2737.86	2730.00	7.86	4452.98	4.21	1014.72	5175.36	364.44	16831.86		303.69167200.00
* 168200.000	20000.00	2738.26	2730.00	8.26	4870.15	4.44	1058.98	5292.21	522.84	19041.49		435.68167200.00
* 168200.000	25000.00	2738.54	2730.00	8.54	5164.36	5.28	1089.11	5692.34	747.77	23629.12		623.11167200.00
* 168200.000	30000.00	2739.11	2730.00	9.11	5806.19	5.72	1152.11	6050.59	1142.16	27906.08		951.76167200.00
* 170800.000	500.00	2736.72	2735.00	1.72	259.80	1.92	202.92	1973.48	.00	500.00		.00169800.00
* 170800.000	1000.00	2737.40	2735.00	2.40	412.90	2.42	244.02	2274.21	.00	1000.00		.00169800.00
* 170800.000	2000.00	2738.35	2735.00	3.35	670.53	2.98	300.77	2755.16	.00	2000.00		.00169800.00
* 170800.000	3000.00	2739.03	2735.00	4.03	890.90	3.37	341.92	3142.09	.00	3000.00		.00169800.00
* 170800.000	4000.00	2739.59	2735.00	4.59	1090.07	3.67	375.24	3378.34	.00	4000.00		.00169800.00
* 170800.000	5000.00	2740.06	2735.00	5.06	1274.45	3.92	404.25	3581.82	.00	5000.00		.00169800.00
* 170800.000	7500.00	2741.06	2735.00	6.06	1712.19	4.38	474.03	4073.68	.00	7500.00		.00169800.00
* 170800.000	10000.00	2741.86	2735.00	6.86	2116.43	4.72	530.38	4410.27	.00	10000.00		.00169800.00
* 170800.000	12500.00	2742.55	2735.00	7.55	2498.61	5.00	578.62	4722.92	.00	12500.00		.00169800.00
* 170800.000	15000.00	2743.16	2735.00	8.16	2864.49	5.24	621.31	5038.04	.00	15000.00		.00169800.00
* 170800.000	17500.00	2743.73	2735.00	8.73	3231.04	5.42	661.32	5221.85	.00	17500.00		.00169800.00
* 170800.000	20000.00	2744.24	2735.00	9.24	3575.55	5.59	696.83	5340.71	.00	20000.00		.00169800.00
* 170800.000	25000.00	2745.11	2735.00	10.11	4211.15	5.94	758.00	5744.01	.00	25000.00		.00169800.00
* 170800.000	30000.00	2745.91	2735.00	10.91	4837.79	6.20	813.81	6105.23	.00	30000.00		.00169800.00

SECNO	Q	CWSEL	ELMIN	DEPTH	AREA	VCH	TOPWID	TWA	QLOB	QCH	QROB	CUMDS
* 172900.000	500.00	2742.94	2741.00	1.94	236.22	2.12	243.01	1985.85	.00	500.00		.00171900.00
* 172900.000	1000.00	2743.67	2741.00	2.67	446.59	2.24	334.14	2288.85	.00	1000.00		.00171900.00
172900.000	2000.00	2744.22	2741.00	3.22	648.41	3.08	402.62	2772.12	.00	2000.00		.00171900.00
172900.000	3000.00	2744.81	2741.00	3.81	907.75	3.30	476.38	3161.81	.00	3000.00		.00171900.00
* 172900.000	4000.00	2745.40	2741.00	4.40	1203.69	3.32	519.97	3400.65	.00	4000.00		.00171900.00
* 172900.000	5000.00	2745.76	2741.00	4.76	1393.26	3.59	537.89	3605.05	.00	5000.00		.00171900.00
* 172900.000	7500.00	2746.54	2741.00	5.54	1826.92	4.11	576.79	4099.17	.00	7500.00		.00171900.00
* 172900.000	10000.00	2747.22	2741.00	6.22	2231.85	4.48	610.89	4437.57	.00	10000.00		.00171900.00
* 172900.000	12500.00	2747.82	2741.00	6.82	2610.10	4.79	641.10	4751.86	.00	12500.00		.00171900.00
* 172900.000	15000.00	2748.37	2741.00	7.37	2968.51	5.05	668.47	5068.45	.00	15000.00		.00171900.00
* 172900.000	17500.00	2748.87	2741.00	7.87	3311.03	5.29	693.62	5253.66	.00	17500.00		.00171900.00
* 172900.000	20000.00	2749.34	2741.00	8.34	3640.43	5.49	716.97	5373.79	.00	20000.00		.00171900.00
* 172900.000	25000.00	2750.13	2741.00	9.13	4225.60	5.92	759.33	5779.68	.05	24999.83		.12171900.00
172900.000	30000.00	2751.00	2741.00	10.00	4908.60	6.15	819.88	6144.61	9.84	29965.56		24.61171900.00

APPENDIX F

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*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
* FEBRUARY 1981 *
* REVISED 02 AUG 88 *
*
* RUN DATE 09/13/1990 TIME 11:07:57 *
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*****
*
* U.S. ARMY CORPS OF ENGINEERS *
* THE HYDROLOGIC ENGINEERING CENTER *
* 609 SECOND STREET *
* DAVIS, CALIFORNIA 95616 *
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::::::::::::::::::::::::::::::::::::
::::::::::::::::::::::::::::::::::::
::: Full Microcomputer Implementation :::
::: by :::
::: Haestad Methods, Inc. :::
:::
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37 Brookside Road * Waterbury, Connecticut 06708 * (203) 755-1666

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

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE. THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION

NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY, DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION

KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

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

*DIAGRAM

1 ID MARTIN COUNTY FLOOD CONTROL STUDY JOB NO. 06901-001-036
 2 ID HDR ENGINEERING, INC. AUSTIN, TEXAS
 3 ID
 4 ID ACKERLY AREA MODEL TO HWY 846 PLAYAS
 5 ID
 6 ID COMPUTING 2-YR, 5-YR, 10-YR, 25-YR, 50-YR, AND 100-YR FLOOD EVENTS
 7 ID FOR ACKERLY/KNOTT AREA USING PLAN OPTION IN HEC-1.
 8 ID **PROPOSED PLAN**
 9 ID PLAN 1: 2-YEAR EVENT
 10 ID PLAN 2: 5-YEAR EVENT
 11 ID PLAN 3: 10-YEAR EVENT
 12 ID PLAN 4: 25-YEAR EVENT
 13 ID PLAN 5: 50-YEAR EVENT
 14 ID PLAN 6: 100-YEAR EVENT
 15 ID
 16 ID
 17 IT 10 300
 18 IO 5 0
 19 JP 6

20 KK TRIPLY

21 KM RUNOFF HYDROGRAPH FOR TRI-PLAYA SUBBASIN

22	KP	1									
23	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
24	BA	3.74									
25	LS	0	72								
26	UD	0.91									
27	KP	2									
28	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
29	KP	3									
30	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
31	KP	4									
32	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
33	KP	5									
34	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
35	KP	6									
36	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9

37 KK PLAYA1

38 KM ROUTE INFLOW HYDROGRAPH THROUGH PLAYA NO. 1

39	RS	1	ELEV	2782.5							
40	SV	0	25	294.3	2207.6	4120.9					
41	SD	0	0	0	0	50000					
42	SE	2782.5	2785	2790	2800	2810					

43 KK RTD1

44 KM ROUTE PLAYA NO. 1 OUTFLOW TO ACKERLY FAR WEST CONFLUENCE

45	RK	3900	.0026	0.030			TRAP	0	4		
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LINE	ID	1	2	3	4	5	6	7	8	9	10
46	KK	ACK-A									
47	KM	RUNOFF HYDROGRAPH FOR ACKERLY-A SUBBASIN									
48	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
49	BA	0.25									
50	LS	0	72								
51	UD	0.19									
52	KP	2									
53	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
54	KP	3									
55	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
56	KP	4									
57	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
58	KP	5									
59	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
60	KP	6									
61	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
62	KK	2002-A									
63	KM	COMBINE ACK-A WITH RT01									
64	HC	2									
65	KK	RT02									
66	KM	ROUTE 2002-A TO DAVENP									
67	RK	4500	.0055	0.030		TRAP	10	6			
68	KK	A-1									
69	KM	RUNOFF HYDROGRAPH FOR A-1 SUBBASIN									
70	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
71	BA	0.74									
72	LS	0	72								
73	UD	0.30									
74	KP	2									
75	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
76	KP	3									
77	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
78	KP	4									
79	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
80	KP	5									
81	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
82	KP	6									
83	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
84	KK	DAVENP									
85	KM	COMBINE RT02 WITH A-1									
86	HC	2									
87	KK	RT03									
88	KM	ROUTE DAVENPORT PLAYA OUTFLOW HYDROGRAPH TO B-1 OUT									
89	RK	5200	.0050	0.030		TRAP	0	4			

LINE	ID	1	2	3	4	5	6	7	8	9	10
90	KK	B-1									
91	KM	COMPUTE RUNOFF HYDROGRAPH FOR B-1 SUBBASIN									
92	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
93	BA	0.43									
94	LS	0	72								
95	UD	0.28									
96	KP	2									
97	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
98	KP	3									
99	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
100	KP	4									
101	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
102	KP	5									
103	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
104	KP	6									
105	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
106	KK	B-1OUT									
107	KM	COMBINE RT03 WITH B-1									
108	HC	2									
109	KK	RT08									
110	KM	ROUTE B-1OUT TO C-1BOUT									
111	RK	5200	.0048	0.030		TRAP	0	4.0			
112	KK	ACK-B									
113	KM	RUNOFF HYDROGRAPH FOR ACKERLY WEST SUBBASIN									
114	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
115	BA	1.33									
116	LS	0	72								
117	UD	0.36									
118	KP	2									
119	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
120	KP	3									
121	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
122	KP	4									
123	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
124	KP	5									
125	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
126	KP	6									
127	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
128	KK	RT05									
129	KM	ROUTE 2002-B TO SNELL									
130	RK	5400	.0043	0.030		TRAP	0	3.6			
131	KK	A-2									
132	KM	RUNOFF HYDROGRAPH FOR A-2									
133	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
134	BA	1.00									
135	LS	0	72								
136	UD	0.26									
137	KP	2									
138	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9

LINE	ID	1	2	3	4	5	6	7	8	9	10
233	KK	RT07									
234	KM	ROUTE ACKWST TO C1BOUT									
235	RK	5900	.0037	0.030		TRAP	0	4.0			
236	KK	C-1B									
237	KM	RUNOFF HYDROGRAPH FOR C-1B									
238	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
239	BA	0.15									
240	LS	0	72								
241	UD	1.10									
242	KP	2									
243	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
244	KP	3									
245	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
246	KP	4									
247	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
248	KP	5									
249	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
250	KP	6									
251	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
252	KK	C-2									
253	KM	RUNOFF HYDROGRAPH FOR C-2									
254	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
255	BA	1.00									
256	LS	0	72								
257	UD	0.50									
258	KP	2									
259	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
260	KP	3									
261	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
262	KP	4									
263	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
264	KP	5									
265	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
266	KP	6									
267	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
268	KK	B-3									
269	KM	RUNOFF HYDROGRAPH FOR B-3									
270	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
271	BA	1.00									
272	LS	0	72								
273	UD	0.47									
274	KP	2									
275	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
276	KP	3									
277	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
278	KP	4									
279	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
280	KP	5									
281	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
282	KP	6									
283	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9

LINE	ID	1	2	3	4	5	6	7	8	9	10
284	KK	RT09									
285	KM	ROUTE B-3 TO C1BOUT									
286	RK	10400	.0038	0.030		TRAP	0	4.0			
287	KK	C-3									
288	KM	RUNOFF HYDROGRAPH FOR C-3									
289	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
290	BA	1.00									
291	LS	0	72								
292	UD	0.38									
293	KP	2									
294	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
295	KP	3									
296	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
297	KP	4									
298	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
299	KP	5									
300	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
301	KP	6									
302	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
303	KK	RT10									
304	KM	ROUTE C-3 TO C1BOUT									
305	RK	5200	.0019	0.030		TRAP	0	4.0			
306	KK	ZANT									
307	KM	COMBINE C-1B - C-2 - RT10 - RT09 TO GIVE ZANT SUBBASIN RUNOFF HYDROGRAPH									
308	HC	4									
309	KK	ZNTIN									
310	KM	COMBINE ACKTOT (DAVENPORT & ACKERLY WEST) WITH ZANT									
311	HC	2									
312	KK	ZNTOUT									
313	RS	1	ELEV	2710							
314	SV	0	118	690							
315	SE	2710	2715	2720							
316	SL	2710	3.1	0.6	0.5						
317	SS	2715	500	2.6	1.5						
318	KK	RT11									
319	KM	ROUTE ZNTOUT TO COXOUT									
320	RK	5200	.0040	0.030		TRAP	0	4.0			
321	KK	COX									
322	KM	RUNOFF HYDROGRAPH FOR COX SUBBASIN									
323	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
324	BA	1.00									
325	LS	0	72								
326	UD	0.49									
327	KP	2									
328	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
329	KP	3									
330	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6

LINE	ID	1	2	3	4	5	6	7	8	9	10
331	KP	4									
332	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
333	KP	5									
334	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
335	KP	6									
336	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
337	KK COXIN										
338	KM COMBINE RT11 WITH COX										
339	HC	2									
340	KK COXOUT										
341	RS	1	ELEV	2682							
342	SV	0	27	396							
343	SE	2682	2685	2690							
344	SL	2682	3.1	0.6	0.5						
345	SS	2687	500	2.6	1.5						
346	KK RT12										
347	KM ROUTE COXOUT TO PHLOUT										
348	RK	5200	.0044	0.030		TRAP	0	4.0			
349	KK PHILIP										
350	KM RUNOFF HYDROGRAPH FOR PHILLIPS SUBBASIN										
351	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
352	BA	1.00									
353	LS	0	72								
354	UD	0.32									
355	KP	2									
356	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
357	KP	3									
358	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
359	KP	4									
360	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
361	KP	5									
362	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
363	KP	6									
364	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
365	KK PHILPL										
366	KM ROUTE PHILIP THROUGH PHILLIPS PLAYA										
367	RS	1	ELEV	2660							
368	SV	0	193	386							
369	SE	2660	2665	2670							
370	SL	2660	3.1	0.6	0.5						
371	SS	2665	200	2.6	1.5						
372	KK RT13										
373	KM ROUTE PHILPL TO PHLOUT										
374	RK	2700	.0019	0.030		TRAP	0	4.0			

LINE	ID	1	2	3	4	5	6	7	8	9	10
375	KK	SHORTE									
376	KM	RUNOFF HYDROGRAPH FOR SHORTE SUBBASIN									
377	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
378	BA	0.45									
379	LS	0	72								
380	UD	0.23									
381	KP	2									
382	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
383	KP	3									
384	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
385	KP	4									
386	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
387	KP	5									
388	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
389	KP	6									
390	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
391	KK	PHLOUT									
392	KM	COMBINE RT13 WITH RT12 AND SHORTE									
393	HC	3									
394	KK	RT14									
395	KM	ROUTE PHLOUT TO F-10UT									
396	RK	5200	.0046	0.030		TRAP	0	4.0			
397	KK	B-4									
398	KM	RUNOFF HYDROGRAPH FOR B-4									
399	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
400	BA	1.17									
401	LS	0	72								
402	UD	1.25									
403	KP	2									
404	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
405	KP	3									
406	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
407	KP	4									
408	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
409	KP	5									
410	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
411	KP	6									
412	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
413	KK	RT15									
414	KM	ROUTE B-4 TO C-4OUT									
415	RK	5400	.0070	0.030		TRAP	0	4.0			
416	KK	C-4									
417	KM	RUNOFF HYDROGRAPH FOR C-4									
418	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
419	BA	0.97									
420	LS	0	72								
421	UD	0.29									
422	KP	2									
423	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9

LINE	ID	1	2	3	4	5	6	7	8	9	10
424	KP	3									
425	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
426	KP	4									
427	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
428	KP	5									
429	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
430	KP	6									
431	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
432	KK	C-4OUT									
433	KM	COMBINE RT15 WITH C-4									
434	HC	2									
435	KK	RT16									
436	KM	ROUTE C-4OUT TO DE3OUT									
437	RK	16400	.0042	0.030		TRAP	0	4.0			
438	KK	D/E-3									
439	KM	RUNOFF HYDROGRAPH FOR D/E-3									
440	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
441	BA	1.36									
442	LS	0	72								
443	UD	0.59									
444	KP	2									
445	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
446	KP	3									
447	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
448	KP	4									
449	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
450	KP	5									
451	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
452	KP	6									
453	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
454	KK	D/E-4									
455	KM	RUNOFF HYDROGRAPH FOR D/E-4									
456	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
457	BA	2.65									
458	LS	0	72								
459	UD	0.97									
460	KP	2									
461	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
462	KP	3									
463	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
464	KP	4									
465	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
466	KP	5									
467	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
468	KP	6									
469	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9

LINE	ID	1	2	3	4	5	6	7	8	9	10
470	KK	DE3OUT									
471	KM	COMBINE RT16 - D/E-3 - D/E-4									
472	HC	3									
473	KK	RT17									
474	KM	ROUTE DE3OUT TO ROSEWD									
475	RK	10400	.0027	0.030		TRAP	0	4.0			
476	KK	F-2									
477	KM	RUNOFF HYDROGRAPH FOR F-2									
478	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
479	BA	1.00									
480	LS	0	72								
481	UD	0.59									
482	KP	2									
483	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
484	KP	3									
485	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
486	KP	4									
487	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
488	KP	5									
489	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
490	KP	6									
491	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
492	KK	ROSEWD									
493	KM	COMBINE RT17 WITH F-2									
494	HC	2									
495	KK	ROSEPL									
496	KM	ROUTE ROSEWD THROUGH ROSEWOOD PLAYA									
497	RS	1	ELEV	2640							
498	SV	0	276	1060							
499	SE	2640	2645	2650							
500	SL	2640	3.1	0.6	1.5						
501	SS	2646	500	2.6	1.5						
502	KK	C-1A									
503	KM	RUNOFF HYDROGRAPH FOR C-1A									
504	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
505	BA	0.13									
506	LS	0	72								
507	UD	1.13									
508	KP	2									
509	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
510	KP	3									
511	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
512	KP	4									
513	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
514	KP	5									
515	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
516	KP	6									
517	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9

LINE	ID	1	2	3	4	5	6	7	8	9	10
562	KK	RT20									
563	KM	ROUTE E1AOUT TO F-1OUT									
564	RK	5200	.0038	0.030		TRAP	0	4.0			
565	KK	F-1									
566	KM	RUNOFF HYDROGRAPH FOR F-1									
567	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
568	BA	1.13									
569	LS	0	72								
570	UD	0.50									
571	KP	2									
572	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
573	KP	3									
574	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
575	KP	4									
576	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
577	KP	5									
578	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
579	KP	6									
580	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
581	KK	SHAW									
582	KM	COMBINE F-1 WITH RT20 TO GIVE RUNOFF HYDROGRAPH FOR SHAW SUBBASIN									
583	HC	2									
584	KK	SHWRSE									
585	KM	COMBINE SHAW - ROSEPL - AND PHLQUT HYDROGRAPHS AT INTERSECTION									
586	HC	3									
587	KK	RT21									
588	KM	ROUTE SHWRSE TO NICHIN									
589	RK	5200	.0050	0.030		TRAP	0	4.0			
590	KK	F-3/4									
591	KM	RUNOFF HYDROGRAPH FOR F-3/4									
592	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
593	BA	1.84									
594	LS	0	72								
595	UD	0.88									
596	KP	2									
597	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
598	KP	3									
599	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
600	KP	4									
601	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
602	KP	5									
603	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
604	KP	6									
605	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9

LINE	ID	1	2	3	4	5	6	7	8	9	10
698	KK	RT24									
699	KM	ROUTE H-1 TO 846AIN									
700	RK	3200	.0063	0.030		TRAP	8	2.8			
701	KK	H-1A									
702	KM	RUNOFF HYDROGRAPH FOR H-1A									
703	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
704	BA	0.13									
705	LS	0	72								
706	UD	0.13									
707	KP	2									
708	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
709	KP	3									
710	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
711	KP	4									
712	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
713	KP	5									
714	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
715	KP	6									
716	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
717	KK	RT25									
718	KM	ROUTE H-1A TO 846AIN									
719	RK	2800	.0039	0.030		TRAP	0	4			
720	KK	I-1B									
721	KM	RUNOFF HYDROGRAPH FOR I-1B									
722	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
723	BA	0.37									
724	LS	0	72								
725	UD	0.27									
726	KP	2									
727	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
728	KP	3									
729	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
730	KP	4									
731	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
732	KP	5									
733	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
734	KP	6									
735	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
736	KK	I-1C									
737	KM	RUNOFF HYDROGRAPH FOR I-1C									
738	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
739	BA	0.60									
740	LS	0	72								
741	UD	0.18									
742	KP	2									
743	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
744	KP	3									
745	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
746	KP	4									
747	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3

LINE	ID	1	2	3	4	5	6	7	8	9	10
797	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
798	KP	4									
799	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
800	KP	5									
801	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
802	KP	6									
803	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
804	KK 846CIN										
805	KM COMBINE J-1 RUNOFF HYDROGRAPH WITH OUTFLOW HYDROGRAPH FROM 846 PLAYA B										
806	HC 2										
807	KK 846PLC										
808	RS	1	ELEV	2580							
809	SV	0	258	736							
810	SE	2575	2580	2585							
811	SS	2580	300	2.6	1.5						
812	ZZ										

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE	(V) ROUTING	(---->) DIVERSION OR PUMP FLOW
NO.	(.) CONNECTOR	(<----) RETURN OF DIVERTED OR PUMPED FLOW
20	TRIPLY	
	V	
	V	
37	PLAYA1	
	V	
	V	
43	RT01	
	.	
46	.	ACK-A
	.	.
	.	.
62	2002-A.....	
	V	
	V	
65	RT02	
	.	
	.	
68	.	A-1
	.	.
	.	.
84	DAVENP.....	
	V	
	V	
87	RT03	
	.	
	.	
90	.	B-1
	.	.
	.	.
106	B-1OUT.....	
	V	
	V	
109	RT08	
	.	
	.	
112	.	ACK-B
	.	V
	.	V
128	.	RT05
	.	.
	.	.
131	.	A-2
	.	.
	.	.
147	.	SNELL.....
	.	V
	.	V
150	.	SNELPL
	.	V
	.	V
157	.	RT06
	.	.

160	.	.	B-2	.

176	.	.	ACKRLY	.
	.	.	V	.
	.	.	V	.
192	.	.	RT04	.

195	.	.	.	A-3

211	.	.	JEFFCT.....	.
	.	.	V	.
	.	.	V	.
214	.	.	JEFFPL	.

221	.	.	ACKWST.....	.

224	.	.	ACKTOT.....	.
	.	.	V	.
	.	.	V	.
227	.	.	MAHONY	.
	.	.	V	.
	.	.	V	.
233	.	.	RT07	.

236	.	.	C-1B	.

252	.	.	C-2	.

268	.	.	B-3	.
	.	.	V	.
	.	.	V	.
284	.	.	RT09	.

287	.	.	.	C-3
	.	.	.	V
	.	.	.	V
303	.	.	.	RT10

306	.	.	ZANT.....	.

309	.	.	ZNTIN.....	.
	.	.	V	.
	.	.	V	.
312	.	.	ZNTOUT	.
	.	.	V	.
	.	.	V	.
318	.	.	RT11	.

321	.	COX	.
	.		.
337	COXIN.....		
	V		
	V		
340	COXOUT		
	V		
	V		
346	RT12		
	.		
	.		
349	.	PHILIP	
	.	V	
	.	V	
365	.	PHILPL	
	.	V	
	.	V	
372	.	RT13	
	.	.	
	.	.	
375	.	.	SHORTE
	.	.	.
	.	.	.
391	PHLOUT.....		
	V		
	V		
394	RT14		
	.		
	.		
397	.	B-4	
	.	V	
	.	V	
413	.	RT15	
	.	.	
	.	.	
416	.	.	C-4
	.	.	.
	.	.	.
432	.	C-4OUT.....	
	.	V	
	.	V	
435	.	RT16	
	.	.	
	.	.	
438	.	.	D/E-3
	.	.	.
	.	.	.
454	.	.	D/E-4
	.	.	.
	.	.	.
470	.	DE3OUT.....	
	.	V	
	.	V	
473	.	RT17	
	.	.	
	.	.	
476	.	.	F-2
	.	.	.

492	ROSEWD.....	
	V	
	V	
495	ROSEPL	
502	C-1A	
	V	
	V	
518	RT18	
		D-1
521		
537	D-10OUT.....	
	V	
	V	
540	RT19	
		E-1A
543		
559	E1AOUT.....	
	V	
	V	
562	RT20	
		F-1
565		
581	SHAW.....	
584	SHWRSE.....	
	V	
	V	
587	RT21	
590	F-3/4	
	V	
	V	
606	RTNICK	
		G-2
609		
625	NICHOL.....	
628	NICHIN.....	
	V	
	V	
631	NICHPL	
	V	

638	V RT22		
641	.	G-1A	
657	.	.	G-1B
673	.	G-1.....	
676	.	V V RT23	
679	.	.	H-1B
695	CRDB46.....		
698	V V RT24		
701	.	H-1A	
717	.	V V RT25	
720	.	.	I-1B
736	.	.	I-1C
752	846AIN.....		
755	V V 846PLA		
762	.	I-1B	
778	846BIN.....		
781	V V 846PLB		
788	.	J-1	
804	846CIN.....		
807	V V 846PLC		

*
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
* FEBRUARY 1981 *
* REVISED 02 AUG 88 *
*
* RUN DATE 09/13/1990 TIME 11:07:57 *
*

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

MARTIN COUNTY FLOOD CONTROL STUDY JOB NO. 06901-001-036
HDR ENGINEERING, INC. AUSTIN, TEXAS

ACKERLY AREA MODEL TO HWY 846 PLAYAS

COMPUTING 2-YR, 5-YR, 10-YR, 25-YR, 50-YR, AND 100-YR FLOOD EVENTS
FOR ACKERLY/KNOTT AREA USING PLAN OPTION IN HEC-1.

- PLAN 1: 2-YEAR EVENT
- PLAN 2: 5-YEAR EVENT
- PLAN 3: 10-YEAR EVENT
- PLAN 4: 25-YEAR EVENT
- PLAN 5: 50-YEAR EVENT
- PLAN 6: 100-YEAR EVENT

18 10 OUTPUT CONTROL VARIABLES

IPRNT 5 PRINT CONTROL
IPLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

11 HYDROGRAPH TIME DATA

NMIN 10 MINUTES IN COMPUTATION INTERVAL
IDATE 1 0 STARTING DATE
ITIME 0000 STARTING TIME
NQ 300 NUMBER OF HYDROGRAPH ORDINATES
NDDATE 3 0 ENDING DATE
NDTIME 0150 ENDING TIME
ICENT 19 CENTURY MARK

COMPUTATION INTERVAL .17 HOURS
TOTAL TIME BASE 49.83 HOURS

ENGLISH UNITS

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

JP

MULTI-PLAN OPTION

NPLAN

6 NUMBER OF PLANS

JR

MULTI-RATIO OPTION

RATIOS OF RUNOFF

1.00

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
 FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
 TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS	
				RATIO 1	
					1.00
HYDROGRAPH AT	TRIPLY	3.74	1	FLOW	350.
				TIME	13.17
			2	FLOW	1021.
				TIME	13.17
			3	FLOW	1521.
				TIME	13.17
			4	FLOW	2075.
				TIME	13.17
			5	FLOW	2610.
				TIME	13.00
			6	FLOW	3149.
				TIME	13.00

ROUTED TO	PLAYA1	3.74	1	FLOW	0.
				TIME	.17
			2	FLOW	0.
				TIME	.17
			3	FLOW	0.
				TIME	.17
			4	FLOW	0.
				TIME	.17
			5	FLOW	0.
				TIME	.17
			6	FLOW	0.
				TIME	.17

** PEAK STAGES IN FEET **

1	STAGE	2786.26
	TIME	27.50
2	STAGE	2788.97
	TIME	27.83
3	STAGE	2790.28
	TIME	27.50
4	STAGE	2790.85
	TIME	27.33
5	STAGE	2791.49
	TIME	28.33
6	STAGE	2792.15
	TIME	27.67

ROUTED TO	RT01	3.74	1	FLOW	0.
				TIME	.17
			2	FLOW	0.
				TIME	.17
			3	FLOW	0.
				TIME	.17
			4	FLOW	0.
				TIME	.17
			5	FLOW	0.
				TIME	0.

TIME .17
6 FLOW 0.
TIME .17

HYDROGRAPH AT ACK-A .25 1 FLOW 53.
TIME 12.33
2 FLOW 148.
TIME 12.33
3 FLOW 218.
TIME 12.33
4 FLOW 294.
TIME 12.33
5 FLOW 365.
TIME 12.33
6 FLOW 437.
TIME 12.33

2 COMBINED AT 2002-A 3.99 1 FLOW 53.
TIME 12.33
2 FLOW 148.
TIME 12.33
3 FLOW 218.
TIME 12.33
4 FLOW 294.
TIME 12.33
5 FLOW 365.
TIME 12.33
6 FLOW 437.
TIME 12.33

ROUTED TO RT02 3.99 1 FLOW 49.
TIME 12.67
2 FLOW 140.
TIME 12.50
3 FLOW 216.
TIME 12.50
4 FLOW 293.
TIME 12.50
5 FLOW 357.
TIME 12.50
6 FLOW 421.
TIME 12.50

HYDROGRAPH AT A-1 .74 1 FLOW 130.
TIME 12.50
2 FLOW 363.
TIME 12.50
3 FLOW 530.
TIME 12.50
4 FLOW 716.
TIME 12.50
5 FLOW 902.
TIME 12.50
6 FLOW 1074.
TIME 12.33

2 COMBINED AT DAVENP 4.73 1 FLOW 167.
TIME 12.50
2 FLOW 504.
TIME 12.50

3	FLOW	746.
	TIME	12.50
4	FLOW	1009.
	TIME	12.50
5	FLOW	1258.
	TIME	12.50
6	FLOW	1492.
	TIME	12.50

ROUTED TO	RT03	4.73	1	FLOW	159.
				TIME	12.83
			2	FLOW	495.
				TIME	12.67
			3	FLOW	716.
				TIME	12.67
			4	FLOW	957.
				TIME	12.50
			5	FLOW	1203.
				TIME	12.50
			6	FLOW	1459.
				TIME	12.50

HYDROGRAPH AT	B-1	.43	1	FLOW	77.
				TIME	12.50
			2	FLOW	213.
				TIME	12.50
			3	FLOW	319.
				TIME	12.33
			4	FLOW	434.
				TIME	12.33
			5	FLOW	539.
				TIME	12.33
			6	FLOW	652.
				TIME	12.33

2 COMBINED AT	B-10UT	5.16	1	FLOW	213.
				TIME	12.67
			2	FLOW	659.
				TIME	12.67
			3	FLOW	997.
				TIME	12.50
			4	FLOW	1374.
				TIME	12.50
			5	FLOW	1729.
				TIME	12.50
			6	FLOW	2082.
				TIME	12.50

ROUTED TO	RT08	5.16	1	FLOW	205.
				TIME	12.83
			2	FLOW	637.
				TIME	12.67
			3	FLOW	984.
				TIME	12.67
			4	FLOW	1340.
				TIME	12.67
			5	FLOW	1673.
				TIME	12.67
			6	FLOW	1990.
				TIME	12.67

HYDROGRAPH AT	ACK-B	1.33	1	FLOW	211.
				TIME	12.50
			2	FLOW	613.
				TIME	12.50
			3	FLOW	908.
				TIME	12.50
4	FLOW	1232.			
	TIME	12.50			
5	FLOW	1548.			
	TIME	12.50			
6	FLOW	1853.			
	TIME	12.50			

ROUTED TO	RT05	1.33	1	FLOW	204.
				TIME	12.83
			2	FLOW	605.
				TIME	12.67
			3	FLOW	887.
				TIME	12.67
4	FLOW	1193.			
	TIME	12.67			
5	FLOW	1494.			
	TIME	12.67			
6	FLOW	1774.			
	TIME	12.67			

HYDROGRAPH AT	A-2	1.00	1	FLOW	180.
				TIME	12.50
			2	FLOW	515.
				TIME	12.33
			3	FLOW	777.
				TIME	12.33
4	FLOW	1054.			
	TIME	12.33			
5	FLOW	1308.			
	TIME	12.33			
6	FLOW	1581.			
	TIME	12.33			

2 COMBINED AT	SNELL	2.33	1	FLOW	340.
				TIME	12.67
			2	FLOW	1006.
				TIME	12.50
			3	FLOW	1520.
				TIME	12.50
4	FLOW	2077.			
	TIME	12.50			
5	FLOW	2625.			
	TIME	12.50			
6	FLOW	3152.			
	TIME	12.50			

ROUTED TO	SNELPL	2.33	1	FLOW	24.
				TIME	20.17
			2	FLOW	245.
				TIME	13.50
3	FLOW	956.			
	TIME	13.00			
4	FLOW	1699.			

	TIME	12.83
5	FLOW	2565.
	TIME	12.67
6	FLOW	2991.
	TIME	12.50

** PEAK STAGES IN FEET **

1	STAGE	2757.64
	TIME	20.17
2	STAGE	2760.29
	TIME	13.50
3	STAGE	2760.79
	TIME	13.00
4	STAGE	2761.17
	TIME	12.83
5	STAGE	2761.55
	TIME	12.67
6	STAGE	2761.72
	TIME	12.50

ROUTED TO RT06 2.33

1	FLOW	24.
	TIME	20.50
2	FLOW	229.
	TIME	13.83
3	FLOW	922.
	TIME	13.17
4	FLOW	1581.
	TIME	12.83
5	FLOW	2369.
	TIME	12.83
6	FLOW	2985.
	TIME	12.67

HYDROGRAPH AT B-2 1.00

1	FLOW	180.
	TIME	12.50
2	FLOW	515.
	TIME	12.33
3	FLOW	777.
	TIME	12.33
4	FLOW	1054.
	TIME	12.33
5	FLOW	1308.
	TIME	12.33
6	FLOW	1581.
	TIME	12.33

HYDROGRAPH AT ACKRLY .68

1	FLOW	110.
	TIME	12.50
2	FLOW	318.
	TIME	12.50
3	FLOW	469.
	TIME	12.50
4	FLOW	636.
	TIME	12.50
5	FLOW	799.
	TIME	12.50
6	FLOW	956.
	TIME	12.50

ROUTED TO RT04 .68

1	FLOW	106.
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	TIME	12.83
2	FLOW	308.
	TIME	12.67
3	FLOW	466.
	TIME	12.67
4	FLOW	629.
	TIME	12.67
5	FLOW	786.
	TIME	12.67
6	FLOW	933.
	TIME	12.67

HYDROGRAPH AT A-3 .92

1	FLOW	124.
	TIME	12.67
2	FLOW	361.
	TIME	12.67
3	FLOW	534.
	TIME	12.67
4	FLOW	726.
	TIME	12.67
5	FLOW	916.
	TIME	12.67
6	FLOW	1095.
	TIME	12.67

2 COMBINED AT JEFFCT 1.60

1	FLOW	226.
	TIME	12.83
2	FLOW	669.
	TIME	12.67
3	FLOW	1001.
	TIME	12.67
4	FLOW	1355.
	TIME	12.67
5	FLOW	1701.
	TIME	12.67
6	FLOW	2028.
	TIME	12.67

ROUTED TO JEFFPL 1.60

1	FLOW	12.
	TIME	24.17
2	FLOW	23.
	TIME	24.50
3	FLOW	28.
	TIME	24.50
4	FLOW	32.
	TIME	24.17
5	FLOW	36.
	TIME	24.50
6	FLOW	40.
	TIME	24.50

** PEAK STAGES IN FEET **

1	STAGE	2770.82
	TIME	24.00
2	STAGE	2772.28
	TIME	24.50
3	STAGE	2773.46
	TIME	24.50
4	STAGE	2774.65
	TIME	24.33

5 STAGE 2776.00
 TIME 24.50
 6 STAGE 2777.43
 TIME 24.50

3 COMBINED AT ACKWST 4.93

1 FLOW 181.
 TIME 12.50
 2 FLOW 517.
 TIME 12.33
 3 FLOW 1139.
 TIME 13.17
 4 FLOW 2090.
 TIME 12.83
 5 FLOW 2972.
 TIME 12.83
 6 FLOW 4039.
 TIME 12.67

2 COMBINED AT ACKTOT 10.09

1 FLOW 307.
 TIME 12.83
 2 FLOW 1022.
 TIME 12.67
 3 FLOW 1691.
 TIME 13.00
 4 FLOW 3266.
 TIME 12.83
 5 FLOW 4410.
 TIME 12.83
 6 FLOW 6029.
 TIME 12.67

ROUTED TO MAHONY 10.09

1 FLOW 34.
 TIME 27.00
 2 FLOW 90.
 TIME 24.50
 3 FLOW 281.
 TIME 16.17
 4 FLOW 596.
 TIME 14.17
 5 FLOW 1169.
 TIME 13.67
 6 FLOW 1914.
 TIME 13.50

** PEAK STAGES IN FEET **

1 STAGE 2736.29
 TIME 27.00
 2 STAGE 2740.11
 TIME 24.50
 3 STAGE 2740.36
 TIME 16.17
 4 STAGE 2740.64
 TIME 14.17
 5 STAGE 2741.04
 TIME 13.67
 6 STAGE 2741.46
 TIME 13.50

ROUTED TO RT07 10.09

1 FLOW 34.
 TIME 27.17

2	FLOW	90.
	TIME	24.83
3	FLOW	281.
	TIME	16.33
4	FLOW	595.
	TIME	14.33
5	FLOW	1167.
	TIME	13.83
6	FLOW	1901.
	TIME	13.67

HYDROGRAPH AT	C-1B	.15	1	FLOW	12.
				TIME	13.33
			2	FLOW	36.
				TIME	13.33
			3	FLOW	54.
				TIME	13.33
			4	FLOW	74.
				TIME	13.33
			5	FLOW	92.
				TIME	13.33
			6	FLOW	112.
				TIME	13.33

HYDROGRAPH AT	C-2	1.00	1	FLOW	135.
				TIME	12.67
			2	FLOW	393.
				TIME	12.67
			3	FLOW	581.
				TIME	12.67
			4	FLOW	789.
				TIME	12.67
			5	FLOW	995.
				TIME	12.67
			6	FLOW	1190.
				TIME	12.67

HYDROGRAPH AT	B-3	1.00	1	FLOW	140.
				TIME	12.67
			2	FLOW	403.
				TIME	12.67
			3	FLOW	594.
				TIME	12.67
			4	FLOW	805.
				TIME	12.67
			5	FLOW	1016.
				TIME	12.67
			6	FLOW	1211.
				TIME	12.67

ROUTED TO	RT09	1.00	1	FLOW	138.
				TIME	13.17
			2	FLOW	397.
				TIME	13.00
			3	FLOW	587.
				TIME	13.00
			4	FLOW	793.
				TIME	13.00
			5	FLOW	991.
				TIME	12.83

6 FLOW 1197.
TIME 12.83

HYDROGRAPH AT C-3 1.00

1 FLOW 153.
TIME 12.50
2 FLOW 448.
TIME 12.50
3 FLOW 666.
TIME 12.50
4 FLOW 904.
TIME 12.50
5 FLOW 1137.
TIME 12.50
6 FLOW 1363.
TIME 12.50

ROUTED TO RT10 1.00

1 FLOW 152.
TIME 12.83
2 FLOW 428.
TIME 12.83
3 FLOW 646.
TIME 12.67
4 FLOW 885.
TIME 12.67
5 FLOW 1119.
TIME 12.67
6 FLOW 1346.
TIME 12.67

4 COMBINED AT ZANT 3.15

1 FLOW 353.
TIME 13.00
2 FLOW 1152.
TIME 12.83
3 FLOW 1746.
TIME 12.83
4 FLOW 2378.
TIME 12.83
5 FLOW 2989.
TIME 12.83
6 FLOW 3573.
TIME 12.67

2 COMBINED AT ZNTIN 13.24

1 FLOW 375.
TIME 13.17
2 FLOW 1180.
TIME 12.83
3 FLOW 1778.
TIME 12.83
4 FLOW 2411.
TIME 12.83
5 FLOW 3026.
TIME 12.83
6 FLOW 3792.
TIME 13.17

ROUTED TO ZNTOUT 13.24

1 FLOW 30.
TIME 49.83
2 FLOW 142.
TIME 17.83
3 FLOW 444.

	TIME	16.33
4	FLOW	948.
	TIME	14.67
5	FLOW	1750.
	TIME	14.17
6	FLOW	2775.
	TIME	13.83

** PEAK STAGES IN FEET **

1	STAGE	2714.03
	TIME	49.83
2	STAGE	2715.19
	TIME	17.83
3	STAGE	2715.46
	TIME	16.33
4	STAGE	2715.79
	TIME	14.67
5	STAGE	2716.20
	TIME	14.17
6	STAGE	2716.63
	TIME	13.83

ROUTED TO	RT11	13.24	1	FLOW	30.
				TIME	49.83
			2	FLOW	142.
				TIME	18.00
			3	FLOW	444.
				TIME	16.50
			4	FLOW	947.
				TIME	14.67
			5	FLOW	1745.
				TIME	14.33
			6	FLOW	2774.
				TIME	14.00

HYDROGRAPH AT	COX	1.00	1	FLOW	137.
				TIME	12.67
			2	FLOW	396.
				TIME	12.67
			3	FLOW	585.
				TIME	12.67
			4	FLOW	795.
				TIME	12.67
			5	FLOW	1002.
				TIME	12.67
			6	FLOW	1197.
				TIME	12.67

2 COMBINED AT	COXIN	14.24	1	FLOW	137.
				TIME	12.67
			2	FLOW	397.
				TIME	12.67
			3	FLOW	590.
				TIME	12.67
			4	FLOW	1041.
				TIME	14.50
			5	FLOW	1909.
				TIME	14.17
			6	FLOW	3020.
				TIME	14.00

ROUTED TO	COXOUT	14.24	1	FLOW	26.
				TIME	49.83
			2	FLOW	56.
				TIME	35.17
			3	FLOW	387.
				TIME	19.67
			4	FLOW	850.
				TIME	16.67
			5	FLOW	1590.
				TIME	15.33
			6	FLOW	2616.
				TIME	14.67

** PEAK STAGES IN FEET **

1	STAGE	2685.08
	TIME	49.83
2	STAGE	2687.06
	TIME	34.83
3	STAGE	2687.41
	TIME	19.50
4	STAGE	2687.73
	TIME	16.67
5	STAGE	2688.12
	TIME	15.33
6	STAGE	2688.57
	TIME	14.67

ROUTED TO	RT12	14.24	1	FLOW	26.
				TIME	49.83
			2	FLOW	56.
				TIME	35.33
			3	FLOW	387.
				TIME	19.67
			4	FLOW	849.
				TIME	16.83
			5	FLOW	1588.
				TIME	15.33
			6	FLOW	2606.
				TIME	14.83

HYDROGRAPH AT	PHILIP	1.00	1	FLOW	171.
				TIME	12.50
			2	FLOW	483.
				TIME	12.50
			3	FLOW	709.
				TIME	12.50
			4	FLOW	958.
				TIME	12.50
			5	FLOW	1205.
				TIME	12.50
			6	FLOW	1436.
				TIME	12.50

ROUTED TO	PHILPL	1.00	1	FLOW	7.
				TIME	24.00
			2	FLOW	17.
				TIME	24.00
			3	FLOW	21.
				TIME	24.17

4	FLOW	24.
	TIME	22.33
5	FLOW	27.
	TIME	24.17
6	FLOW	30.
	TIME	24.17

** PEAK STAGES IN FEET **

1	STAGE	2660.48
	TIME	24.00
2	STAGE	2661.25
	TIME	24.00
3	STAGE	2661.90
	TIME	24.17
4	STAGE	2662.57
	TIME	22.33
5	STAGE	2663.33
	TIME	24.17
6	STAGE	2664.13
	TIME	24.17

ROUTED TO	RT13	1.00	1	FLOW	7.
				TIME	24.33
			2	FLOW	17.
				TIME	24.17
			3	FLOW	21.
				TIME	24.33
			4	FLOW	24.
				TIME	22.33
			5	FLOW	27.
				TIME	24.33
			6	FLOW	30.
				TIME	24.33

HYDROGRAPH AT	SHORTE	.45	1	FLOW	87.
				TIME	12.33
			2	FLOW	249.
				TIME	12.33
			3	FLOW	373.
				TIME	12.33
			4	FLOW	504.
				TIME	12.33
			5	FLOW	624.
				TIME	12.33
			6	FLOW	752.
				TIME	12.33

3 COMBINED AT	PHLOUT	15.69	1	FLOW	87.
				TIME	12.33
			2	FLOW	249.
				TIME	12.33
			3	FLOW	421.
				TIME	19.67
			4	FLOW	905.
				TIME	16.83
			5	FLOW	1658.
				TIME	15.33
			6	FLOW	2700.
				TIME	14.83

ROUTED TO	RT14	15.69	1	FLOW	82.
				TIME	12.67
			2	FLOW	243.
				TIME	12.50
			3	FLOW	421.
				TIME	19.83
			4	FLOW	904.
				TIME	17.00
			5	FLOW	1655.
				TIME	15.50
			6	FLOW	2693.
				TIME	14.83

HYDROGRAPH AT	B-4	1.17	1	FLOW	88.
				TIME	13.67
			2	FLOW	257.
				TIME	13.50
			3	FLOW	387.
				TIME	13.50
			4	FLOW	530.
				TIME	13.50
			5	FLOW	660.
				TIME	13.50
			6	FLOW	799.
				TIME	13.50

ROUTED TO	RT15	1.17	1	FLOW	88.
				TIME	13.83
			2	FLOW	256.
				TIME	13.67
			3	FLOW	385.
				TIME	13.67
			4	FLOW	526.
				TIME	13.50
			5	FLOW	659.
				TIME	13.50
			6	FLOW	798.
				TIME	13.50

HYDROGRAPH AT	C-4	.97	1	FLOW	172.
				TIME	12.50
			2	FLOW	478.
				TIME	12.50
			3	FLOW	702.
				TIME	12.33
			4	FLOW	956.
				TIME	12.33
			5	FLOW	1189.
				TIME	12.33
			6	FLOW	1441.
				TIME	12.33

2 COMBINED AT	C-4OUT	2.14	1	FLOW	173.
				TIME	12.50
			2	FLOW	512.
				TIME	12.50
			3	FLOW	778.
				TIME	12.50
			4	FLOW	1061.
				TIME	12.50

			5	FLOW	1360.
				TIME	12.50
			6	FLOW	1643.
				TIME	12.50
ROUTED TO	RT16	2.14	1	FLOW	158.
				TIME	13.33
			2	FLOW	498.
				TIME	13.00
			3	FLOW	774.
				TIME	13.00
			4	FLOW	1030.
				TIME	13.00
			5	FLOW	1317.
				TIME	12.83
			6	FLOW	1618.
				TIME	12.83
HYDROGRAPH AT	D/E-3	1.36	1	FLOW	168.
				TIME	12.83
			2	FLOW	482.
				TIME	12.83
			3	FLOW	709.
				TIME	12.67
			4	FLOW	969.
				TIME	12.67
			5	FLOW	1225.
				TIME	12.67
			6	FLOW	1475.
				TIME	12.67
HYDROGRAPH AT	D/E-4	2.65	1	FLOW	237.
				TIME	13.33
			2	FLOW	697.
				TIME	13.17
			3	FLOW	1043.
				TIME	13.17
			4	FLOW	1425.
				TIME	13.17
			5	FLOW	1784.
				TIME	13.17
			6	FLOW	2149.
				TIME	13.17
3 COMBINED AT	DE3OUT	6.15	1	FLOW	502.
				TIME	13.33
			2	FLOW	1594.
				TIME	13.00
			3	FLOW	2409.
				TIME	13.00
			4	FLOW	3264.
				TIME	13.00
			5	FLOW	4106.
				TIME	12.83
			6	FLOW	4987.
				TIME	12.83
ROUTED TO	RT17	6.15	1	FLOW	474.
				TIME	13.83
			2	FLOW	1580.

	TIME	13.33
3	FLOW	2346.
	TIME	13.33
4	FLOW	3243.
	TIME	13.17
5	FLOW	4099.
	TIME	13.17
6	FLOW	4932.
	TIME	13.17

HYDROGRAPH AT F-2 1.00

1	FLOW	123.
	TIME	12.83
2	FLOW	354.
	TIME	12.83
3	FLOW	521.
	TIME	12.67
4	FLOW	712.
	TIME	12.67
5	FLOW	901.
	TIME	12.67
6	FLOW	1084.
	TIME	12.67

2 COMBINED AT ROSEWD 7.15

1	FLOW	519.
	TIME	13.83
2	FLOW	1786.
	TIME	13.33
3	FLOW	2691.
	TIME	13.17
4	FLOW	3753.
	TIME	13.17
5	FLOW	4714.
	TIME	13.17
6	FLOW	5667.
	TIME	13.17

ROUTED TO ROSEPL 7.15

1	FLOW	54.
	TIME	24.83
2	FLOW	175.
	TIME	21.00
3	FLOW	260.
	TIME	19.33
4	FLOW	705.
	TIME	16.33
5	FLOW	1346.
	TIME	15.33
6	FLOW	2148.
	TIME	14.83

** PEAK STAGES IN FEET **

1	STAGE	2642.35
	TIME	24.83
2	STAGE	2645.15
	TIME	20.83
3	STAGE	2646.08
	TIME	19.33
4	STAGE	2646.49
	TIME	16.33
5	STAGE	2646.87
	TIME	15.33

			6	STAGE	2647.26
				TIME	14.83
HYDROGRAPH AT	C-1A	.13	1	FLOW	10.
				TIME	13.50
			2	FLOW	31.
				TIME	13.33
			3	FLOW	46.
				TIME	13.33
			4	FLOW	63.
				TIME	13.33
			5	FLOW	79.
				TIME	13.33
			6	FLOW	95.
				TIME	13.33
ROUTED TO	RT18	.13	1	FLOW	10.
				TIME	13.83
			2	FLOW	31.
				TIME	13.67
			3	FLOW	46.
				TIME	13.67
			4	FLOW	62.
				TIME	13.50
			5	FLOW	78.
				TIME	13.50
			6	FLOW	95.
				TIME	13.50
HYDROGRAPH AT	D-1	.89	1	FLOW	142.
				TIME	12.50
			2	FLOW	410.
				TIME	12.50
			3	FLOW	608.
				TIME	12.50
			4	FLOW	824.
				TIME	12.50
			5	FLOW	1036.
				TIME	12.50
			6	FLOW	1240.
				TIME	12.50
2 COMBINED AT	D-1OUT	1.02	1	FLOW	142.
				TIME	12.50
			2	FLOW	411.
				TIME	12.50
			3	FLOW	612.
				TIME	12.50
			4	FLOW	832.
				TIME	12.50
			5	FLOW	1049.
				TIME	12.50
			6	FLOW	1260.
				TIME	12.50
ROUTED TO	RT19	1.02	1	FLOW	136.
				TIME	13.00
			2	FLOW	396.
				TIME	12.83
			3	FLOW	575.

	TIME	12.83
4	FLOW	794.
	TIME	12.67
5	FLOW	1012.
	TIME	12.67
6	FLOW	1229.
	TIME	12.67

HYDROGRAPH AT E-1A .55

1	FLOW	49.
	TIME	13.33
2	FLOW	145.
	TIME	13.17
3	FLOW	216.
	TIME	13.17
4	FLOW	296.
	TIME	13.17
5	FLOW	370.
	TIME	13.17
6	FLOW	446.
	TIME	13.17

2 COMBINED AT E1AOUT 1.57

1	FLOW	181.
	TIME	13.00
2	FLOW	517.
	TIME	12.83
3	FLOW	761.
	TIME	12.83
4	FLOW	1029.
	TIME	12.83
5	FLOW	1295.
	TIME	12.83
6	FLOW	1558.
	TIME	12.67

ROUTED TO RT20 1.57

1	FLOW	179.
	TIME	13.17
2	FLOW	510.
	TIME	13.00
3	FLOW	748.
	TIME	13.00
4	FLOW	1007.
	TIME	12.83
5	FLOW	1283.
	TIME	12.83
6	FLOW	1553.
	TIME	12.83

HYDROGRAPH AT F-1 1.13

1	FLOW	152.
	TIME	12.67
2	FLOW	444.
	TIME	12.67
3	FLOW	656.
	TIME	12.67
4	FLOW	892.
	TIME	12.67
5	FLOW	1125.
	TIME	12.67
6	FLOW	1345.
	TIME	12.67

2 COMBINED AT	SHAW	2.70	1	FLOW	277.
				TIME	13.17
			2	FLOW	863.
				TIME	12.83
			3	FLOW	1320.
				TIME	12.83
			4	FLOW	1814.
				TIME	12.83
			5	FLOW	2292.
				TIME	12.83
			6	FLOW	2751.
				TIME	12.83
3 COMBINED AT	SHWRSE	25.54	1	FLOW	317.
				TIME	13.17
			2	FLOW	1036.
				TIME	12.83
			3	FLOW	1574.
				TIME	12.83
			4	FLOW	2160.
				TIME	12.83
			5	FLOW	3342.
				TIME	15.33
			6	FLOW	5405.
				TIME	14.83
ROUTED TO	RT21	25.54	1	FLOW	314.
				TIME	13.33
			2	FLOW	1018.
				TIME	13.00
			3	FLOW	1521.
				TIME	13.00
			4	FLOW	2116.
				TIME	12.83
			5	FLOW	3332.
				TIME	15.50
			6	FLOW	5391.
				TIME	14.83
HYDROGRAPH AT	F-3/4	1.84	1	FLOW	176.
				TIME	13.17
			2	FLOW	510.
				TIME	13.17
			3	FLOW	764.
				TIME	13.00
			4	FLOW	1046.
				TIME	13.00
			5	FLOW	1318.
				TIME	13.00
			6	FLOW	1588.
				TIME	13.00
ROUTED TO	RTNICK	1.84	1	FLOW	175.
				TIME	13.33
			2	FLOW	510.
				TIME	13.17
			3	FLOW	763.
				TIME	13.17
			4	FLOW	1042.
				TIME	13.17

5 FLOW 1307.
 TIME 13.17
 6 FLOW 1572.
 TIME 13.17

HYDROGRAPH AT G-2 1.88

1 FLOW 267.
 TIME 12.67
 2 FLOW 764.
 TIME 12.67
 3 FLOW 1123.
 TIME 12.67
 4 FLOW 1522.
 TIME 12.67
 5 FLOW 1919.
 TIME 12.67
 6 FLOW 2287.
 TIME 12.67

2 COMBINED AT NICHOL 3.72

1 FLOW 343.
 TIME 12.83
 2 FLOW 1055.
 TIME 12.83
 3 FLOW 1582.
 TIME 12.83
 4 FLOW 2170.
 TIME 12.83
 5 FLOW 2764.
 TIME 12.67
 6 FLOW 3347.
 TIME 12.67

2 COMBINED AT NICHIN 29.26

1 FLOW 625.
 TIME 13.17
 2 FLOW 2013.
 TIME 13.00
 3 FLOW 3089.
 TIME 12.83
 4 FLOW 4286.
 TIME 12.83
 5 FLOW 5466.
 TIME 12.83
 6 FLOW 6603.
 TIME 12.83

ROUTED TO NICHPL 29.26

1 FLOW 50.
 TIME 48.50
 2 FLOW 164.
 TIME 35.67
 3 FLOW 589.
 TIME 25.17
 4 FLOW 1572.
 TIME 19.33
 5 FLOW 2813.
 TIME 17.17
 6 FLOW 4718.
 TIME 16.00

** PEAK STAGES IN FEET **

1 STAGE 2617.24
 TIME 48.00

2	STAGE	2619.95
	TIME	35.50
3	STAGE	2621.41
	TIME	25.00
4	STAGE	2622.00
	TIME	19.33
5	STAGE	2622.54
	TIME	17.17
6	STAGE	2623.23
	TIME	16.00

ROUTED TO	RT22	29.26	1	FLOW	50.
				TIME	48.67
			2	FLOW	164.
				TIME	35.83
			3	FLOW	589.
				TIME	25.17
			4	FLOW	1571.
				TIME	19.33
			5	FLOW	2812.
				TIME	17.17
			6	FLOW	4710.
				TIME	16.00

HYDROGRAPH AT	G-1A	.32	1	FLOW	56.
				TIME	12.50
			2	FLOW	157.
				TIME	12.50
			3	FLOW	229.
				TIME	12.50
			4	FLOW	310.
				TIME	12.50
			5	FLOW	390.
				TIME	12.50
			6	FLOW	464.
				TIME	12.33

HYDROGRAPH AT	G-1B	.58	1	FLOW	103.
				TIME	12.50
			2	FLOW	287.
				TIME	12.50
			3	FLOW	430.
				TIME	12.33
			4	FLOW	585.
				TIME	12.33
			5	FLOW	726.
				TIME	12.33
			6	FLOW	880.
				TIME	12.33

2 COMBINED AT	G-1	.90	1	FLOW	159.
				TIME	12.50
			2	FLOW	444.
				TIME	12.50
			3	FLOW	656.
				TIME	12.33
			4	FLOW	892.
				TIME	12.33
			5	FLOW	1109.
				TIME	12.33

6 FLOW 1344.
TIME 12.33

ROUTED TO RT23 .90

1 FLOW 156.
TIME 12.67
2 FLOW 433.
TIME 12.50
3 FLOW 653.
TIME 12.50
4 FLOW 886.
TIME 12.50
5 FLOW 1105.
TIME 12.50
6 FLOW 1328.
TIME 12.50

HYDROGRAPH AT H-1B 1.01

1 FLOW 201.
TIME 12.33
2 FLOW 572.
TIME 12.33
3 FLOW 854.
TIME 12.33
4 FLOW 1153.
TIME 12.33
5 FLOW 1428.
TIME 12.33
6 FLOW 1717.
TIME 12.33

3 COMBINED AT CRD846 31.17

1 FLOW 287.
TIME 12.67
2 FLOW 910.
TIME 12.50
3 FLOW 1334.
TIME 12.50
4 FLOW 1801.
TIME 12.50
5 FLOW 2956.
TIME 17.17
6 FLOW 4881.
TIME 16.00

ROUTED TO RT24 31.17

1 FLOW 284.
TIME 12.67
2 FLOW 879.
TIME 12.50
3 FLOW 1319.
TIME 12.50
4 FLOW 1797.
TIME 12.50
5 FLOW 2954.
TIME 17.17
6 FLOW 4874.
TIME 16.00

HYDROGRAPH AT H-1A .13

1 FLOW 28.
TIME 12.33
2 FLOW 81.
TIME 12.17
3 FLOW 123.

TIME 12.17
4 FLOW 166.
TIME 12.17
5 FLOW 203.
TIME 12.17
6 FLOW 247.
TIME 12.17

ROUTED TO RT25 .13
1 FLOW 27.
TIME 12.50
2 FLOW 79.
TIME 12.33
3 FLOW 118.
TIME 12.33
4 FLOW 158.
TIME 12.33
5 FLOW 194.
TIME 12.33
6 FLOW 233.
TIME 12.33

HYDROGRAPH AT I-1B .37
1 FLOW 66.
TIME 12.50
2 FLOW 186.
TIME 12.33
3 FLOW 281.
TIME 12.33
4 FLOW 382.
TIME 12.33
5 FLOW 473.
TIME 12.33
6 FLOW 573.
TIME 12.33

HYDROGRAPH AT I-1C .60
1 FLOW 129.
TIME 12.33
2 FLOW 358.
TIME 12.33
3 FLOW 527.
TIME 12.33
4 FLOW 709.
TIME 12.33
5 FLOW 880.
TIME 12.33
6 FLOW 1052.
TIME 12.33

4 COMBINED AT 846AIN 32.27
1 FLOW 440.
TIME 12.50
2 FLOW 1397.
TIME 12.50
3 FLOW 2054.
TIME 12.50
4 FLOW 2850.
TIME 12.33
5 FLOW 3600.
TIME 12.33
6 FLOW 4968.
TIME 16.00

ROUTED TO	846PLA	32.27	1	FLOW	15.
				TIME	49.83
			2	FLOW	75.
				TIME	49.83
			3	FLOW	167.
				TIME	49.83
			4	FLOW	365.
				TIME	32.33
			5	FLOW	1292.
				TIME	23.50
			6	FLOW	2346.
				TIME	20.00

** PEAK STAGES IN FEET **

1	STAGE	2581.01
	TIME	49.83
2	STAGE	2582.91
	TIME	49.83
3	STAGE	2585.00
	TIME	49.83
4	STAGE	2586.21
	TIME	32.17
5	STAGE	2586.84
	TIME	23.50
6	STAGE	2587.35
	TIME	20.00

HYDROGRAPH AT	1-1B	.31	1	FLOW	66.
				TIME	12.33
			2	FLOW	192.
				TIME	12.17
			3	FLOW	293.
				TIME	12.17
			4	FLOW	397.
				TIME	12.17
			5	FLOW	483.
				TIME	12.17
			6	FLOW	589.
				TIME	12.17

2 COMBINED AT	846BIN	32.58	1	FLOW	67.
				TIME	12.33
			2	FLOW	192.
				TIME	12.17
			3	FLOW	294.
				TIME	12.17
			4	FLOW	399.
				TIME	12.17
			5	FLOW	1302.
				TIME	23.50
			6	FLOW	2361.
				TIME	20.00

ROUTED TO	846PLB	32.58	1	FLOW	3.
				TIME	49.83
			2	FLOW	24.
				TIME	49.83
			3	FLOW	165.
				TIME	49.83
			4	FLOW	361.

	TIME	33.50
5	FLOW	1279.
	TIME	24.33
6	FLOW	2318.
	TIME	20.83

** PEAK STAGES IN FEET **

1	STAGE	2585.33
	TIME	49.83
2	STAGE	2586.36
	TIME	49.83
3	STAGE	2587.19
	TIME	49.83
4	STAGE	2587.37
	TIME	33.50
5	STAGE	2587.94
	TIME	24.17
6	STAGE	2588.43
	TIME	20.83

HYDROGRAPH AT J-1 .47

1	FLOW	101.
	TIME	12.33
2	FLOW	280.
	TIME	12.33
3	FLOW	413.
	TIME	12.33
4	FLOW	556.
	TIME	12.33
5	FLOW	689.
	TIME	12.33
6	FLOW	824.
	TIME	12.33

2 COMBINED AT 846CIN 33.05

1	FLOW	101.
	TIME	12.33
2	FLOW	280.
	TIME	12.33
3	FLOW	413.
	TIME	12.33
4	FLOW	556.
	TIME	12.33
5	FLOW	1289.
	TIME	24.00
6	FLOW	2340.
	TIME	20.83

ROUTED TO 846PLC 33.05

1	FLOW	11.
	TIME	15.17
2	FLOW	42.
	TIME	13.17
3	FLOW	162.
	TIME	49.83
4	FLOW	350.
	TIME	35.67
5	FLOW	1218.
	TIME	25.50
6	FLOW	2234.
	TIME	21.83

** PEAK STAGES IN FEET **

1	STAGE	2580.06
	TIME	15.17
2	STAGE	2580.14
	TIME	13.17
3	STAGE	2580.35
	TIME	49.83
4	STAGE	2580.58
	TIME	35.50
5	STAGE	2581.34
	TIME	25.50
6	STAGE	2582.01
	TIME	21.83

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

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*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1)
*   FEBRUARY 1981
*   REVISED 02 AUG 88
*
* RUN DATE 09/13/1990 TIME 10:42:33
*
*****
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*****
*
* U.S. ARMY CORPS OF ENGINEERS
* THE HYDROLOGIC ENGINEERING CENTER
*   609 SECOND STREET
*   DAVIS, CALIFORNIA 95616
*
*****
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X   X  XXXXXXX  XXXXX      X
X   X  X      X   X      XX
X   X  X      X           X
XXXXXXX XXXX  X      XXXXX X
X   X  X      X           X
X   X  X      X   X      X
X   X  XXXXXXX  XXXXX      XXX
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::::::::::::::::::::::::::::::::::::
::::::::::::::::::::::::::::::::::::
:::
::: Full Microcomputer Implementation :::
::: by :::
::: Haestad Methods, Inc. :::
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37 Brookside Road * Waterbury, Connecticut 06708 * (203) 755-1666

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

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

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

*DIAGRAM

1 ID MARTIN COUNTY FLOOD CONTROL STUDY JOB NO. 06901-001-036
 2 ID HDR ENGINEERING, INC. AUSTIN, TEXAS
 3 ID
 4 ID ACKERLY AREA MODEL TO HWY 846 PLAYAS
 5 ID
 6 ID COMPUTING 2-YR, 5-YR, 10-YR, 25-YR, 50-YR, AND 100-YR FLOOD EVENTS
 7 ID FOR ACKERLY/KNOTT AREA USING PLAN OPTION IN HEC-1.
 8 ID **EXISTING CONDITIONS**
 9 ID PLAN 1: 2-YEAR EVENT
 10 ID PLAN 2: 5-YEAR EVENT
 11 ID PLAN 3: 10-YEAR EVENT
 12 ID PLAN 4: 25-YEAR EVENT
 13 ID PLAN 5: 50-YEAR EVENT
 14 ID PLAN 6: 100-YEAR EVENT
 15 ID
 16 ID
 17 IT 10 300
 18 IO 5 0
 19 JP 6

20 KK TRIPLY

21 KM RUNOFF HYDROGRAPH FOR TRI-PLAYA SUBBASIN

22	KP	1									
23	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
24	BA	3.74									
25	LS	0	72								
26	UD	0.91									
27	KP	2									
28	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
29	KP	3									
30	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
31	KP	4									
32	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
33	KP	5									
34	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
35	KP	6									
36	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9

37 KK PLAYA1

38 KM ROUTE INFLOW HYDROGRAPH THROUGH PLAYA NO. 1

39	RS	1	ELEV	2782.5				
40	SV	0	25	294.3	2207.6	4120.9		
41	SQ	0	0	0	0	50000		
42	SE	2782.5	2785	2790	2800	2810		

43 KK RT01

44 KM ROUTE PLAYA NO. 1 OUTFLOW TO ACKERLY FAR WEST CONFLUENCE

45 RK 3900 .0026 0.030 TRAP 0 4

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

46 KK ACK-A
 47 KM RUNOFF HYDROGRAPH FOR ACKERLY-A SUBBASIN
 48 PH 50 32.4 0.42 0.8 1.4 1.6 1.7 2.1 2.4 2.8
 49 BA 0.25
 50 LS 0 72
 51 UD 0.19
 52 KP 2
 53 PH 20 32.4 0.51 1.0 1.9 2.2 2.3 2.8 3.3 3.9
 54 KP 3
 55 PH 10 32.4 0.58 1.2 2.2 2.6 2.8 3.4 3.9 4.6
 56 KP 4
 57 PH 4 32.4 0.67 1.4 2.6 3.1 3.3 3.8 4.7 5.3
 58 KP 5
 59 PH 2 32.4 0.75 1.5 3.0 3.4 3.7 4.4 5.3 6.1
 60 KP 6
 61 PH 1 32.4 0.82 1.7 3.3 3.8 4.2 5.1 5.9 6.9

62 KK 2002-A
 63 KM COMBINE ACK-A WITH RT01
 64 HC 2

65 KK RT02
 66 KM ROUTE 2002-A TO DAVENP
 67 RK 4500 .0055 0.030 TRAP 10 6

68 KK A-1
 69 KM RUNOFF HYDROGRAPH FOR A-1 SUBBASIN
 70 PH 50 32.4 0.42 0.8 1.4 1.6 1.7 2.1 2.4 2.8
 71 BA 0.74
 72 LS 0 72
 73 UD 0.30
 74 KP 2
 75 PH 20 32.4 0.51 1.0 1.9 2.2 2.3 2.8 3.3 3.9
 76 KP 3
 77 PH 10 32.4 0.58 1.2 2.2 2.6 2.8 3.4 3.9 4.6
 78 KP 4
 79 PH 4 32.4 0.67 1.4 2.6 3.1 3.3 3.8 4.7 5.3
 80 KP 5
 81 PH 2 32.4 0.75 1.5 3.0 3.4 3.7 4.4 5.3 6.1
 82 KP 6
 83 PH 1 32.4 0.82 1.7 3.3 3.8 4.2 5.1 5.9 6.9

84 KK DAVENP
 85 KM COMBINE RT02 WITH A-1
 86 HC 2

87 KK RT03
 88 KM ROUTE DAVENPORT PLAYA OUTFLOW HYDROGRAPH TO B-1 OUT
 89 RK 5200 .0050 0.030 TRAP 0 4

LINE	ID	1	2	3	4	5	6	7	8	9	10
90	KK	B-1									
91	KM	COMPUTE RUNOFF HYDROGRAPH FOR B-1 SUBBASIN									
92	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
93	BA	0.43									
94	LS	0	72								
95	UD	0.28									
96	KP	2									
97	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
98	KP	3									
99	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
100	KP	4									
101	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
102	KP	5									
103	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
104	KP	6									
105	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
106	KK	B-1OUT									
107	KM	COMBINE RT03 WITH B-1									
108	HC	2									
109	KK	RT08									
110	KM	ROUTE B-1OUT TO C-1BOUT									
111	RK	5200	.0048	0.030		TRAP	0	4.0			
112	KK	ACK-B									
113	KM	RUNOFF HYDROGRAPH FOR ACKERLY WEST SUBBASIN									
114	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
115	BA	1.33									
116	LS	0	72								
117	UD	0.36									
118	KP	2									
119	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
120	KP	3									
121	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
122	KP	4									
123	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
124	KP	5									
125	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
126	KP	6									
127	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
128	KK	RT05									
129	KM	ROUTE 2002-B TO A-2OUT									
130	RK	5400	.0043	0.030		TRAP	0	3.6			
131	KK	A-2									
132	KM	RUNOFF HYDROGRAPH FOR A-2									
133	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
134	BA	1.00									
135	LS	0	72								
136	UD	0.26									
137	KP	2									
138	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9

LINE	ID	1	2	3	4	5	6	7	8	9	10
139	KP	3									
140	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
141	KP	4									
142	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
143	KP	5									
144	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
145	KP	6									
146	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
147	KK	SNELL									
148	KM	COMBINE RT05 WITH A-2									
149	HC	2									
150	KK	RT06									
151	KM	ROUTE A-2OUT TO ACKNST									
152	RK	5500 .0045 0.030				TRAP	0	4.0			
153	KK	B-2									
154	KM	RUNOFF HYDROGRAPH FOR B-2									
155	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
156	BA	1.00									
157	LS	0 72									
158	UD	0.26									
159	KP	2									
160	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
161	KP	3									
162	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
163	KP	4									
164	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
165	KP	5									
166	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
167	KP	6									
168	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
169	KK	ACKRLY									
170	KM	RUNOFF HYDROGRAPH FOR ACKERLY SUBBASIN									
171	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
172	BA	0.68									
173	LS	0 72									
174	UD	0.35									
175	KP	2									
176	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
177	KP	3									
178	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
179	KP	4									
180	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
181	KP	5									
182	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
183	KP	6									
184	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9

LINE	ID	1	2	3	4	5	6	7	8	9	10
185	KK	RT04									
186	KM	ROUTE ACKRLY SUBBASIN TO 2002-B									
187	RK	4600	.0022	0.030		TRAP	0	4			
188	KK	A-3									
189	KM	RUNOFF HYDROGRAPH FOR A-3									
190	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
191	BA	0.92									
192	LS	0	72								
193	UD	0.50									
194	KP	2									
195	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
196	KP	3									
197	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
198	KP	4									
199	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
200	KP	5									
201	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
202	KP	6									
203	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
204	KK	JEFFCT									
205	KM	COMBINE ROUTED ACKERLY HYDROGRAPH WITH A-3 HYDROGRAPH									
206	HC	2									
207	KK	ACKWST									
208	KM	COMBINE RT06 WITH B-2 AND A-3									
209	HC	3									
210	KK	MAHONY									
211	KM	COMBINE ACKWST RUNOFF HYDROGRAPH WITH RT08 (DAVENPORT) HYDROGRAPH									
212	HC	2									
213	KK	RT07									
214	KM	ROUTE ACKWST TO C1BOUT									
215	RK	5900	.0037	0.030		TRAP	0	4.0			
216	KK	C-1B									
217	KM	RUNOFF HYDROGRAPH FOR C-1B									
218	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
219	BA	0.15									
220	LS	0	72								
221	UD	1.10									
222	KP	2									
223	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
224	KP	3									
225	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
226	KP	4									
227	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
228	KP	5									
229	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
230	KP	6									
231	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9

LINE	ID	1	2	3	4	5	6	7	8	9	10
232	KK	C-2									
233	KM	RUNOFF HYDROGRAPH FOR C-2									
234	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
235	BA	1.00									
236	LS	0	72								
237	UD	0.50									
238	KP	2									
239	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
240	KP	3									
241	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
242	KP	4									
243	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
244	KP	5									
245	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
246	KP	6									
247	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
248	KK	B-3									
249	KM	RUNOFF HYDROGRAPH FOR B-3									
250	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
251	BA	1.00									
252	LS	0	72								
253	UD	0.47									
254	KP	2									
255	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
256	KP	3									
257	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
258	KP	4									
259	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
260	KP	5									
261	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
262	KP	6									
263	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
264	KK	RT09									
265	KM	ROUTE B-3 TO C1BOUT									
266	RK	10400	.0038	0.030		TRAP	0	4.0			
267	KK	C-3									
268	KM	RUNOFF HYDROGRAPH FOR C-3									
269	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
270	BA	1.00									
271	LS	0	72								
272	UD	0.38									
273	KP	2									
274	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
275	KP	3									
276	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
277	KP	4									
278	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
279	KP	5									
280	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
281	KP	6									
282	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9

LINE	ID	1	2	3	4	5	6	7	8	9	10
330	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
331	KP	6									
332	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
333	KK PHILPL										
334	KM	ROUTE PHILIP THROUGH PHILLIPS PLAYA									
335	RS	1	ELEV	2660							
336	SV	0	193	386							
337	SE	2660	2665	2670							
338	SS	2660	5100	2.6	1.5						
339	KK RT13										
340	KM	ROUTE PHILPL TO PHLOUT									
341	RK	2700	.0019	0.030		TRAP	0	4.0			
342	KK SHORTE										
343	KM	RUNOFF HYDROGRAPH FOR SHORTE SUBBASIN									
344	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
345	BA	0.45									
346	LS	0	72								
347	UD	0.23									
348	KP	2									
349	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
350	KP	3									
351	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
352	KP	4									
353	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
354	KP	5									
355	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
356	KP	6									
357	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
358	KK PHLOUT										
359	KM	COMBINE RT13 WITH RT12 AND SHORTE									
360	HC	3									
361	KK RT14										
362	KM	ROUTE PHLOUT TO F-10UT									
363	RK	5200	.0046	0.030		TRAP	0	4.0			
364	KK B-4										
365	KM	RUNOFF HYDROGRAPH FOR B-4									
366	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
367	BA	1.17									
368	LS	0	72								
369	UD	1.25									
370	KP	2									
371	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
372	KP	3									
373	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
374	KP	4									
375	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
376	KP	5									
377	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
378	KP	6									

LINE	ID	1	2	3	4	5	6	7	8	9	10
379	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
380	KK	RT15									
381	KM	ROUTE B-4 TO C-4OUT									
382	RK	5400	.0070	0.030		TRAP	0	4.0			
383	KK	C-4									
384	KM	RUNOFF HYDROGRAPH FOR C-4									
385	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
386	BA	0.97									
387	LS	0	72								
388	UD	0.29									
389	KP	2									
390	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
391	KP	3									
392	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
393	KP	4									
394	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
395	KP	5									
396	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
397	KP	6									
398	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
399	KK	C-4OUT									
400	KM	COMBINE RT15 WITH C-4									
401	HC	2									
402	KK	RT16									
403	KM	ROUTE C-4OUT TO DE3OUT									
404	RK	16400	.0042	0.030		TRAP	0	4.0			
405	KK	D/E-3									
406	KM	RUNOFF HYDROGRAPH FOR D/E-3									
407	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
408	BA	1.36									
409	LS	0	72								
410	UD	0.59									
411	KP	2									
412	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
413	KP	3									
414	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
415	KP	4									
416	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
417	KP	5									
418	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
419	KP	6									
420	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
421	KK	D/E-4									
422	KM	RUNOFF HYDROGRAPH FOR D/E-4									
423	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
424	BA	2.65									
425	LS	0	72								
426	UD	0.97									
427	KP	2									

LINE	ID	1	2	3	4	5	6	7	8	9	10	
428	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9	
429	KP	3										
430	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6	
431	KP	4										
432	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3	
433	KP	5										
434	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1	
435	KP	6										
436	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9	
437	KK	DE3OUT										
438	KM	COMBINE RT16 - D/E-3 - D/E-4										
439	HC	3										
440	KK	RT17										
441	KM	ROUTE DE3OUT TO ROSEWD										
442	RK	10400	.0027	0.030		TRAP	0	4.0				
443	KK	F-2										
444	KM	RUNOFF HYDROGRAPH FOR F-2										
445	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8	
446	BA	1.00										
447	LS	0	72									
448	UD	0.59										
449	KP	2										
450	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9	
451	KP	3										
452	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6	
453	KP	4										
454	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3	
455	KP	5										
456	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1	
457	KP	6										
458	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9	
459	KK	ROSEWD										
460	KM	COMBINE RT17 WITH F-2										
461	HC	2										
462	KK	ROSEPL										
463	KM	ROUTE ROSEWD THROUGH ROSEWOOD PLAYA										
464	RS	1	ELEV	2640								
465	SV	0	276	1060								
466	SE	2640	2645	2650								
467	SS	2640	5000	2.6	1.5							
468	KK	C-1A										
469	KM	RUNOFF HYDROGRAPH FOR C-1A										
470	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8	
471	BA	0.13										
472	LS	0	72									
473	UD	1.13										
474	KP	2										
475	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9	
476	KP	3										

LINE	ID	1	2	3	4	5	6	7	8	9	10
477	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
478	KP	4									
479	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
480	KP	5									
481	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
482	KP	6									
483	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
484	KK	RT18									
485	KM	ROUTE C-1A TO D-10UT									
486	RK	5400	.0050	0.030		TRAP	0	4.0			
487	KK	D-1									
488	KM	RUNOFF HYDROGRAPH FOR D-1									
489	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
490	BA	0.89									
491	LS	0	72								
492	UD	0.36									
493	KP	2									
494	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
495	KP	3									
496	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
497	KP	4									
498	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
499	KP	5									
500	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
501	KP	6									
502	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
503	KK	D-10UT									
504	KM	COMBINE RT18 WITH D-1									
505	HC	2									
506	KK	RT19									
507	KM	ROUTE D-10UT TO E1AOUT									
508	RK	6700	.0025	0.030		TRAP	0	4.0			
509	KK	E-1A									
510	KM	RUNOFF HYDROGRAPH FOR E-1A									
511	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
512	BA	0.55									
513	LS	0	72								
514	UD	0.97									
515	KP	2									
516	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
517	KP	3									
518	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
519	KP	4									
520	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
521	KP	5									
522	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
523	KP	6									
524	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9

LINE	ID	1	2	3	4	5	6	7	8	9	10
525	KK	E1AOUT									
526	KM	COMBINE RT19 WITH E-1A									
527	HC	2									
528	KK	RT20									
529	KM	ROUTE E1AOUT TO F-1OUT									
530	RK	5200	.0038	0.030		TRAP	0	4.0			
531	KK	F-1									
532	KM	RUNOFF HYDROGRAPH FOR F-1									
533	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
534	BA	1.13									
535	LS	0	72								
536	UD	0.50									
537	KP	2									
538	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
539	KP	3									
540	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
541	KP	4									
542	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
543	KP	5									
544	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
545	KP	6									
546	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
547	KK	SHAW									
548	KM	COMBINE F-1 WITH RT20 TO GIVE RUNOFF HYDROGRAPH FOR SHAW SUBBASIN									
549	HC	2									
550	KK	SHWRSE									
551	KM	COMBINE SHAW - ROSEPL - AND PHLOUT HYDROGRAPHS AT INTERSECTION									
552	HC	3									
553	KK	RT21									
554	KM	ROUTE SHWRSE TO NICHIN									
555	RK	5200	.0050	0.030		TRAP	0	4.0			
556	KK	F-3/4									
557	KM	RUNOFF HYDROGRAPH FOR F-3/4									
558	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
559	BA	1.84									
560	LS	0	72								
561	UD	0.88									
562	KP	2									
563	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
564	KP	3									
565	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
566	KP	4									
567	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
568	KP	5									
569	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
570	KP	6									
571	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9

LINE	ID	1	2	3	4	5	6	7	8	9	10
572	KK	RTNICK									
573	KM	ROUTE F-3/4 TO NICHIN									
574	RK	5200	.0050	0.030		TRAP	0	4.0			
575	KK	G-2									
576	KM	RUNOFF HYDROGRAPH FOR G-2									
577	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
578	BA	1.88									
579	LS	0	72								
580	UD	0.46									
581	KP	2									
582	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
583	KP	3									
584	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
585	KP	4									
586	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
587	KP	5									
588	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
589	KP	6									
590	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
591	KK	NICHOL									
592	KM	COMBINE RTNICK WITH G-2 TO GIVE NICHOL SUBBASIN RUNOFF HYDROGRAPH									
593	HC	2									
594	KK	NICHIN									
595	KM	COMBINE NICHOL WITH RT21 TO GIVE INFLOW HYDROGRAPH INTO NICHOL'S LAKE									
596	HC	2									
597	KK	NICHPL									
598	KM	ROUTE NICHOL'S LAKE INFLOW HYDROGRAPH (NICHIN) THROUGH NICHOL'S LAKE									
599	RS	1	ELEV	2615							
600	SV	0	120	388	947	1935					
601	SE	2605	2610	2615	2620	2625					
602	SS	2615	1300	2.6	1.5						
603	KK	RT22									
604	KM	ROUTE NICKLE LAKE OUTFLOW HYDROGRAPH TO CRD846									
605	RK	5500	.0055	0.030		TRAP	8	2.8			
606	KK	G-1A									
607	KM	RUNOFF HYDROGRAPH FOR G-1A									
608	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
609	BA	0.32									
610	LS	0	72								
611	UD	0.30									
612	KP	2									
613	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
614	KP	3									
615	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
616	KP	4									
617	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
618	KP	5									
619	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1

LINE	ID	1	2	3	4	5	6	7	8	9	10
620	KP	6									
621	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
622	KK	G-1B									
623	KM	RUNOFF HYDROGRAPH FOR G-1B									
624	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
625	BA	0.58									
626	LS	0	72								
627	UD	0.28									
628	KP	2									
629	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
630	KP	3									
631	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
632	KP	4									
633	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
634	KP	5									
635	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
636	KP	6									
637	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
638	KK	G-1									
639	KM	COMBINE G-1A WITH G-1B									
640	HC	2									
641	KK	RT23									
642	KM	ROUTE G-1 TO CRD846									
643	RK	5300	.0042	0.030		TRAP	8	2.8			
644	KK	H-1B									
645	KM	RUNOFF HYDROGRAPH FOR H-1B									
646	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
647	BA	1.01									
648	LS	0	72								
649	UD	0.22									
650	KP	2									
651	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
652	KP	3									
653	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
654	KP	4									
655	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
656	KP	5									
657	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
658	KP	6									
659	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
660	KK	CRD846									
661	KM	COMBINE H-1B - RT23 - RT22									
662	HC	3									
663	KK	RT24									
664	KM	ROUTE H-1 TO 846AIN									
665	RK	3200	.0063	0.030		TRAP	8	2.8			

LINE	ID	1	2	3	4	5	6	7	8	9	10
666	KK	H-1A									
667	KM	RUNOFF HYDROGRAPH FOR H-1A									
668	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
669	BA	0.13									
670	LS	0	72								
671	UD	0.13									
672	KP	2									
673	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
674	KP	3									
675	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
676	KP	4									
677	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
678	KP	5									
679	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
680	KP	6									
681	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
682	KK	RT25									
683	KM	ROUTE H-1A TO 846AIN									
684	RK	2800	.0039	0.030		TRAP	0	4			
685	KK	I-1B									
686	KM	RUNOFF HYDROGRAPH FOR I-1B									
687	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
688	BA	0.37									
689	LS	0	72								
690	UD	0.27									
691	KP	2									
692	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
693	KP	3									
694	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
695	KP	4									
696	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
697	KP	5									
698	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
699	KP	6									
700	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
701	KK	I-1C									
702	KM	RUNOFF HYDROGRAPH FOR I-1C									
703	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
704	BA	0.60									
705	LS	0	72								
706	UD	0.18									
707	KP	2									
708	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
709	KP	3									
710	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
711	KP	4									
712	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
713	KP	5									
714	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
715	KP	6									
716	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9

LINE	ID	1	2	3	4	5	6	7	8	9	10
717	KK	846AIN									
718	KM	COMBINE RT24 - RT25 - I-1B - I-1C									
719	HC	4									
720	KK	846PLA									
721	KM	ROUTE 846AIN HYDROGRAPH THROUGH 846 PLAYA A									
722	RS	1	ELEV	2580							
723	SV	0	357	1189	2937						
724	SE	2575	2580	2585	2590						
725	SS	2580	700	2.6	1.5						
726	KK	I-1B									
727	KM	RUNOFF HYDROGRAPH FOR I-1B									
728	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
729	BA	0.31									
730	LS	0	72								
731	UD	0.13									
732	KP	2									
733	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
734	KP	3									
735	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
736	KP	4									
737	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
738	KP	5									
739	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
740	KP	6									
741	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
742	KK	846BIN									
743	KM	COMBINE I-1A RUNOFF HYDROGRAPH WITH OUTFLOW FROM 846 PLAYA A									
744	HC	2									
745	KK	846PLB									
746	KM	ROUTE 846BIN HYDROGRAPH THROUGH 846 PLAYA B									
747	RS	1	ELEV	2585							
748	SV	0	216	663							
749	SE	2580	2585	2590							
750	SS	2585	1500	2.6	1.5						
751	KK	J-1									
752	KM	RUNOFF HYDROGRAPH FOR J-1									
753	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
754	BA	0.47									
755	LS	0	72								
756	UD	0.18									
757	KP	2									
758	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
759	KP	3									
760	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
761	KP	4									
762	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
763	KP	5									
764	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
765	KP	6									

LINE	ID.....	1.....	2.....	3.....	4.....	5.....	6.....	7.....	8.....	9.....	10
766	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
767	KK 846CIN										
768	KM COMBINE J-1 RUNOFF HYDROGRAPH WITH OUTFLOW HYDROGRAPH FROM 846 PLAYA B										
769	HC	2									
770	KK 846PLC										
771	RS	1	ELEV	2580							
772	SV	0	258	736							
773	SE	2575	2580	2585							
774	SS	2580	300	2.6	1.5						
775	ZZ										

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE	(V) ROUTING	(--->) DIVERSION OR PUMP FLOW
NO.	(.) CONNECTOR	(<---) RETURN OF DIVERTED OR PUMPED FLOW
20	TRIPLY	
	V	
	V	
37	PLAYA1	
	V	
	V	
43	RT01	
	.	
	.	
46	.	ACK-A
	.	.
	.	.
62	2002-A.....	
	V	
	V	
65	RT02	
	.	
	.	
68	.	A-1
	.	.
	.	.
84	DAVENP.....	
	V	
	V	
87	RT03	
	.	
	.	
90	.	B-1
	.	.
	.	.
106	B-1OUT.....	
	V	
	V	
109	RT08	
	.	
	.	
112	.	ACK-B
	.	V
	.	V
128	.	RT05
	.	.
	.	.
131	.	A-2
	.	.
	.	.
147	.	SNELL.....
	.	V
	.	V
150	.	RT06
	.	.
	.	.
153	.	B-2
	.	.

169	.	.	.	ACKRLY	
	.	.	.	V	
	.	.	.	V	
185	.	.	.	RT04	
	
	
188	.	.	.	.	A-3

204	.	.	.	JEFFCT.....	
	
	
207	.	ACKWST.....	.	.	
	
	
210	MAHONY.....	.	.	.	
	V	.	.	.	
	V	.	.	.	
213	RT07	.	.	.	
	
	
216	.	C-1B	.	.	
	
	
232	.	.	C-2	.	
	
	
248	.	.	.	B-3	
	.	.	.	V	
	.	.	.	V	
264	.	.	.	RT09	
	
	
267	.	.	.	.	C-3
	.	.	.	.	V
	.	.	.	.	V
283	.	.	.	.	RT10

286	.	ZANT.....	.	.	
	
	
289	ZNTOUT.....	.	.	.	
	V	.	.	.	
	V	.	.	.	
292	RT11	.	.	.	
	
	
295	.	COX	.	.	
	
	
311	COXOUT.....	.	.	.	
	V	.	.	.	
	V	.	.	.	
314	RT12	.	.	.	
	
	
317	.	PHILIP	.	.	
	.	V	.	.	

333	.	V	
	.	PHILPL	
	.	V	
	.	V	
339	.	RT13	
	.	.	
342	.	.	SHORTE
	.	.	.
	.	.	.
358	.	PHLOUT	.....
	.	V	
	.	V	
361	.	RT14	
	.	.	
364	.	B-4	
	.	V	
	.	V	
380	.	RT15	
	.	.	
	.	.	
383	.	.	C-4
	.	.	.
	.	.	.
399	.	C-4OUT	.....
	.	V	
	.	V	
402	.	RT16	
	.	.	
	.	.	
405	.	.	D/E-3
	.	.	.
	.	.	.
421	.	.	D/E-4
	.	.	.
	.	.	.
437	.	DE3OUT	.....
	.	V	
	.	V	
440	.	RT17	
	.	.	
	.	.	
443	.	.	F-2
	.	.	.
	.	.	.
459	.	ROSEWD	.....
	.	V	
	.	V	
462	.	ROSEPL	
	.	.	
	.	.	
468	.	.	C-1A
	.	.	V
	.	.	V
484	.	.	RT18
	.	.	.
	.	.	.
487	.	.	D-1
	.	.	.

503	.	.	D-10UT.....	.
	.	.	V	.
	.	.	V	.
506	.	.	RT19	.

509	.	.	.	E-1A

525	.	.	E1AOUT.....	.
	.	.	V	.
	.	.	V	.
528	.	.	RT20	.

531	.	.	.	F-1

547	.	.	SHAW.....	.

550	SHWRSE.....	.	.	.
	V	.	.	.
	V	.	.	.
553	RT21	.	.	.

556	.	F-3/4	.	.
	.	V	.	.
	.	V	.	.
572	.	RTNICK	.	.

575	.	.	G-2	.

591	.	NICHOL.....	.	.

594	NICHIN.....	.	.	.
	V	.	.	.
	V	.	.	.
597	NICHPL	.	.	.
	V	.	.	.
	V	.	.	.
603	RT22	.	.	.

606	.	G-1A	.	.

622	.	.	G-1B	.

638	.	G-1.....	.	.
	.	V	.	.
	.	V	.	.
641	.	RT23	.	.

644	.	.	
	.	.	H-1B
	.	.	.
660	CRD846	.....
	V		
	V		
663	RT24		
	.		
666	.	H-1A	
	.	V	
	.	V	
682	.	RT25	
	.	.	
685	.	.	I-1B
	.	.	.
701	.	.	I-1C
	.	.	.
	.	.	.
717	846AIN	.....
	V		
	V		
720	846PLA		
	.		
726	.	I-1B	
	.	.	
	.	.	
742	846BIN	.....
	V		
	V		
745	846PLB		
	.		
751	.	J-1	
	.	.	
	.	.	
767	846CIN	.....
	V		
	V		
770	846PLC		

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

*
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
* FEBRUARY 1981 *
* REVISED 02 AUG 88 *
*
* RUN DATE 09/13/1990 TIME 10:42:33 *
*

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

MARTIN COUNTY FLOOD CONTROL STUDY JOB NO. 06901-001-036
HDR ENGINEERING, INC. AUSTIN, TEXAS

ACKERLY AREA MODEL TO HWY 846 PLAYAS

COMPUTING 2-YR, 5-YR, 10-YR, 25-YR, 50-YR, AND 100-YR FLOOD EVENTS
FOR ACKERLY/KNOTT AREA USING PLAN OPTION IN HEC-1.

- PLAN 1: 2-YEAR EVENT
- PLAN 2: 5-YEAR EVENT
- PLAN 3: 10-YEAR EVENT
- PLAN 4: 25-YEAR EVENT
- PLAN 5: 50-YEAR EVENT
- PLAN 6: 100-YEAR EVENT

18 10 OUTPUT CONTROL VARIABLES
 IPRNT 5 PRINT CONTROL
 IPLOT 0 PLOT CONTROL
 QSCAL 0. HYDROGRAPH PLOT SCALE

IT HYDROGRAPH TIME DATA
 NMIN 10 MINUTES IN COMPUTATION INTERVAL
 IDATE 1 0 STARTING DATE
 ITIME 0000 STARTING TIME
 NQ 300 NUMBER OF HYDROGRAPH ORDINATES
 NDDATE 3 0 ENDING DATE
 NDTIME 0150 ENDING TIME
 ICENT 19 CENTURY MARK

COMPUTATION INTERVAL .17 HOURS
TOTAL TIME BASE 49.83 HOURS

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

JP MULTI-PLAN OPTION
 NPLAN 6 NUMBER OF PLANS

JR MULTI-RATIO OPTION
 RATIOS OF RUNOFF
 1.00

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
 FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
 TIME TO PEAK IN HOURS

RATIOS APPLIED TO FLOWS

OPERATION	STATION	AREA	PLAN	RATIO 1
				1.00
HYDROGRAPH AT	TRIPLY	3.74	1	FLOW 350.
				TIME 13.17
			2	FLOW 1021.
				TIME 13.17
			3	FLOW 1521.
				TIME 13.17
			4	FLOW 2075.
				TIME 13.17
			5	FLOW 2610.
				TIME 13.00
			6	FLOW 3149.
				TIME 13.00

ROUTED TO	PLAYA1	3.74	1	FLOW 0.
				TIME .17
			2	FLOW 0.
				TIME .17
			3	FLOW 0.
				TIME .17
			4	FLOW 0.
				TIME .17
			5	FLOW 0.
				TIME .17
			6	FLOW 0.
				TIME .17

** PEAK STAGES IN FEET **

1	STAGE 2786.26
	TIME 27.50
2	STAGE 2788.97
	TIME 27.83
3	STAGE 2790.28
	TIME 27.50
4	STAGE 2790.85
	TIME 27.33
5	STAGE 2791.49
	TIME 28.33
6	STAGE 2792.15
	TIME 27.67

ROUTED TO	RT01	3.74	1	FLOW 0.
				TIME .17
			2	FLOW 0.
				TIME .17
			3	FLOW 0.
				TIME .17
			4	FLOW 0.
				TIME .17
			5	FLOW 0.
				TIME .17

TIME .17
6 FLOW 0.
TIME .17

HYDROGRAPH AT ACK-A .25 1 FLOW 53.
TIME 12.33
2 FLOW 148.
TIME 12.33
3 FLOW 218.
TIME 12.33
4 FLOW 294.
TIME 12.33
5 FLOW 365.
TIME 12.33
6 FLOW 437.
TIME 12.33

2 COMBINED AT 2002-A 3.99 1 FLOW 53.
TIME 12.33
2 FLOW 148.
TIME 12.33
3 FLOW 218.
TIME 12.33
4 FLOW 294.
TIME 12.33
5 FLOW 365.
TIME 12.33
6 FLOW 437.
TIME 12.33

ROUTED TO RT02 3.99 1 FLOW 49.
TIME 12.67
2 FLOW 140.
TIME 12.50
3 FLOW 216.
TIME 12.50
4 FLOW 293.
TIME 12.50
5 FLOW 357.
TIME 12.50
6 FLOW 421.
TIME 12.50

HYDROGRAPH AT A-1 .74 1 FLOW 130.
TIME 12.50
2 FLOW 363.
TIME 12.50
3 FLOW 530.
TIME 12.50
4 FLOW 716.
TIME 12.50
5 FLOW 902.
TIME 12.50
6 FLOW 1074.
TIME 12.33

2 COMBINED AT DAVENP 4.73 1 FLOW 167.
TIME 12.50
2 FLOW 504.
TIME 12.50

3 FLOW 746.
TIME 12.50
4 FLOW 1009.
TIME 12.50
5 FLOW 1258.
TIME 12.50
6 FLOW 1492.
TIME 12.50

ROUTED TO RT03 4.73 1 FLOW 159.
TIME 12.83
2 FLOW 495.
TIME 12.67
3 FLOW 716.
TIME 12.67
4 FLOW 957.
TIME 12.50
5 FLOW 1203.
TIME 12.50
6 FLOW 1459.
TIME 12.50

HYDROGRAPH AT B-1 .43 1 FLOW 77.
TIME 12.50
2 FLOW 213.
TIME 12.50
3 FLOW 319.
TIME 12.33
4 FLOW 434.
TIME 12.33
5 FLOW 539.
TIME 12.33
6 FLOW 652.
TIME 12.33

2 COMBINED AT B-1OUT 5.16 1 FLOW 213.
TIME 12.67
2 FLOW 659.
TIME 12.67
3 FLOW 997.
TIME 12.50
4 FLOW 1374.
TIME 12.50
5 FLOW 1729.
TIME 12.50
6 FLOW 2082.
TIME 12.50

ROUTED TO RT08 5.16 1 FLOW 205.
TIME 12.83
2 FLOW 637.
TIME 12.67
3 FLOW 984.
TIME 12.67
4 FLOW 1340.
TIME 12.67
5 FLOW 1673.
TIME 12.67
6 FLOW 1990.
TIME 12.67

HYDROGRAPH AT	ACK-B	1.33	1	FLOW	211.
				TIME	12.50
			2	FLOW	613.
				TIME	12.50
			3	FLOW	908.
				TIME	12.50
4	FLOW	1232.			
	TIME	12.50			
5	FLOW	1548.			
	TIME	12.50			
6	FLOW	1853.			
	TIME	12.50			

ROUTED TO	RT05	1.33	1	FLOW	204.
				TIME	12.83
			2	FLOW	605.
				TIME	12.67
			3	FLOW	887.
				TIME	12.67
4	FLOW	1193.			
	TIME	12.67			
5	FLOW	1494.			
	TIME	12.67			
6	FLOW	1774.			
	TIME	12.67			

HYDROGRAPH AT	A-2	1.00	1	FLOW	180.
				TIME	12.50
			2	FLOW	515.
				TIME	12.33
			3	FLOW	777.
				TIME	12.33
4	FLOW	1054.			
	TIME	12.33			
5	FLOW	1308.			
	TIME	12.33			
6	FLOW	1581.			
	TIME	12.33			

2 COMBINED AT	SNELL	2.33	1	FLOW	340.
				TIME	12.67
			2	FLOW	1006.
				TIME	12.50
			3	FLOW	1520.
				TIME	12.50
4	FLOW	2077.			
	TIME	12.50			
5	FLOW	2625.			
	TIME	12.50			
6	FLOW	3152.			
	TIME	12.50			

ROUTED TO	RT06	2:33	1	FLOW	336.
				TIME	12.83
			2	FLOW	1000.
				TIME	12.67
3	FLOW	1489.			
	TIME	12.67			
4	FLOW	2017.			

TIME 12.67
5 FLOW 2535.
TIME 12.67
6 FLOW 3017.
TIME 12.67

HYDROGRAPH AT B-2 1.00
1 FLOW 180.
TIME 12.50
2 FLOW 515.
TIME 12.33
3 FLOW 777.
TIME 12.33
4 FLOW 1054.
TIME 12.33
5 FLOW 1308.
TIME 12.33
6 FLOW 1581.
TIME 12.33

HYDROGRAPH AT ACKRLY .68
1 FLOW 110.
TIME 12.50
2 FLOW 318.
TIME 12.50
3 FLOW 469.
TIME 12.50
4 FLOW 636.
TIME 12.50
5 FLOW 799.
TIME 12.50
6 FLOW 956.
TIME 12.50

ROUTED TO RT04 .68
1 FLOW 107.
TIME 12.83
2 FLOW 308.
TIME 12.67
3 FLOW 466.
TIME 12.67
4 FLOW 634.
TIME 12.67
5 FLOW 792.
TIME 12.67
6 FLOW 940.
TIME 12.67

HYDROGRAPH AT A-3 .92
1 FLOW 124.
TIME 12.67
2 FLOW 361.
TIME 12.67
3 FLOW 534.
TIME 12.67
4 FLOW 726.
TIME 12.67
5 FLOW 916.
TIME 12.67
6 FLOW 1095.
TIME 12.67

2 COMBINED AT JEFFCT 1.60
1 FLOW 227.
TIME 12.83

2	FLOW	669.
	TIME	12.67
3	FLOW	1000.
	TIME	12.67
4	FLOW	1360.
	TIME	12.67
5	FLOW	1708.
	TIME	12.67
6	FLOW	2035.
	TIME	12.67

3 COMBINED AT ACKWST 4.93

1	FLOW	662.
	TIME	12.83
2	FLOW	2037.
	TIME	12.67
3	FLOW	3008.
	TIME	12.67
4	FLOW	4075.
	TIME	12.67
5	FLOW	5138.
	TIME	12.50
6	FLOW	6240.
	TIME	12.50

2 COMBINED AT MAHONY 10.09

1	FLOW	867.
	TIME	12.83
2	FLOW	2674.
	TIME	12.67
3	FLOW	3992.
	TIME	12.67
4	FLOW	5414.
	TIME	12.67
5	FLOW	6799.
	TIME	12.67
6	FLOW	8072.
	TIME	12.67

ROUTED TO RT07 10.09

1	FLOW	856.
	TIME	13.00
2	FLOW	2621.
	TIME	12.83
3	FLOW	3823.
	TIME	12.83
4	FLOW	5238.
	TIME	12.67
5	FLOW	6677.
	TIME	12.67
6	FLOW	8059.
	TIME	12.67

HYDROGRAPH AT C-1B .15

1	FLOW	12.
	TIME	13.33
2	FLOW	36.
	TIME	13.33
3	FLOW	54.
	TIME	13.33
4	FLOW	74.
	TIME	13.33
5	FLOW	92.
	TIME	13.33

6 FLOW 112.
TIME 13.33

HYDROGRAPH AT C-2 1.00
1 FLOW 135.
TIME 12.67
2 FLOW 393.
TIME 12.67
3 FLOW 581.
TIME 12.67
4 FLOW 789.
TIME 12.67
5 FLOW 995.
TIME 12.67
6 FLOW 1190.
TIME 12.67

HYDROGRAPH AT B-3 1.00
1 FLOW 140.
TIME 12.67
2 FLOW 403.
TIME 12.67
3 FLOW 594.
TIME 12.67
4 FLOW 805.
TIME 12.67
5 FLOW 1016.
TIME 12.67
6 FLOW 1211.
TIME 12.67

ROUTED TO RT09 1.00
1 FLOW 138.
TIME 13.17
2 FLOW 397.
TIME 13.00
3 FLOW 587.
TIME 13.00
4 FLOW 793.
TIME 13.00
5 FLOW 991.
TIME 12.83
6 FLOW 1197.
TIME 12.83

HYDROGRAPH AT C-3 1.00
1 FLOW 153.
TIME 12.50
2 FLOW 448.
TIME 12.50
3 FLOW 666.
TIME 12.50
4 FLOW 904.
TIME 12.50
5 FLOW 1137.
TIME 12.50
6 FLOW 1363.
TIME 12.50

ROUTED TO RT10 1.00
1 FLOW 152.
TIME 12.83
2 FLOW 428.
TIME 12.83
3 FLOW 646.

				TIME	12.67
			4	FLOW	885.
				TIME	12.67
			5	FLOW	1119.
				TIME	12.67
			6	FLOW	1346.
				TIME	12.67
4 COMBINED AT	ZANT	3.15	1	FLOW	353.
				TIME	13.00
			2	FLOW	1152.
				TIME	12.83
			3	FLOW	1746.
				TIME	12.83
			4	FLOW	2378.
				TIME	12.83
			5	FLOW	2989.
				TIME	12.83
			6	FLOW	3573.
				TIME	12.67
2 COMBINED AT	ZNTOUT	13.24	1	FLOW	1209.
				TIME	13.00
			2	FLOW	3772.
				TIME	12.83
			3	FLOW	5569.
				TIME	12.83
			4	FLOW	7511.
				TIME	12.67
			5	FLOW	9605.
				TIME	12.67
			6	FLOW	11632.
				TIME	12.67
ROUTED TO	RT11	13.24	1	FLOW	1185.
				TIME	13.17
			2	FLOW	3612.
				TIME	13.00
			3	FLOW	5461.
				TIME	12.83
			4	FLOW	7503.
				TIME	12.83
			5	FLOW	9453.
				TIME	12.83
			6	FLOW	11250.
				TIME	12.83
HYDROGRAPH AT	COX	1.00	1	FLOW	137.
				TIME	12.67
			2	FLOW	396.
				TIME	12.67
			3	FLOW	585.
				TIME	12.67
			4	FLOW	795.
				TIME	12.67
			5	FLOW	1002.
				TIME	12.67
			6	FLOW	1197.
				TIME	12.67

2 COMBINED AT	COXOUT	14.24	1	FLOW	1271.
				TIME	13.17
			2	FLOW	3902.
				TIME	13.00
			3	FLOW	5987.
				TIME	12.83
			4	FLOW	8214.
				TIME	12.83
			5	FLOW	10342.
				TIME	12.83
			6	FLOW	12304.
				TIME	12.83

ROUTED TO	RT12	14.24	1	FLOW	1221.
				TIME	13.33
			2	FLOW	3886.
				TIME	13.00
			3	FLOW	5764.
				TIME	13.00
			4	FLOW	7937.
				TIME	12.83
			5	FLOW	10138.
				TIME	12.83
			6	FLOW	12219.
				TIME	12.83

HYDROGRAPH AT	PHILIP	1.00	1	FLOW	171.
				TIME	12.50
			2	FLOW	483.
				TIME	12.50
			3	FLOW	709.
				TIME	12.50
			4	FLOW	958.
				TIME	12.50
			5	FLOW	1205.
				TIME	12.50
			6	FLOW	1436.
				TIME	12.50

ROUTED TO	PHILPL	1.00	1	FLOW	159.
				TIME	12.67
			2	FLOW	458.
				TIME	12.50
			3	FLOW	712.
				TIME	12.50
			4	FLOW	975.
				TIME	12.50
			5	FLOW	1211.
				TIME	12.50
			6	FLOW	1450.
				TIME	12.50

** PEAK STAGES IN FEET **

1	STAGE	2660.05
	TIME	12.67
2	STAGE	2660.10
	TIME	12.50
3	STAGE	2660.14
	TIME	12.50
4	STAGE	2660.17

				TIME	12.50
			5	STAGE	2660.20
				TIME	12.50
			6	STAGE	2660.22
				TIME	12.50
ROUTED TO	RT13	1.00	1	FLOW	151.
				TIME	12.83
			2	FLOW	451.
				TIME	12.67
			3	FLOW	668.
				TIME	12.67
			4	FLOW	903.
				TIME	12.67
			5	FLOW	1129.
				TIME	12.67
			6	FLOW	1355.
				TIME	12.50
HYDROGRAPH AT	SHORTE	.45	1	FLOW	87.
				TIME	12.33
			2	FLOW	249.
				TIME	12.33
			3	FLOW	373.
				TIME	12.33
			4	FLOW	504.
				TIME	12.33
			5	FLOW	624.
				TIME	12.33
			6	FLOW	752.
				TIME	12.33
3 COMBINED AT	PHLOUT	15.69	1	FLOW	1327.
				TIME	13.17
			2	FLOW	4271.
				TIME	13.00
			3	FLOW	6352.
				TIME	12.83
			4	FLOW	8871.
				TIME	12.83
			5	FLOW	11283.
				TIME	12.83
			6	FLOW	13565.
				TIME	12.83
ROUTED TO	RT14	15.69	1	FLOW	1320.
				TIME	13.33
			2	FLOW	4122.
				TIME	13.00
			3	FLOW	6324.
				TIME	13.00
			4	FLOW	8607.
				TIME	13.00
			5	FLOW	10930.
				TIME	12.83
			6	FLOW	13321.
				TIME	12.83
HYDROGRAPH AT	B-4	1.17	1	FLOW	88.
				TIME	13.67

2 FLOW 257.
TIME 13.50
3 FLOW 387.
TIME 13.50
4 FLOW 530.
TIME 13.50
5 FLOW 660.
TIME 13.50
6 FLOW 799.
TIME 13.50

ROUTED TO RT15 1.17 1 FLOW 88.
TIME 13.83
2 FLOW 256.
TIME 13.67
3 FLOW 385.
TIME 13.67
4 FLOW 526.
TIME 13.50
5 FLOW 659.
TIME 13.50
6 FLOW 798.
TIME 13.50

HYDROGRAPH AT C-4 .97 1 FLOW 172.
TIME 12.50
2 FLOW 478.
TIME 12.50
3 FLOW 702.
TIME 12.33
4 FLOW 956.
TIME 12.33
5 FLOW 1189.
TIME 12.33
6 FLOW 1441.
TIME 12.33

2 COMBINED AT C-4OUT 2.14 1 FLOW 173.
TIME 12.50
2 FLOW 512.
TIME 12.50
3 FLOW 778.
TIME 12.50
4 FLOW 1061.
TIME 12.50
5 FLOW 1360.
TIME 12.50
6 FLOW 1643.
TIME 12.50

ROUTED TO RT16 2.14 1 FLOW 157.
TIME 13.33
2 FLOW 498.
TIME 13.00
3 FLOW 769.
TIME 13.00
4 FLOW 1026.
TIME 13.00
5 FLOW 1318.
TIME 12.83

			6	FLOW	1619.
				TIME	12.83
HYDROGRAPH AT	D/E-3	1.36	1	FLOW	168.
				TIME	12.83
			2	FLOW	482.
				TIME	12.83
			3	FLOW	709.
				TIME	12.67
			4	FLOW	969.
				TIME	12.67
			5	FLOW	1225.
				TIME	12.67
			6	FLOW	1475.
				TIME	12.67
HYDROGRAPH AT	D/E-4	2.65	1	FLOW	237.
				TIME	13.33
			2	FLOW	697.
				TIME	13.17
			3	FLOW	1043.
				TIME	13.17
			4	FLOW	1425.
				TIME	13.17
			5	FLOW	1784.
				TIME	13.17
			6	FLOW	2149.
				TIME	13.17
3 COMBINED AT	DE3OUT	6.15	1	FLOW	501.
				TIME	13.33
			2	FLOW	1595.
				TIME	13.00
			3	FLOW	2405.
				TIME	13.00
			4	FLOW	3260.
				TIME	13.00
			5	FLOW	4108.
				TIME	12.83
			6	FLOW	4988.
				TIME	12.83
ROUTED TO	RT17	6.15	1	FLOW	473.
				TIME	13.67
			2	FLOW	1578.
				TIME	13.33
			3	FLOW	2338.
				TIME	13.33
			4	FLOW	3242.
				TIME	13.17
			5	FLOW	4097.
				TIME	13.17
			6	FLOW	4928.
				TIME	13.17
HYDROGRAPH AT	F-2	1.00	1	FLOW	123.
				TIME	12.83
			2	FLOW	354.
				TIME	12.83
			3	FLOW	521.

	TIME	12.67
4	FLOW	712.
	TIME	12.67
5	FLOW	901.
	TIME	12.67
6	FLOW	1084.
	TIME	12.67

2 COMBINED AT	ROSEWD	7.15	1	FLOW	526.
				TIME	13.67
			2	FLOW	1784.
				TIME	13.33
			3	FLOW	2697.
				TIME	13.17
			4	FLOW	3752.
				TIME	13.17
			5	FLOW	4712.
				TIME	13.17
			6	FLOW	5663.
				TIME	13.17

ROUTED TO	ROSEPL	7.15	1	FLOW	514.
				TIME	13.83
			2	FLOW	1720.
				TIME	13.50
			3	FLOW	2693.
				TIME	13.33
			4	FLOW	3658.
				TIME	13.17
			5	FLOW	4715.
				TIME	13.17
			6	FLOW	5720.
				TIME	13.17

**** PEAK STAGES IN FEET ****

1	STAGE	2640.11
	TIME	13.83
2	STAGE	2640.26
	TIME	13.50
3	STAGE	2640.34
	TIME	13.33
4	STAGE	2640.42
	TIME	13.17
5	STAGE	2640.51
	TIME	13.17
6	STAGE	2640.57
	TIME	13.17

HYDROGRAPH AT	C-1A	.13	1	FLOW	10.
				TIME	13.50
			2	FLOW	31.
				TIME	13.33
			3	FLOW	46.
				TIME	13.33
			4	FLOW	63.
				TIME	13.33
			5	FLOW	79.
				TIME	13.33
			6	FLOW	95.
				TIME	13.33

ROUTED TO	RT18.	.13	1	FLOW	10.
				TIME	13.83
			2	FLOW	30.
				TIME	13.67
			3	FLOW	46.
				TIME	13.50
			4	FLOW	63.
				TIME	13.50
			5	FLOW	79.
				TIME	13.50
			6	FLOW	95.
				TIME	13.50
HYDROGRAPH AT	D-1	.89	1	FLOW	142.
				TIME	12.50
			2	FLOW	410.
				TIME	12.50
			3	FLOW	608.
				TIME	12.50
			4	FLOW	824.
				TIME	12.50
			5	FLOW	1036.
				TIME	12.50
			6	FLOW	1240.
				TIME	12.50
2 COMBINED AT	D-10UT	1.02	1	FLOW	142.
				TIME	12.50
			2	FLOW	411.
				TIME	12.50
			3	FLOW	613.
				TIME	12.50
			4	FLOW	834.
				TIME	12.50
			5	FLOW	1051.
				TIME	12.50
			6	FLOW	1262.
				TIME	12.50
ROUTED TO	RT19	1.02	1	FLOW	134.
				TIME	12.83
			2	FLOW	394.
				TIME	12.83
			3	FLOW	577.
				TIME	12.67
			4	FLOW	801.
				TIME	12.67
			5	FLOW	1021.
				TIME	12.67
			6	FLOW	1239.
				TIME	12.67
HYDROGRAPH AT	E-1A	.55	1	FLOW	49.
				TIME	13.33
			2	FLOW	145.
				TIME	13.17
			3	FLOW	216.
				TIME	13.17
			4	FLOW	296.

TIME 13.17
5 FLOW 370.
TIME 13.17
6 FLOW 446.
TIME 13.17

2 COMBINED AT E1AOUT 1.57
1 FLOW 178.
TIME 13.00
2 FLOW 515.
TIME 12.83
3 FLOW 758.
TIME 12.83
4 FLOW 1025.
TIME 12.83
5 FLOW 1291.
TIME 12.83
6 FLOW 1568.
TIME 12.67

ROUTED TO RT20 1.57
1 FLOW 177.
TIME 13.17
2 FLOW 508.
TIME 13.00
3 FLOW 746.
TIME 13.00
4 FLOW 1012.
TIME 12.83
5 FLOW 1288.
TIME 12.83
6 FLOW 1558.
TIME 12.83

HYDROGRAPH AT F-1 1.13
1 FLOW 152.
TIME 12.67
2 FLOW 444.
TIME 12.67
3 FLOW 656.
TIME 12.67
4 FLOW 892.
TIME 12.67
5 FLOW 1125.
TIME 12.67
6 FLOW 1345.
TIME 12.67

2 COMBINED AT SHAW 2.70
1 FLOW 275.
TIME 13.17
2 FLOW 867.
TIME 12.83
3 FLOW 1326.
TIME 12.83
4 FLOW 1819.
TIME 12.83
5 FLOW 2297.
TIME 12.83
6 FLOW 2756.
TIME 12.83

3 COMBINED AT SHWRSE 25.54
1 FLOW 1946.
TIME 13.33

2	FLOW	6182.
	TIME	13.17
3	FLOW	9509.
	TIME	13.00
4	FLOW	13366.
	TIME	13.00
5	FLOW	16950.
	TIME	13.00
6	FLOW	20476.
	TIME	13.00

ROUTED TO RT21 25.54

1	FLOW	1918.
	TIME	13.50
2	FLOW	6135.
	TIME	13.17
3	FLOW	9454.
	TIME	13.17
4	FLOW	13085.
	TIME	13.00
5	FLOW	16796.
	TIME	13.00
6	FLOW	20414.
	TIME	13.00

HYDROGRAPH AT F-3/4 1.84

1	FLOW	176.
	TIME	13.17
2	FLOW	510.
	TIME	13.17
3	FLOW	764.
	TIME	13.00
4	FLOW	1046.
	TIME	13.00
5	FLOW	1318.
	TIME	13.00
6	FLOW	1588.
	TIME	13.00

ROUTED TO RTNICK 1.84

1	FLOW	175.
	TIME	13.33
2	FLOW	510.
	TIME	13.17
3	FLOW	762.
	TIME	13.17
4	FLOW	1041.
	TIME	13.17
5	FLOW	1305.
	TIME	13.17
6	FLOW	1569.
	TIME	13.17

HYDROGRAPH AT G-2 1.88

1	FLOW	267.
	TIME	12.67
2	FLOW	764.
	TIME	12.67
3	FLOW	1123.
	TIME	12.67
4	FLOW	1522.
	TIME	12.67
5	FLOW	1919.
	TIME	12.67

6 FLOW 2287.
TIME 12.67

2 COMBINED AT NICHOL 3.72

1 FLOW 348.
TIME 12.83
2 FLOW 1064.
TIME 12.83
3 FLOW 1592.
TIME 12.83
4 FLOW 2183.
TIME 12.83
5 FLOW 2787.
TIME 12.67
6 FLOW 3372.
TIME 12.67

2 COMBINED AT NICHIN 29.26

1 FLOW 2183.
TIME 13.50
2 FLOW 7047.
TIME 13.17
3 FLOW 10806.
TIME 13.17
4 FLOW 15111.
TIME 13.00
5 FLOW 19307.
TIME 13.00
6 FLOW 23426.
TIME 13.00

ROUTED TO NICHPL 29.26

1 FLOW 1848.
TIME 13.83
2 FLOW 6347.
TIME 13.50
3 FLOW 10142.
TIME 13.33
4 FLOW 14181.
TIME 13.17
5 FLOW 18309.
TIME 13.17
6 FLOW 22381.
TIME 13.17

** PEAK STAGES IN FEET **

1 STAGE 2615.66
TIME 13.83
2 STAGE 2616.52
TIME 13.50
3 STAGE 2617.08
TIME 13.33
4 STAGE 2617.60
TIME 13.17
5 STAGE 2618.08
TIME 13.17
6 STAGE 2618.52
TIME 13.17

ROUTED TO RT22 29.26

1 FLOW 1830.
TIME 14.00
2 FLOW 6312.
TIME 13.50

3	FLOW	10009.
	TIME	13.33
4	FLOW	14119.
	TIME	13.33
5	FLOW	18054.
	TIME	13.17
6	FLOW	22253.
	TIME	13.17

HYDROGRAPH AT G-1A .32

1	FLOW	56.
	TIME	12.50
2	FLOW	157.
	TIME	12.50
3	FLOW	229.
	TIME	12.50
4	FLOW	310.
	TIME	12.50
5	FLOW	390.
	TIME	12.50
6	FLOW	464.
	TIME	12.33

HYDROGRAPH AT G-1B .58

1	FLOW	103.
	TIME	12.50
2	FLOW	287.
	TIME	12.50
3	FLOW	430.
	TIME	12.33
4	FLOW	585.
	TIME	12.33
5	FLOW	726.
	TIME	12.33
6	FLOW	880.
	TIME	12.33

2 COMBINED AT G-1 .90

1	FLOW	159.
	TIME	12.50
2	FLOW	444.
	TIME	12.50
3	FLOW	656.
	TIME	12.33
4	FLOW	892.
	TIME	12.33
5	FLOW	1109.
	TIME	12.33
6	FLOW	1344.
	TIME	12.33

ROUTED TO RT23 .90

1	FLOW	155.
	TIME	12.67
2	FLOW	434.
	TIME	12.50
3	FLOW	652.
	TIME	12.50
4	FLOW	884.
	TIME	12.50
5	FLOW	1105.
	TIME	12.50
6	FLOW	1325.
	TIME	12.50

HYDROGRAPH AT	H-1B	1.01	1	FLOW	201.
				TIME	12.33
			2	FLOW	572.
				TIME	12.33
			3	FLOW	854.
				TIME	12.33
			4	FLOW	1153.
				TIME	12.33
			5	FLOW	1428.
				TIME	12.33
			6	FLOW	1717.
				TIME	12.33

3 COMBINED AT	CRD846	31.17	1	FLOW	1894.
				TIME	14.00
			2	FLOW	6464.
				TIME	13.50
			3	FLOW	10333.
				TIME	13.33
			4	FLOW	14536.
				TIME	13.33
			5	FLOW	18660.
				TIME	13.17
			6	FLOW	22994.
				TIME	13.17

ROUTED TO	RT24	31.17	1	FLOW	1891.
				TIME	14.00
			2	FLOW	6417.
				TIME	13.50
			3	FLOW	10226.
				TIME	13.33
			4	FLOW	14511.
				TIME	13.33
			5	FLOW	18476.
				TIME	13.17
			6	FLOW	22875.
				TIME	13.17

HYDROGRAPH AT	H-1A	.13	1	FLOW	28.
				TIME	12.33
			2	FLOW	81.
				TIME	12.17
			3	FLOW	123.
				TIME	12.17
			4	FLOW	166.
				TIME	12.17
			5	FLOW	203.
				TIME	12.17
			6	FLOW	247.
				TIME	12.17

ROUTED TO	RT25	.13	1	FLOW	27.
				TIME	12.50
			2	FLOW	79.
				TIME	12.33
			3	FLOW	118.
				TIME	12.33
			4	FLOW	158.

				TIME	12.33
			5	FLOW	194.
				TIME	12.33
			6	FLOW	233.
				TIME	12.33

HYDROGRAPH AT	I-1B	.37	1	FLOW	66.
				TIME	12.50
			2	FLOW	186.
				TIME	12.33
			3	FLOW	281.
				TIME	12.33
			4	FLOW	382.
				TIME	12.33
			5	FLOW	473.
				TIME	12.33
			6	FLOW	573.
				TIME	12.33

HYDROGRAPH AT	I-1C	.60	1	FLOW	129.
				TIME	12.33
			2	FLOW	358.
				TIME	12.33
			3	FLOW	527.
				TIME	12.33
			4	FLOW	709.
				TIME	12.33
			5	FLOW	880.
				TIME	12.33
			6	FLOW	1052.
				TIME	12.33

4 COMBINED AT	846AIN	32.27	1	FLOW	1929.
				TIME	14.00
			2	FLOW	6480.
				TIME	13.50
			3	FLOW	10371.
				TIME	13.33
			4	FLOW	14693.
				TIME	13.33
			5	FLOW	18742.
				TIME	13.17
			6	FLOW	23211.
				TIME	13.17

ROUTED TO	846PLA	32.27	1	FLOW	1351.
				TIME	14.83
			2	FLOW	4883.
				TIME	14.17
			3	FLOW	8237.
				TIME	13.83
			4	FLOW	11997.
				TIME	13.67
			5	FLOW	15671.
				TIME	13.67
			6	FLOW	19796.
				TIME	13.50

** PEAK STAGES IN FEET **

1	STAGE	2580.82
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	TIME	14.83
2	STAGE	2581.93
	TIME	14.17
3	STAGE	2582.73
	TIME	13.83
4	STAGE	2583.51
	TIME	13.67
5	STAGE	2584.19
	TIME	13.67
6	STAGE	2584.91
	TIME	13.50

HYDROGRAPH AT 1-1B .31

1	FLOW	66.
	TIME	12.33
2	FLOW	192.
	TIME	12.17
3	FLOW	293.
	TIME	12.17
4	FLOW	397.
	TIME	12.17
5	FLOW	483.
	TIME	12.17
6	FLOW	589.
	TIME	12.17

2 COMBINED AT 846BIN 32.58

1	FLOW	1360.
	TIME	14.83
2	FLOW	4904.
	TIME	14.17
3	FLOW	8269.
	TIME	13.83
4	FLOW	12030.
	TIME	13.67
5	FLOW	15718.
	TIME	13.67
6	FLOW	19861.
	TIME	13.50

ROUTED TO 846PLB 32.58

1	FLOW	1323.
	TIME	15.33
2	FLOW	4797.
	TIME	14.33
3	FLOW	8097.
	TIME	14.00
4	FLOW	11829.
	TIME	13.83
5	FLOW	15452.
	TIME	13.67
6	FLOW	19574.
	TIME	13.67

** PEAK STAGES IN FEET **

1	STAGE	2585.48
	TIME	15.33
2	STAGE	2586.14
	TIME	14.33
3	STAGE	2586.62
	TIME	14.00
4	STAGE	2587.09
	TIME	13.83

5	STAGE	2587.50
	TIME	13.67
6	STAGE	2587.93
	TIME	13.67

HYDROGRAPH AT J-1 .47

1	FLOW	101.
	TIME	12.33
2	FLOW	280.
	TIME	12.33
3	FLOW	413.
	TIME	12.33
4	FLOW	556.
	TIME	12.33
5	FLOW	689.
	TIME	12.33
6	FLOW	824.
	TIME	12.33

2 COMBINED AT 846CIN 33.05

1	FLOW	1334.
	TIME	15.17
2	FLOW	4828.
	TIME	14.33
3	FLOW	8144.
	TIME	14.00
4	FLOW	11878.
	TIME	13.83
5	FLOW	15524.
	TIME	13.67
6	FLOW	19671.
	TIME	13.67

ROUTED TO 846PLC 33.05

1	FLOW	1091.
	TIME	16.67
2	FLOW	3907.
	TIME	15.00
3	FLOW	6761.
	TIME	14.67
4	FLOW	9938.
	TIME	14.33
5	FLOW	13109.
	TIME	14.17
6	FLOW	16643.
	TIME	14.17

** PEAK STAGES IN FEET **

1	STAGE	2581.25
	TIME	16.67
2	STAGE	2582.92
	TIME	15.00
3	STAGE	2584.22
	TIME	14.67
4	STAGE	2585.48
	TIME	14.33
5	STAGE	2586.72
	TIME	14.17
6	STAGE	2588.11
	TIME	14.17

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

APPENDIX G

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*****  
*  
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *  
* FEBRUARY 1981 *  
* REVISED 02 AUG 88 *  
*  
* RUN DATE 09/14/1990 TIME 09:37:30 *  
*  
*****
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*****  
*  
* U.S. ARMY CORPS OF ENGINEERS *  
* THE HYDROLOGIC ENGINEERING CENTER *  
* 609 SECOND STREET *  
* DAVIS, CALIFORNIA 95616 *  
*  
*  
*****
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X X XXXXXXX XXXXX X  
X X X X X XX  
X X X X X  
XXXXXXXX XXXX X XXXXX X  
X X X X X  
X X X X X  
X X XXXXXXX XXXXX XXX
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:::::::::::::::::::::::::::::::::::::::  
:::::::::::::::::::::::::::::::::::::  
::: Full Microcomputer Implementation :::  
::: by :::  
::: Haestad Methods, Inc. :::  
::: :::  
:::::::::::::::::::::::::::::::::::::  
:::::::::::::::::::::::::::::::::::::
```

37 Brookside Road * Waterbury, Connecticut 06708 * (203) 755-1666

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

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

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

*DIAGRAM

1 ID MARTIN COUNTY FLOOD CONTROL STUDY JOB NO. 06901-001-036
 2 ID HDR ENGINEERING, INC. AUSTIN, TEXAS
 3 ID
 4 ID BROWN AREA EXISTING CONDITIONS
 5 ID
 6 ID COMPUTING 2-YR, 5-YR, 10-YR, 25-YR, 50-YR, AND 100-YR FLOOD EVENTS
 7 ID FOR BROWN AREA USING PLAN OPTION IN HEC-1.
 8 ID
 9 ID PLAN 1: 2-YEAR EVENT
 10 ID PLAN 2: 5-YEAR EVENT
 11 ID PLAN 3: 10-YEAR EVENT
 12 ID PLAN 4: 25-YEAR EVENT
 13 ID PLAN 5: 50-YEAR EVENT
 14 ID PLAN 6: 100-YEAR EVENT
 15 ID
 16 ID
 17 IT 5 300
 18 IO 5 0
 19 JP 6

20 KK BECKMY

21 KM RUNOFF HYDROGRAPH FOR BECKMEYER SUBBASIN

22	KP	1									
23	PH	50	28.2	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
24	BA	1.01									
25	LS	0	72								
26	UD	0.83									
27	KP	2									
28	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
29	KP	3									
30	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
31	KP	4									
32	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
33	KP	5									
34	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
35	KP	6									
36	PH	1	28.2	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9

37 KK BECKPL

38 KM ROUTE BECKMEYER RUNOFF HYDROGRAPH THROUGH BECKMEYER PLAYA

39 RS 1 ELEV 2760

40 SV 0 154 438

41 SE 2755 2760 2765

42 SS 2760 500 2.6 1.5

43 KK RT01

44 KM ROUTE BECKMEYER PLAYA OUTFLOW HYDROGRAPH TO MULLINS PLAYA

45 RK 4500 .0044 0.030 TRAP 30 4

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

46	KK MULLIN										
47	KM	RUNOFF	HYDROGRAPH FOR MULLINS SUBBASIN								
48	PH	50	28.2	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
49	BA	1.94									
50	LS	0	72								
51	UD	1.20									
52	KP	2									
53	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
54	KP	3									
55	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
56	KP	4									
57	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
58	KP	5									
59	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
60	KP	6									
61	PH	1	28.2	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9

62	KK MULLIN										
63	KM	COMBINE RT01 WITH MULLINS HYDROGRAPH TO GIVE INFLOW TO MULLINS PLAYA									
64	HC	2									

65	KK MULLPL										
66	KM	ROUTE MULLIN INFLOW HYDROGRAPH THROUGH MULLINS PLAYA									
67	RS	1	ELEV	2740							
68	SV	0	111	276							
69	SE	2735	2740	2745							
70	SS	2740	500	2.6	1.5						

71	KK RT02										
72	KM	ROUTE MULLPL TO COOK OUTLET									
73	RK	4000	.0062	0.030		TRAP	30	4			

74	KK COOK										
75	KM	RUNOFF	HYDROGRAPH FOR COOK SUBBASIN								
76	PH	50	28.2	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
77	BA	0.84									
78	LS	0	72								
79	UD	0.97									
80	KP	2									
81	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
82	KP	3									
83	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
84	KP	4									
85	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
86	KP	5									
87	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
88	KP	6									
89	PH	1	28.2	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9

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

90	KK	CKOUT									
91	KM	COMBINE RT02 WITH COOK HYDROGRAPH TO GIVE TOTAL HYDROGRAPH AT COOK OUTLET									
92	HC	2									
93	KK	RT03									
94	KM	ROUTE COOK OUTFLOW HYDROGRAPH TO BOND LAKE									
95	RK	4000	.0037	0.030		TRAP	30	4			
96	KK	BOND									
97	KM	RUNOFF HYDROGRAPH FOR BOND LAKE SUBBASIN									
98	PH	50	28.2	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
99	BA	0.74									
100	LS	0	72								
101	UD	1.00									
102	KP	2									
103	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
104	KP	3									
105	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
106	KP	4									
107	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
108	KP	5									
109	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
110	KP	6									
111	PH	1	28.2	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
112	KK	BONDIN									
113	KM	COMBINE RT03 WITH BOND HYDROGRAPH TO GIVE INFLOW HYDROGRAPH TO BOND LAKE									
114	HC	2									
115	KK	BONDLK									
116	KM	ROUTE BOND LAKE INFLOW HYDROGRAPH THROUGH BOND LAKE									
117	RS	1	ELEV	2700							
118	SV	0	342								
119	SE	2700	2705								
120	SS	2700	500	2.6	1.5						
121	KK	RT04									
122	KM	ROUTE BOND LAKE OUTFLOW HYDROGRAPH TO LANGHAM PLAYA									
123	RK	5500	.0027	0.030		TRAP	30	4			
124	KK	B5									
125	KM	RUNOFF HYDROGRAPH FOR B5 SUBBASIN									
126	PH	50	28.2	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
127	BA	2.00									
128	LS	0	72								
129	UD	2.40									
130	KP	2									
131	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
132	KP	3									
133	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
134	KP	4									
135	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
136	KP	5									
137	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1

LINE	ID	1	2	3	4	5	6	7	8	9	10
138	KP	6									
139	PH	1	28.2	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
140	KK	RT06									
141	KM	ROUTE B5 RUNOFF HYDROGRAPH TO LANGHAM PLAYA									
142	RK	5000	.0060	0.030		TRAP	5	1			
143	KK	B6									
144	KM	RUNOFF HYDROGRAPH FOR B6 SUBBASIN									
145	PH	50	28.2	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
146	BA	1.16									
147	LS	0	72								
148	UD	1.15									
149	KP	2									
150	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
151	KP	3									
152	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
153	KP	4									
154	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
155	KP	5									
156	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
157	KP	6									
158	PH	1	28.2	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
159	KK	LANGHM									
160	KM	COMBINE RT06 AND B6 HYDROGRAPHS TO GIVE LANGHAM SUBBASIN RUNOFF HYDROGRAPH									
161	HC	2									
162	KK	LANGIN									
163	KM	COMBINE LANGHM AND RT04 HYDROGRAPH TO GIVE INFLOW HYDROGRAPH TO LANGHAM LAKE									
164	HC	2									
165	KK	LANGPL									
166	KM	ROUTE LANGHAM PLAYA INFLOW HYDROGRAPH THROUGH LANGHAM PLAYA									
167	RS	1	ELEV	2675							
168	SV	0	114	228							
169	SE	2670	2675	2680							
170	SS	2675	500	2.6	1.5						
171	KK	DRYWLS									
172	KM	RUNOFF HYDROGRAPH FOR DRY WELLS SUBBASIN									
173	PH	50	28.2	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
174	BA	0.73									
175	LS	0	72								
176	UD	1.06									
177	KP	2									
178	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
179	KP	3									
180	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
181	KP	4									
182	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
183	KP	5									
184	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
185	KP	6									
186	PH	1	28.2	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9

LINE	ID	1	2	3	4	5	6	7	8	9	10	
187	KK	DRYIN										
188	KM	COMBINE LANGHAM PLAYA OUTFLOW HYDROGRAPH WITH DRY WELLS RUNOFF HYDROGRAPH										
189	KM	TO GIVE INFLOW HYDROGRAPH TO DRY WELLS PLAYA										
190	HC	2										
191	KK	DRYWPL										
192	KM	ROUTE DRY WELLS PLAYA INFLOW HYDROGRAPH THROUGH DRY WELLS PLAYA										
193	RS	1	ELEV	2670								
194	SV	0	68	208	485	970						
195	SE	2755	2760	2765	2770	2775						
196	SS	2770	1000	2.6	1.5							
197	KK	DAVIS										
198	KM	RUNOFF HYDROGRAPH FOR DAVIS SUBBASIN										
199	PH	50	28.2	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8	
200	BA	1.34										
201	LS	0	72									
202	UD	1.85										
203	KP	2										
204	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9	
205	KP	3										
206	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6	
207	KP	4										
208	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3	
209	KP	5										
210	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1	
211	KP	6										
212	PH	1	28.2	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9	
213	KK	DAVPLY										
214	KM	ROUTE DAVIS RUNOFF HYDROGRAPH THROUGH DAVIS PLAYA										
215	RS	1	ELEV	2760								
216	SV	0	68	208	485							
217	SE	2755	2760	2765	2770							
218	SS	2760	500	2.6	1.5							
219	KK	RT07										
220	KM	ROUTE DAVIS PLAYA OUTFLOW HYDROGRAPH TO HALE PLAYA										
221	RK	9300	.0060	0.030	TRAP	30	4					
222	KK	STAFFD										
223	KM	RUNOFF HYDROGRAPH FOR STAFFORD SUBBASIN										
224	PH	50	28.2	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8	
225	BA	0.57										
226	LS	0	72									
227	UD	0.96										
228	KP	2										
229	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9	
230	KP	3										
231	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6	
232	KP	4										
233	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3	
234	KP	5										
235	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1	

LINE	ID	1	2	3	4	5	6	7	8	9	10
332	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
333	KP	3									
334	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
335	KP	4									
336	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
337	KP	5									
338	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
339	KP	6									
340	PH	1	28.2	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
341	KK	ELLSIN									
342	KM	COMBINE ELLSBY RUNOFF HYDROGRAPH WITH RT11 TO GIVE HYDROGRAPH AT ELLSBERRY									
343	KM	PLAYA									
344	HC	2									
345	KK	ELLSPL									
346	KM	ROUTE ELLSBERRY INFLOW HYDROGRAPH THROUGH ELLSBERRY PLAYA									
347	RS	1	ELEV	2625							
348	SV	0	522	1044							
349	SE	2620	2625	2630							
350	SS	2625	1000	2.6	1.5						
351	KK	RT12									
352	KM	ROUTE COUNTY ROAD CROSSING HYDROGRAPH TO HUGHES PLAYA									
353	RK	8000	.0030	0.030		TRAP	30	4			
354	KK	HUGHES									
355	KM	RUNOFF HYDROGRAPH FOR HUGHES SUBBASIN									
356	PH	50	28.2	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
357	BA	2.05									
358	LS	0	72								
359	UD	1.92									
360	KP	2									
361	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
362	KP	3									
363	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
364	KP	4									
365	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
366	KP	5									
367	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
368	KP	6									
369	PH	1	28.2	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
370	KK	HUGHIN									
371	KM	COMBIE RT12 WITH HUGHES RUNOFF HYDROGRAPH TO GIVE INFLOW HYDROGRAPH INTO									
372	KM	HUGHES PLAYA									
373	HC	2									
374	KK	HUGHPL									
375	KM	ROUTE HUGHES PLAYA INFLOW HYDROGRAPH THROUGH HUGHES PLAYA									
376	RS	1	ELEV	2590							
377	SV	0	106	480	1328						
378	SE	2590	2595	2600	2605						
379	SS	2590	500	2.6	1.5						

LINE	ID	1	2	3	4	5	6	7	8	9	10
429	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
430	KP	3									
431	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
432	KP	4									
433	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
434	KP	5									
435	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
436	KP	6									
437	PH	1	28.2	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
438	KK BLGIN										
439	KM COMBINE RT14 HYDROGRAPH WITH BLGRAV HYDROGRAPH TO GIVE INFLOW HYDROGRAPH										
440	KM FOR BLAGRAVE PLAYA										
441	HC	2									
442	KK BLGRPL										
443	KM ROUTE BLAGRAVE PLAYA INFLOW HYDROGRAPH THROUGH BLAGRAVE PLAYA										
444	RS	1	ELEV	2635							
445	SV	0	76	347							
446	SE	2630	2635	2640							
447	SS	2635	500	2.6	1.5						
448	KK RT15										
449	KM ROUTE BLAGRAVE PLAYA OUTFLOW HYDROGRAPH TO RAYLONG PLAYAS										
450	RK	14000	.0028	0.030		TRAP	30	4			
451	KK WRIGHT										
452	KM RUNOFF HYDROGRAPH FOR WRIGHT SUBBASIN										
453	PH	50	28.2	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
454	BA	0.73									
455	LS	0	72								
456	UD	0.67									
457	KP	2									
458	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
459	KP	3									
460	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
461	KP	4									
462	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
463	KP	5									
464	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
465	KP	6									
466	PH	1	28.2	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
467	KK WRGHTP										
468	KM ROUTE WRIGHT RUNOFF HYDROGRAPH THROUGH WRIGHT PLAYA										
469	RS	1	ELEV	2625							
470	SV	0	10	72	322	572					
471	SE	2613	2615	2620	2625	2630					
472	SS	2625	500	2.6	1.5						

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE NO.	(V) ROUTING (.) CONNECTOR	(--->) DIVERSION OR PUMP FLOW (<---) RETURN OF DIVERTED OR PUMPED FLOW
20	BECKMY V V	
37	BECKPL V V	
43	RT01 .	
46	. MULLIN .	
62	MULLIN..... V V	
65	MULLPL V V	
71	RT02 .	
74	. COOK .	
90	CKOUT..... V V	
93	RT03 .	
96	. BOND .	
112	BONDIN..... V V	
115	BONDLK V V	
121	RT04 .	
124	. B5 V V	
140	. RT06 .	
143	. B6 .	
159	. LANGHM..... .	

162	LANGIN.....		
	V		
	V		
165	LANGPL		
	.		
	.		
171		DRYWLS	
	.		
	.		
187	DRYIN.....		
	V		
	V		
191	DRYWPL		
	.		
	.		
197		DAVIS	
	.	V	
	.	V	
213		DAVPLY	
	.	V	
	.	V	
219		RT07	
	.		
	.		
222		STAFFD	
	.	V	
	.	V	
238		STAFPL	
	.	V	
	.	V	
244		RT08	
	.		
	.		
247			HALE
	.		.
	.		.
263		HALEIN.....	
	.	V	
	.	V	
266		HALEPL	
	.	V	
	.	V	
272		RT09	
	.		
	.		
275			HUNT
	.		.
	.		.
291		HWY26.....	
	.	V	
	.	V	
294		RT10	
	.		
	.		
297		MARILN	
	.		.
	.		.
313		MRLIN.....	
	.	V	

317	MRLNPL	V	
		V	
		V	
322	RT11		
325		ELLSBY	
341	ELLSIN.....		
		V	
		V	
345	ELLSPL		
		V	
		V	
351	RT12		
354		HUGHES	
370	HUGHIN.....		
		V	
		V	
374	HUGHPL		
		V	
		V	
380	RT13		
383		SH846B	
399	SH846X.....		
403		CURRIE	
		V	
		V	
419		RT14	
422			BLGRAV
438		BLGIN.....	
		V	
		V	
442		BLGRPL	
		V	
		V	
448		RT15	
451			WRIGHT
			V
			V
467			WRGHTP
			V

473	.	.	V		
	.	.	RT16		
	.	.	.		
476	.	.	.	B18	
	
492	.	.	.	.	B19

508	.	RAYLNG.....			
	.	V			
	.	V			
511	.	RT17			
	.	.			
514	.	.	BATJER		
	.	.	.		
	.	.	.		
530	.	BTJOUT.....			

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
*   FEBRUARY 1981                 *
*   REVISED 02 AUG 88             *
*
* RUN DATE 09/14/1990 TIME 09:37:30 *
*
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*
* U.S. ARMY CORPS OF ENGINEERS
* THE HYDROLOGIC ENGINEERING CENTER
*   609 SECOND STREET
*   DAVIS, CALIFORNIA 95616
*
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MARTIN COUNTY FLOOD CONTROL STUDY JOB NO. 06901-001-036
HDR ENGINEERING, INC. AUSTIN, TEXAS

BROWN AREA EXISTING CONDITIONS

COMPUTING 2-YR, 5-YR, 10-YR, 25-YR, 50-YR, AND 100-YR FLOOD EVENTS FOR BROWN AREA USING PLAN OPTION IN HEC-1.

- PLAN 1: 2-YEAR EVENT
- PLAN 2: 5-YEAR EVENT
- PLAN 3: 10-YEAR EVENT
- PLAN 4: 25-YEAR EVENT
- PLAN 5: 50-YEAR EVENT
- PLAN 6: 100-YEAR EVENT

18 IO OUTPUT CONTROL VARIABLES

IPRNT 5 PRINT CONTROL
IPLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

IT HYDROGRAPH TIME DATA

NMIN 5 MINUTES IN COMPUTATION INTERVAL
IDATE 1 0 STARTING DATE
ITIME 0000 STARTING TIME
NQ 300 NUMBER OF HYDROGRAPH ORDINATES
NDDATE 2 0 ENDING DATE
NDTIME 0055 ENDING TIME
ICENT 19 CENTURY MARK

COMPUTATION INTERVAL .08 HOURS
TOTAL TIME BASE 24.92 HOURS

ENGLISH UNITS

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

JP

MULTI-PLAN OPTION
NPLAN

6 NUMBER OF PLANS

JR

MULTI-RATIO OPTION
RATIOS OF RUNOFF
1.00

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
 FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
 TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS	
				RATIO 1	
					1.00
HYDROGRAPH AT	BECKMY	1.01	1	FLOW	106.
				TIME	13.08
			2	FLOW	308.
				TIME	13.00
			3	FLOW	459.
				TIME	13.00
			4	FLOW	625.
				TIME	13.00
			5	FLOW	786.
				TIME	12.92
			6	FLOW	946.
				TIME	12.92
ROUTED TO	BECKPL	1.01	1	FLOW	55.
				TIME	13.92
			2	FLOW	198.
				TIME	13.58
			3	FLOW	321.
				TIME	13.50
			4	FLOW	464.
				TIME	13.42
			5	FLOW	601.
				TIME	13.42
			6	FLOW	748.
				TIME	13.33
** PEAK STAGES IN FEET **					
			1	STAGE	2760.12
				TIME	13.92
			2	STAGE	2760.28
				TIME	13.58
			3	STAGE	2760.39
				TIME	13.50
			4	STAGE	2760.50
				TIME	13.42
			5	STAGE	2760.60
				TIME	13.42
			6	STAGE	2760.69
				TIME	13.33
ROUTED TO	RT01	1.01	1	FLOW	54.
				TIME	14.25
			2	FLOW	198.
				TIME	13.83
			3	FLOW	320.
				TIME	13.67
			4	FLOW	464.
				TIME	13.58
			5	FLOW	600.

				TIME	13.50
			6	FLOW	747.
				TIME	13.50
HYDROGRAPH AT	MULLIN	1.94	1	FLOW	157.
				TIME	13.50
			2	FLOW	457.
				TIME	13.42
			3	FLOW	686.
				TIME	13.42
			4	FLOW	937.
				TIME	13.42
			5	FLOW	1174.
				TIME	13.33
			6	FLOW	1420.
				TIME	13.33

2 COMBINED AT	MULLIN	2.95	1	FLOW	198.
				TIME	13.67
			2	FLOW	633.
				TIME	13.58
			3	FLOW	986.
				TIME	13.50
			4	FLOW	1384.
				TIME	13.50
			5	FLOW	1757.
				TIME	13.42
			6	FLOW	2153.
				TIME	13.42

ROUTED TO	MULLPL	2.95	1	FLOW	172.
				TIME	14.17
			2	FLOW	587.
				TIME	13.83
			3	FLOW	935.
				TIME	13.75
			4	FLOW	1321.
				TIME	13.75
			5	FLOW	1686.
				TIME	13.67
			6	FLOW	2081.
				TIME	13.58

** PEAK STAGES IN FEET **

1	STAGE	2740.26
	TIME	14.17
2	STAGE	2740.59
	TIME	13.83
3	STAGE	2740.80
	TIME	13.75
4	STAGE	2741.01
	TIME	13.75
5	STAGE	2741.19
	TIME	13.67
6	STAGE	2741.36
	TIME	13.58

ROUTED TO	RT02	2.95	1	FLOW	172.
				TIME	14.33
			2	FLOW	587.

	TIME	14.00
3	FLOW	933.
	TIME	13.92
4	FLOW	1321.
	TIME	13.83
5	FLOW	1686.
	TIME	13.75
6	FLOW	2080.
	TIME	13.67

HYDROGRAPH AT	COOK	.84	1	FLOW	79.
				TIME	13.25
			2	FLOW	230.
				TIME	13.17
			3	FLOW	344.
				TIME	13.17
			4	FLOW	469.
				TIME	13.08
			5	FLOW	590.
				TIME	13.08
			6	FLOW	712.
				TIME	13.08

2 COMBINED AT	CKOUT	3.79	1	FLOW	212.
				TIME	14.25
			2	FLOW	720.
				TIME	13.83
			3	FLOW	1158.
				TIME	13.75
			4	FLOW	1645.
				TIME	13.67
			5	FLOW	2109.
				TIME	13.58
			6	FLOW	2614.
				TIME	13.58

ROUTED TO	RT03	3.79	1	FLOW	212.
				TIME	14.50
			2	FLOW	720.
				TIME	14.00
			3	FLOW	1156.
				TIME	13.92
			4	FLOW	1641.
				TIME	13.75
			5	FLOW	2107.
				TIME	13.67
			6	FLOW	2613.
				TIME	13.67

HYDROGRAPH AT	BOND	.74	1	FLOW	68.
				TIME	13.25
			2	FLOW	199.
				TIME	13.17
			3	FLOW	297.
				TIME	13.17
			4	FLOW	406.
				TIME	13.17
			5	FLOW	509.
				TIME	13.17
			6	FLOW	613.

TIME 13.17

2 COMBINED AT	BONDIN	4.53	1	FLOW	247.
				TIME	14.42
			2	FLOW	838.
				TIME	13.92
			3	FLOW	1357.
				TIME	13.75
			4	FLOW	1938.
				TIME	13.67
			5	FLOW	2493.
				TIME	13.58
			6	FLOW	3097.
				TIME	13.58

ROUTED TO	BONDLK	4.53	1	FLOW	202.
				TIME	15.42
			2	FLOW	703.
				TIME	14.50
			3	FLOW	1173.
				TIME	14.33
			4	FLOW	1700.
				TIME	14.17
			5	FLOW	2217.
				TIME	14.00
			6	FLOW	2792.
				TIME	14.00

** PEAK STAGES IN FEET **

1	STAGE	2700.29
	TIME	15.42
2	STAGE	2700.66
	TIME	14.50
3	STAGE	2700.93
	TIME	14.33
4	STAGE	2701.19
	TIME	14.17
5	STAGE	2701.42
	TIME	14.00
6	STAGE	2701.66
	TIME	14.00

ROUTED TO	RT04	4.53	1	FLOW	202.
				TIME	15.75
			2	FLOW	702.
				TIME	14.67
			3	FLOW	1173.
				TIME	14.50
			4	FLOW	1699.
				TIME	14.33
			5	FLOW	2217.
				TIME	14.17
			6	FLOW	2792.
				TIME	14.08

HYDROGRAPH AT	B5	2.00	1	FLOW	99.
				TIME	15.08
			2	FLOW	277.
				TIME	14.75
			3	FLOW	425.

	TIME	14.75
4	FLOW	575.
	TIME	14.67
5	FLOW	722.
	TIME	14.67
6	FLOW	888.
	TIME	14.67

ROUTED TO	RT06	2.00	1	FLOW	99.
				TIME	15.25
			2	FLOW	277.
				TIME	14.92
			3	FLOW	425.
				TIME	14.83
			4	FLOW	574.
				TIME	14.75
			5	FLOW	722.
				TIME	14.75
			6	FLOW	887.
				TIME	14.75

HYDROGRAPH AT	B6	1.16	1	FLOW	97.
				TIME	13.42
			2	FLOW	282.
				TIME	13.33
			3	FLOW	423.
				TIME	13.33
			4	FLOW	578.
				TIME	13.33
			5	FLOW	723.
				TIME	13.33
			6	FLOW	874.
				TIME	13.25

2 COMBINED AT	LANGHM	3.16	1	FLOW	147.
				TIME	14.75
			2	FLOW	424.
				TIME	13.75
			3	FLOW	654.
				TIME	13.83
			4	FLOW	900.
				TIME	13.75
			5	FLOW	1132.
				TIME	13.75
			6	FLOW	1391.
				TIME	13.75

2 COMBINED AT	LANGIN	7.69	1	FLOW	339.
				TIME	15.50
			2	FLOW	1100.
				TIME	14.67
			3	FLOW	1799.
				TIME	14.42
			4	FLOW	2556.
				TIME	14.25
			5	FLOW	3306.
				TIME	14.17
			6	FLOW	4146.
				TIME	14.08

ROUTED TO	LANGPL	7.69	1	FLOW	336.
				TIME	15.75
			2	FLOW	1091.
				TIME	14.83
			3	FLOW	1785.
				TIME	14.58
			4	FLOW	2538.
				TIME	14.42
			5	FLOW	3286.
				TIME	14.25
			6	FLOW	4123.
				TIME	14.17

** PEAK STAGES IN FEET **

1	STAGE	2675.40
	TIME	15.75
2	STAGE	2675.89
	TIME	14.83
3	STAGE	2676.23
	TIME	14.58
4	STAGE	2676.56
	TIME	14.42
5	STAGE	2676.85
	TIME	14.25
6	STAGE	2677.16
	TIME	14.17

HYDROGRAPH AT	DRYWLS	.73	1	FLOW	65.
				TIME	13.33
			2	FLOW	188.
				TIME	13.25
			3	FLOW	282.
				TIME	13.25
			4	FLOW	385.
				TIME	13.25
			5	FLOW	482.
				TIME	13.17
			6	FLOW	582.
				TIME	13.17

2 COMBINED AT	DRYIN	8.42	1	FLOW	358.
				TIME	15.67
			2	FLOW	1158.
				TIME	14.75
			3	FLOW	1904.
				TIME	14.50
			4	FLOW	2713.
				TIME	14.33
			5	FLOW	3522.
				TIME	14.17
			6	FLOW	4437.
				TIME	14.08

ROUTED TO	DRYWPL	8.42	1	FLOW	0.
				TIME	.08
			2	FLOW	62.
				TIME	24.92
			3	FLOW	541.
				TIME	18.42
			4	FLOW	1231.

	TIME	16.58
5	FLOW	2161.
	TIME	15.75
6	FLOW	3234.
	TIME	15.25

** PEAK STAGES IN FEET **

1	STAGE	2764.18
	TIME	24.92
2	STAGE	2770.08
	TIME	24.92
3	STAGE	2770.35
	TIME	18.42
4	STAGE	2770.60
	TIME	16.58
5	STAGE	2770.88
	TIME	15.75
6	STAGE	2771.15
	TIME	15.25

HYDROGRAPH AT DAVIS 1.34

1	FLOW	79.
	TIME	14.33
2	FLOW	227.
	TIME	14.08
3	FLOW	346.
	TIME	14.08
4	FLOW	472.
	TIME	14.08
5	FLOW	589.
	TIME	14.08
6	FLOW	719.
	TIME	14.08

ROUTED TO DAVPLY 1.34

1	FLOW	74.
	TIME	14.83
2	FLOW	217.
	TIME	14.50
3	FLOW	334.
	TIME	14.42
4	FLOW	456.
	TIME	14.33
5	FLOW	576.
	TIME	14.33
6	FLOW	705.
	TIME	14.25

** PEAK STAGES IN FEET **

1	STAGE	2760.14
	TIME	14.83
2	STAGE	2760.30
	TIME	14.50
3	STAGE	2760.40
	TIME	14.42
4	STAGE	2760.50
	TIME	14.33
5	STAGE	2760.57
	TIME	14.25
6	STAGE	2760.66
	TIME	14.25

ROUTED TO	RT07	1.34	1	FLOW	74.
				TIME	15.42
			2	FLOW	217.
				TIME	14.92
			3	FLOW	334.
				TIME	14.75
			4	FLOW	456.
				TIME	14.67
			5	FLOW	576.
				TIME	14.58
			6	FLOW	705.
				TIME	14.58

HYDROGRAPH AT	STAFFD	.57	1	FLOW	54.
				TIME	13.25
			2	FLOW	157.
				TIME	13.17
			3	FLOW	235.
				TIME	13.08
			4	FLOW	321.
				TIME	13.08
			5	FLOW	404.
				TIME	13.08
			6	FLOW	486.
				TIME	13.08

ROUTED TO	STAFPL	.57	1	FLOW	46.
				TIME	13.58
			2	FLOW	146.
				TIME	13.42
			3	FLOW	224.
				TIME	13.33
			4	FLOW	309.
				TIME	13.33
			5	FLOW	388.
				TIME	13.25
			6	FLOW	471.
				TIME	13.25

** PEAK STAGES IN FEET **

1	STAGE	2740.10
	TIME	13.58
2	STAGE	2740.23
	TIME	13.42
3	STAGE	2740.31
	TIME	13.33
4	STAGE	2740.38
	TIME	13.33
5	STAGE	2740.44
	TIME	13.25
6	STAGE	2740.51
	TIME	13.25

ROUTED TO	RT08	.57	1	FLOW	46.
				TIME	14.00
			2	FLOW	146.
				TIME	13.67
			3	FLOW	224.
				TIME	13.58
			4	FLOW	308.

	TIME	13.50
5	FLOW	386.
	TIME	13.50
6	FLOW	470.
	TIME	13.42

HYDROGRAPH AT	HALE	1.15	1	FLOW	67.
				TIME	14.33
			2	FLOW	192.
				TIME	14.17
			3	FLOW	292.
				TIME	14.17
			4	FLOW	398.
				TIME	14.17
			5	FLOW	497.
				TIME	14.08
			6	FLOW	608.
				TIME	14.08

3 COMBINED AT	HALEIN	3.06	1	FLOW	159.
				TIME	15.00
			2	FLOW	471.
				TIME	14.50
			3	FLOW	742.
				TIME	14.33
			4	FLOW	1010.
				TIME	14.25
			5	FLOW	1279.
				TIME	14.17
			6	FLOW	1574.
				TIME	14.17

ROUTED TO	HALEPL	3.06	1	FLOW	153.
				TIME	15.33
			2	FLOW	464.
				TIME	14.75
			3	FLOW	733.
				TIME	14.58
			4	FLOW	1003.
				TIME	14.42
			5	FLOW	1269.
				TIME	14.33
			6	FLOW	1564.
				TIME	14.25

** PEAK STAGES IN FEET **

1	STAGE	2700.24
	TIME	15.33
2	STAGE	2700.50
	TIME	14.67
3	STAGE	2700.68
	TIME	14.58
4	STAGE	2700.84
	TIME	14.42
5	STAGE	2700.98
	TIME	14.33
6	STAGE	2701.13
	TIME	14.25

ROUTED TO	RT09	3.06	1	FLOW	153.
-----------	------	------	---	------	------

				TIME	15.67
			2	FLOW	464.
				TIME	14.92
			3	FLOW	733.
				TIME	14.75
			4	FLOW	1002.
				TIME	14.58
			5	FLOW	1268.
				TIME	14.50
			6	FLOW	1563.
				TIME	14.42
HYDROGRAPH AT	HUNT	.93	1	FLOW	68.
				TIME	13.75
			2	FLOW	197.
				TIME	13.58
			3	FLOW	298.
				TIME	13.58
			4	FLOW	407.
				TIME	13.58
			5	FLOW	508.
				TIME	13.58
			6	FLOW	616.
				TIME	13.50
3 COMBINED AT	HWY26	12.41	1	FLOW	189.
				TIME	15.50
			2	FLOW	572.
				TIME	14.75
			3	FLOW	921.
				TIME	14.50
			4	FLOW	1847.
				TIME	16.42
			5	FLOW	3264.
				TIME	15.58
			6	FLOW	4876.
				TIME	15.08
ROUTED TO	RT10	12.41	1	FLOW	188.
				TIME	15.75
			2	FLOW	572.
				TIME	14.92
			3	FLOW	921.
				TIME	14.58
			4	FLOW	1846.
				TIME	16.50
			5	FLOW	3263.
				TIME	15.67
			6	FLOW	4876.
				TIME	15.17
HYDROGRAPH AT	MARILN	1.32	1	FLOW	168.
				TIME	12.83
			2	FLOW	483.
				TIME	12.75
			3	FLOW	719.
				TIME	12.75
			4	FLOW	978.
				TIME	12.75
			5	FLOW	1231.

TIME 12.75
6 FLOW 1477.
TIME 12.75

2 COMBINED AT MRLIN 13.73
1 FLOW 221.
TIME 15.50
2 FLOW 660.
TIME 14.75
3 FLOW 1061.
TIME 14.50
4 FLOW 1952.
TIME 16.50
5 FLOW 3399.
TIME 15.67
6 FLOW 5082.
TIME 15.17

ROUTED TO MRLNPL 13.73
1 FLOW 211.
TIME 16.00
2 FLOW 640.
TIME 15.17
3 FLOW 1031.
TIME 14.83
4 FLOW 1890.
TIME 16.83
5 FLOW 3285.
TIME 15.92
6 FLOW 4926.
TIME 15.42

** PEAK STAGES IN FEET **

1 STAGE 2640.14
TIME 15.92
2 STAGE 2640.30
TIME 15.17
3 STAGE 2640.40
TIME 14.83
4 STAGE 2640.61
TIME 16.83
5 STAGE 2640.88
TIME 15.92
6 STAGE 2641.16
TIME 15.42

ROUTED TO RT11 13.73
1 FLOW 211.
TIME 16.42
2 FLOW 639.
TIME 15.42
3 FLOW 1031.
TIME 15.08
4 FLOW 1889.
TIME 17.00
5 FLOW 3284.
TIME 16.08
6 FLOW 4919.
TIME 15.58

HYDROGRAPH AT ELLSBY 2.28
1 FLOW 145.
TIME 14.08
2 FLOW 418.

	TIME	13.92
3	FLOW	635.
	TIME	13.92
4	FLOW	866.
	TIME	13.92
5	FLOW	1082.
	TIME	13.83
6	FLOW	1318.
	TIME	13.83

2 COMBINED AT	ELLSIN	16.01	1	FLOW	288.
				TIME	16.08
			2	FLOW	889.
				TIME	15.08
			3	FLOW	1495.
				TIME	14.67
			4	FLOW	2128.
				TIME	17.00
			5	FLOW	3701.
				TIME	16.00
			6	FLOW	5585.
				TIME	15.50

ROUTED TO	ELLSPL	16.01	1	FLOW	273.
				TIME	16.75
			2	FLOW	866.
				TIME	15.50
			3	FLOW	1446.
				TIME	15.08
			4	FLOW	2053.
				TIME	17.33
			5	FLOW	3543.
				TIME	16.33
			6	FLOW	5354.
				TIME	15.83

** PEAK STAGES IN FEET **

1	STAGE	2625.22
	TIME	16.67
2	STAGE	2625.48
	TIME	15.50
3	STAGE	2625.67
	TIME	15.08
4	STAGE	2625.85
	TIME	17.33
5	STAGE	2626.23
	TIME	16.33
6	STAGE	2626.62
	TIME	15.83

ROUTED TO	RT12	16.01	1	FLOW	273.
				TIME	17.08
			2	FLOW	865.
				TIME	15.75
			3	FLOW	1445.
				TIME	15.33
			4	FLOW	2052.
				TIME	17.58
			5	FLOW	3541.
				TIME	16.50

6 FLOW 5349.
TIME 16.00

HYDROGRAPH AT HUGHES 2.05

1 FLOW 118.
TIME 14.42
2 FLOW 337.
TIME 14.17
3 FLOW 515.
TIME 14.17
4 FLOW 701.
TIME 14.17
5 FLOW 876.
TIME 14.17
6 FLOW 1071.
TIME 14.17

2 COMBINED AT HUGHIN 18.06

1 FLOW 332.
TIME 16.75
2 FLOW 1088.
TIME 15.17
3 FLOW 1849.
TIME 15.00
4 FLOW 2625.
TIME 14.83
5 FLOW 3905.
TIME 16.50
6 FLOW 5920.
TIME 15.92

ROUTED TO HUGHPL 18.06

1 FLOW 331.
TIME 17.00
2 FLOW 1086.
TIME 15.42
3 FLOW 1844.
TIME 15.08
4 FLOW 2617.
TIME 14.92
5 FLOW 3892.
TIME 16.58
6 FLOW 5900.
TIME 16.00

** PEAK STAGES IN FEET **

1 STAGE 2590.40
TIME 17.00
2 STAGE 2590.88
TIME 15.33
3 STAGE 2591.25
TIME 15.08
4 STAGE 2591.59
TIME 14.92
5 STAGE 2592.07
TIME 16.58
6 STAGE 2592.73
TIME 16.00

ROUTED TO RT13 18.06

1 FLOW 331.
TIME 17.25
2 FLOW 1086.
TIME 15.58

3	FLOW	1844.
	TIME	15.25
4	FLOW	2615.
	TIME	15.08
5	FLOW	3888.
	TIME	16.67
6	FLOW	5895.
	TIME	16.08

HYDROGRAPH AT SH846B .47

1	FLOW	46.
	TIME	13.17
2	FLOW	134.
	TIME	13.08
3	FLOW	200.
	TIME	13.08
4	FLOW	273.
	TIME	13.08
5	FLOW	342.
	TIME	13.08
6	FLOW	411.
	TIME	13.00

2 COMBINED AT SH846X 18.53

1	FLOW	338.
	TIME	17.17
2	FLOW	1116.
	TIME	15.50
3	FLOW	1892.
	TIME	15.25
4	FLOW	2673.
	TIME	15.00
5	FLOW	3932.
	TIME	16.67
6	FLOW	5955.
	TIME	16.08

HYDROGRAPH AT CURRIE 2.54

1	FLOW	108.
	TIME	15.92
2	FLOW	296.
	TIME	15.50
3	FLOW	454.
	TIME	15.50
4	FLOW	607.
	TIME	15.42
5	FLOW	768.
	TIME	15.42
6	FLOW	949.
	TIME	15.42

ROUTED TO RT14 2.54

1	FLOW	108.
	TIME	16.42
2	FLOW	296.
	TIME	15.92
3	FLOW	454.
	TIME	15.83
4	FLOW	607.
	TIME	15.67
5	FLOW	768.
	TIME	15.67
6	FLOW	949.
	TIME	15.67

HYDROGRAPH AT	BLGRAV	1.90	1	FLOW	113.
				TIME	14.25
			2	FLOW	324.
				TIME	14.08
			3	FLOW	495.
				TIME	14.08
			4	FLOW	674.
				TIME	14.08
			5	FLOW	842.
				TIME	14.00
			6	FLOW	1027.
				TIME	14.00

2 COMBINED AT	BLGIN	4.44	1	FLOW	181.
				TIME	15.58
			2	FLOW	516.
				TIME	14.83
			3	FLOW	803.
				TIME	14.75
			4	FLOW	1091.
				TIME	14.67
			5	FLOW	1383.
				TIME	14.67
			6	FLOW	1711.
				TIME	14.67

ROUTED TO	BLGRPL	4.44	1	FLOW	172.
				TIME	16.42
			2	FLOW	490.
				TIME	15.50
			3	FLOW	771.
				TIME	15.33
			4	FLOW	1052.
				TIME	15.08
			5	FLOW	1343.
				TIME	15.00
			6	FLOW	1670.
				TIME	15.00

** PEAK STAGES IN FEET **

1	STAGE	2635.26
	TIME	16.42
2	STAGE	2635.52
	TIME	15.50
3	STAGE	2635.70
	TIME	15.25
4	STAGE	2635.86
	TIME	15.08
5	STAGE	2636.02
	TIME	15.00
6	STAGE	2636.18
	TIME	15.00

ROUTED TO	RT15	4.44	1	FLOW	172.
				TIME	17.33
			2	FLOW	490.
				TIME	16.17
			3	FLOW	771.
				TIME	15.83

4	FLOW	1052.
	TIME	15.58
5	FLOW	1342.
	TIME	15.50
6	FLOW	1670.
	TIME	15.42

HYDROGRAPH AT WRIGHT .73

1	FLOW	88.
	TIME	12.92
2	FLOW	255.
	TIME	12.83
3	FLOW	378.
	TIME	12.83
4	FLOW	515.
	TIME	12.83
5	FLOW	648.
	TIME	12.75
6	FLOW	780.
	TIME	12.75

ROUTED TO WRGHTP .73

1	FLOW	43.
	TIME	13.67
2	FLOW	154.
	TIME	13.42
3	FLOW	254.
	TIME	13.33
4	FLOW	368.
	TIME	13.25
5	FLOW	479.
	TIME	13.17
6	FLOW	596.
	TIME	13.17

** PEAK STAGES IN FEET **

1	STAGE	2625.10
	TIME	13.67
2	STAGE	2625.24
	TIME	13.42
3	STAGE	2625.33
	TIME	13.25
4	STAGE	2625.43
	TIME	13.25
5	STAGE	2625.51
	TIME	13.17
6	STAGE	2625.59
	TIME	13.17

ROUTED TO RT16 .73

1	FLOW	43.
	TIME	14.08
2	FLOW	154.
	TIME	13.67
3	FLOW	254.
	TIME	13.50
4	FLOW	366.
	TIME	13.50
5	FLOW	477.
	TIME	13.42
6	FLOW	595.
	TIME	13.33

HYDROGRAPH AT	B18	1.95	1	FLOW	111.
				TIME	14.42
			2	FLOW	317.
				TIME	14.25
			3	FLOW	484.
				TIME	14.25
			4	FLOW	659.
				TIME	14.17
			5	FLOW	824.
				TIME	14.17
			6	FLOW	1008.
				TIME	14.17

HYDROGRAPH AT	B19	1.60	1	FLOW	143.
				TIME	13.33
			2	FLOW	418.
				TIME	13.25
			3	FLOW	625.
				TIME	13.25
			4	FLOW	854.
				TIME	13.17
			5	FLOW	1072.
				TIME	13.17
			6	FLOW	1293.
				TIME	13.17

4 COMBINED AT	RAYLNG	8.72	1	FLOW	284.
				TIME	16.25
			2	FLOW	857.
				TIME	15.33
			3	FLOW	1387.
				TIME	15.08
			4	FLOW	1883.
				TIME	14.83
			5	FLOW	2460.
				TIME	14.67
			6	FLOW	3111.
				TIME	14.67

ROUTED TO	RT17	8.72	1	FLOW	284.
				TIME	16.42
			2	FLOW	856.
				TIME	15.42
			3	FLOW	1387.
				TIME	15.17
			4	FLOW	1883.
				TIME	14.92
			5	FLOW	2460.
				TIME	14.75
			6	FLOW	3110.
				TIME	14.75

HYDROGRAPH AT	BATJER	.91	1	FLOW	84.
				TIME	13.25
			2	FLOW	244.
				TIME	13.17
			3	FLOW	366.
				TIME	13.17
			4	FLOW	500.
				TIME	13.17

5	FLOW	625.
	TIME	13.17
6	FLOW	754.
	TIME	13.17

2 COMBINED AT BTJOUT 9.63

1	FLOW	316.
	TIME	13.75
2	FLOW	987.
	TIME	13.58
3	FLOW	1531.
	TIME	13.50
4	FLOW	2123.
	TIME	13.50
5	FLOW	2686.
	TIME	13.42
6	FLOW	3366.
	TIME	14.58

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

HEC1 S/N: 1090525070

HMVersion: 5.20

Data File: BRWN-ALT.HC1

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*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
*   FEBRUARY 1981                 *
*   REVISED 02 AUG 88             *
*
* RUN DATE 09/14/1990 TIME 10:31:42 *
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*
* U.S. ARMY CORPS OF ENGINEERS
* THE HYDROLOGIC ENGINEERING CENTER
*   609 SECOND STREET
*   DAVIS, CALIFORNIA 95616
*
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X   X XXXXXXXX  XXXXX      X
X   X X      X   X      XX
X   X X      X           X
XXXXXXX XXXX  X           XXXXX X
X   X X      X           X
X   X X      X   X      X
X   X XXXXXXXX  XXXXX      XXX

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::::::::::::::::::::::::::::::::::::
::
:: Full Microcomputer Implementation ::
::           by                       ::
::      Haestad Methods, Inc.        ::
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37 Brookside Road * Waterbury, Connecticut 06708 * (203) 755-1666

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

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

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

*DIAGRAM

1 ID MARTIN COUNTY FLOOD CONTROL STUDY JOB NO. 06901-001-036
 2 ID HDR ENGINEERING, INC. AUSTIN, TEXAS
 3 ID
 4 ID BROWN AREA PROPOSED ALTERNATIVES
 5 ID
 6 ID COMPUTING 2-YR, 5-YR, 10-YR, 25-YR, 50-YR, AND 100-YR FLOOD EVENTS
 7 ID FOR BROWN AREA USING PLAN OPTION IN HEC-1.
 8 ID
 9 ID PLAN 1: 2-YEAR EVENT
 10 ID PLAN 2: 5-YEAR EVENT
 11 ID PLAN 3: 10-YEAR EVENT
 12 ID PLAN 4: 25-YEAR EVENT
 13 ID PLAN 5: 50-YEAR EVENT
 14 ID PLAN 6: 100-YEAR EVENT
 15 ID
 16 ID
 17 IT 5 300
 18 IO 5 0
 19 JP 6

20 KK BECKMY

21 KM RUNOFF HYDROGRAPH FOR BECKMEYER SUBBASIN

22	KP	1									
23	PH	50	28.2	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
24	BA	1.01									
25	LS	0	72								
26	UD	0.83									
27	KP	2									
28	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
29	KP	3									
30	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
31	KP	4									
32	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
33	KP	5									
34	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
35	KP	6									
36	PH	1	28.2	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9

37 KK BECKPL

38 KM ROUTE BECKMEYER RUNOFF HYDROGRAPH THROUGH BECKMEYER PLAYA

39 KM PIPE INVERT AT EL 2655

40 KM SPILL AT 2660

41	RS	1	ELEV	2755						
42	SV	0	154	438						
43	SE	2755	2760	2765						
44	SL	2755	3.1	0.6	0.5					
45	SS	2760	500	2.6	1.5					

46 KK RT01

47 KM ROUTE BECKMEYER PLAYA OUTFLOW HYDROGRAPH TO MULLINS PLAYA

48 RK 4500 .0044 0.030 TRAP 30 4

LINE	ID	1	2	3	4	5	6	7	8	9	10
49	KK	MULLIN									
50	KM	RUNOFF HYDROGRAPH FOR MULLINS SUBBASIN									
51	PH	50	28.2	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
52	BA	1.94									
53	LS	0	72								
54	UD	1.20									
55	KP	2									
56	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
57	KP	3									
58	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
59	KP	4									
60	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
61	KP	5									
62	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
63	KP	6									
64	PH	1	28.2	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
65	KK	MULLIN									
66	KM	COMBINE RT01 WITH MULLINS HYDROGRAPH TO GIVE INFLOW TO MULLINS PLAYA									
67	HC	2									
68	KK	MULLPL									
69	KM	ROUTE MULLIN INFLOW HYDROGRAPH THROUGH MULLINS PLAYA									
70	KM	PIPE INVERT AT 2735									
71	KM	SPILL AT 2740.5									
72	RS	1	ELEV	2735							
73	SV	0	111	276							
74	SE	2735	2740	2745							
75	SL	2735	3.1	0.6	1.5						
76	SS	2740.5	500	2.6	1.5						
77	KK	RT02									
78	KM	ROUTE MULLPL TO COOK OUTLET									
79	RK	4000	.0062	0.030		TRAP	30	4			
80	KK	COOK									
81	KM	RUNOFF HYDROGRAPH FOR COOK SUBBASIN									
82	PH	50	28.2	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
83	BA	0.84									
84	LS	0	72								
85	UD	0.97									
86	KP	2									
87	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
88	KP	3									
89	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
90	KP	4									
91	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
92	KP	5									
93	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
94	KP	6									
95	PH	1	28.2	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9

LINE	ID	1	2	3	4	5	6	7	8	9	10
144	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
145	KP	5									
146	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
147	KP	6									
148	PH	1	28.2	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
149	KK	RT06									
150	KM	ROUTE B5 RUNOFF HYDROGRAPH TO LANGHAM PLAYA									
151	RK	5000	.0060	0.030		TRAP	5	1			
152	KK	B6									
153	KM	RUNOFF HYDROGRAPH FOR B6 SUBBASIN									
154	PH	50	28.2	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
155	BA	1.16									
156	LS	0	72								
157	UD	1.15									
158	KP	2									
159	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
160	KP	3									
161	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
162	KP	4									
163	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
164	KP	5									
165	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
166	KP	6									
167	PH	1	28.2	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
168	KK	LANGHM									
169	KM	COMBINE RT06 AND B6 HYDROGRAPHS TO GIVE LANGHAM SUBBASIN RUNOFF HYDROGRAPH									
170	HC	2									
171	KK	LANGIN									
172	KM	COMBINE LANGHM AND RT04 HYDROGRAPH TO GIVE INFLOW HYDROGRAPH TO LANGHAM LAKE									
173	HC	2									
174	KK	LANGPL									
175	KM	ROUTE LANGHAM PLAYA INFLOW HYDROGRAPH THROUGH LANGHAM PLAYA									
176	KM	PIPE INVERT AT 2670									
177	KM	SPILL AT 2675									
178	RS	1	ELEV	2670							
179	SV	0	114	228							
180	SE	2670	2675	2680							
181	SL	2670	3.1	0.6	0.5						
182	SS	2675	500	2.6	1.5						
183	KK	DRYWLS									
184	KM	RUNOFF HYDROGRAPH FOR DRY WELLS SUBBASIN									
185	PH	50	28.2	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
186	BA	0.73									
187	LS	0	72								
188	UD	1.06									
189	KP	2									
190	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
191	KP	3									
192	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6

LINE	ID	1	2	3	4	5	6	7	8	9	10
333	KK	MRLNPL									
334	RS	1	ELEV	2640							
335	SV	0	122	602	1706						
336	SE	2635	2640	2645	2650						
337	SL	2640	3.1	0.6	0.5						
338	SS	2643	1500	2.6	1.5						
339	KK	RT11									
340	KM	ROUTE MARILYN PLAYA OUTFLOW HYDORGRAPH TO COUNTY ROAD B1 CROSSING									
341	RK	7000	.0028	0.030	TRAP	30	4				
342	KK	ELLSBY									
343	KM	RUNOFF HYDROGRAPH FOR ELLSBERRY SUBBASIN									
344	PH	50	28.2	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
345	BA	2.28									
346	LS	0	72								
347	UD	1.67									
348	KP	2									
349	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
350	KP	3									
351	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
352	KP	4									
353	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
354	KP	5									
355	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
356	KP	6									
357	PH	1	28.2	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
358	KK	ELLSIN									
359	KM	COMBINE ELLSBY RUNOFF HYDROGRAPH WITH RT11 TO GIVE HYDROGRAPH AT ELLSBERRY									
360	KM	PLAYA									
361	HC	2									
362	KK	ELLSPL									
363	KM	ROUTE ELLSBERRY INFLOW HYDROGRAPH THROUGH ELLSBERRY PLAYA									
364	RS	1	ELEV	2620							
365	SV	0	522	1044							
366	SE	2620	2625	2630							
367	SL	2620	3.1	0.6	0.5						
368	SS	2625	1000	2.6	1.5						
369	KK	RT12									
370	KM	ROUTE COUNTY ROAD CROSSING HYDROGRAPH TO HUGHES PLAYA									
371	RK	8000	.0030	0.030	TRAP	30	4				
372	KK	HUGHES									
373	KM	RUNOFF HYDROGRAPH FOR HUGHES SUBBASIN									
374	PH	50	28.2	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
375	BA	2.05									
376	LS	0	72								
377	UD	1.92									
378	KP	2									
379	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
380	KP	3									

LINE	ID	1	2	3	4	5	6	7	8	9	10
381	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
382	KP	4									
383	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
384	KP	5									
385	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
386	KP	6									
387	PH	1	28.2	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
388	KK HUGHIN										
389	KM COMBIE RT12 WITH HUGHES RUNOFF HYDROGRAPH TO GIVE INFLOW HYDROGRAPH INTO										
390	KM HUGHES PLAYA										
391	HC	2									
392	KK HUGHPL										
393	KM ROUTE HUGHES PLAYA INFLOW HYDROGRAPH THROUGH HUGHES PLAYA										
394	RS	1	ELEV	2590							
395	SV	0	106	480	1328						
396	SE	2590	2595	2600	2605						
397	SL	2590	3.1	0.6	0.5						
398	SS	2596	500	2.6	1.5						
399	KK RT13										
400	KM ROUTE HUGHES PLAYA OUTFLOW HYDROGRAPH TO HWY 846 CROSSING										
401	RK	5500	.0030	0.030	TRAP	20	4				
402	KK SH846B										
403	KM RUNOFF HYDROGRAPH FOR S.H. 846 B SUBBASIN										
404	PH	50	28.2	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
405	BA	0.47									
406	LS	0	72								
407	UD	0.92									
408	KP	2									
409	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
410	KP	3									
411	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
412	KP	4									
413	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
414	KP	5									
415	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
416	KP	6									
417	PH	1	28.2	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
418	KK SH846X										
419	KM COMBINE RT13 WITH SH846B RUNOFF HYDROGRAPH TO GIVE HYDROGRAPH AT										
420	KM S.H. 846 CROSSING WEST OF BATJER PLAYA										
421	HC	2									
422	KK CURRIE										
423	KM RUNOFF HYDROGRAPH FOR CURRIE SUBBASIN										
424	PH	50	28.2	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
425	BA	2.54									
426	LS	0	72								
427	UD	3.03									
428	KP	2									
429	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9

LINE	ID	1	2	3	4	5	6	7	8	9	10
430	KP	3									
431	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
432	KP	4									
433	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
434	KP	5									
435	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
436	KP	6									
437	PH	1	28.2	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
438	KK CURDET										
439	KM	ROUTE CURRIE RUNOFF HYDROGRAPH THROUGH CURRIE DETENTION BASIN									
440	RS	1	ELEV	2668							
441	SV	0	19	366	1447						
442	SE	2668	2670	2675	2680						
443	SL	2668	3.1	0.6	0.5						
444	SS	2673	500	2.6	1.5						
445	KK RT14										
446	KM	ROUTE CURRIE RUNOFF HYDROGRAPH TO BLAGRAVE PLAYA									
447	RK	8000	.0038	0.030		TRAP	30	4			
448	KK BLGRAV										
449	KM	RUNOFF HYDROGRAPH FOR BLAGRAVE SUBBASIN									
450	PH	50	28.2	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
451	BA	1.90									
452	LS	0	72								
453	UD	1.83									
454	KP	2									
455	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
456	KP	3									
457	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
458	KP	4									
459	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
460	KP	5									
461	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
462	KP	6									
463	PH	1	28.2	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
464	KK BLGIN										
465	KM	COMBINE RT14 HYDROGRAPH WITH BLGRAV HYDROGRAPH TO GIVE INFLOW HYDROGRAPH									
466	KM	FOR BLAGRAVE PLAYA									
467	HC	2									
468	KK BLGRPL										
469	KM	ROUTE BLAGRAVE PLAYA INFLOW HYDROGRAPH THROUGH BLAGRAVE PLAYA									
470	RS	1	ELEV	2630							
471	SV	0	76	347							
472	SE	2630	2635	2640							
473	SL	2630	3.1	0.6	0.5						
474	SS	2637	500	2.6	1.5						

LINE	ID	1	2	3	4	5	6	7	8	9	10
475	KK	RT15									
476	KM	ROUTE	BLAGRAVE	PLAYA	OUTFLOW	HYDROGRAPH	TO	RAYLONG	PLAYAS		
477	RK	14000	.0028	0.030		TRAP	30	4			
478	KK	WRIGHT									
479	KM	RUNOFF	HYDROGRAPH	FOR	WRIGHT	SUBBASIN					
480	PH	50	28.2	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
481	BA	0.73									
482	LS	0	72								
483	UD	0.67									
484	KP	2									
485	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
486	KP	3									
487	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
488	KP	4									
489	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
490	KP	5									
491	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
492	KP	6									
493	PH	1	28.2	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
494	KK	WRGHTP									
495	KM	ROUTE	WRIGHT	RUNOFF	HYDROGRAPH	THROUGH	WRIGHT	PLAYA			
496	RS	1	ELEV	2622							
497	SV	0	10	72	322	572					
498	SE	2613	2615	2620	2625	2630					
499	SL	2622	3.1	0.6	0.5						
500	SS	2625	500	2.6	1.5						
501	KK	RT16									
502	KM	ROUTE	WRIGHT	PLAYA	OUTFLOW	HYDROGRAPH	TO	RAYLONG	PLAYAS		
503	RK	6000	.0050	0.030		TRAP	20	4			
504	KK	B18									
505	KM	RUNOFF	HYDROGRAPH	FOR	B18	SUBBASIN					
506	PH	50	28.2	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
507	BA	1.95									
508	LS	0	72								
509	UD	1.95									
510	KP	2									
511	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
512	KP	3									
513	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
514	KP	4									
515	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
516	KP	5									
517	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
518	KP	6									
519	PH	1	28.2	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT
 LINE (V) ROUTING (--->) DIVERSION OR PUMP FLOW
 NO. (.) CONNECTOR (<---) RETURN OF DIVERTED OR PUMPED FLOW

20	BECKMY		
	V		
	V		
37	BECKPL		
	V		
	V		
46	RT01		
	.		
	.		
49	.	MULLIN	
	.	.	
	.	.	
65	MULLIN.....		
	V		
	V		
68	MULLPL		
	V		
	V		
77	RT02		
	.		
	.		
80	.	COOK	
	.	.	
	.	.	
96	CKOUT.....		
	V		
	V		
99	RT03		
	.		
	.		
102	.	BOND	
	.	.	
	.	.	
118	BOND IN.....		
	V		
	V		
121	BOND LK		
	V		
	V		
130	RT04		
	.		
	.		
133	.	B5	
	.	V	
	.	V	
149	.	RT06	
	.	.	
	.	.	
152	.	.	B6
	.	.	.
	.	.	.
168	.	LANGHM.....	
	.	.	

171	LANGIN.....			
	V			
	V			
174	LANGPL			
	.			
	.			
183		DRYWLS		
	.			
	.			
199	DRYIN.....			
	V			
	V			
203	DRYWPL			
	.			
	.			
210		DAVIS		
	.	V		
	.	V		
226		DAVPLY		
	.	V		
	.	V		
233		RT07		
	.			
	.			
236			STAFFD	
	.		V	
	.		V	
252			STAFPL	
	.		V	
	.		V	
259			RT08	
	.			
	.			
262				HALE
	.			.
	.			.
278		HALEIN.....		
	.	V		
	.	V		
281		HALEPL		
	.	V		
	.	V		
288		RT09		
	.			
	.			
291			HUNT	
	.			.
	.			.
307	HWY26.....			
	V			
	V			
310	RT10			
	.			
	.			
313		MARILN		
	.			.
	.			.
329	MRLIN.....			
	V			

	V		
333	MRLNPL		
	V		
	V		
339	RT11		
	.		
	.		
342	.	ELLSBY	
	.	.	
	.	.	
358	ELLSIN.....		
	V		
	V		
362	ELLSPL		
	V		
	V		
369	RT12		
	.		
	.		
372	.	HUGHES	
	.	.	
	.	.	
388	HUGHIN.....		
	V		
	V		
392	HUGHPL		
	V		
	V		
399	RT13		
	.		
	.		
402	.	SH846B	
	.	.	
	.	.	
418	SH846X.....		
	.		
	.		
422	.	CURRIE	
	.	V	
	.	V	
438	.	CURDET	
	.	V	
	.	V	
445	.	RT14	
	.	.	
	.	.	
448	.	.	BLGRAV
	.	.	.
	.	.	.
464	.	BLGIN.....	
	.	V	
	.	V	
468	.	BLGRPL	
	.	V	
	.	V	
475	.	RT15	
	.	.	
	.	.	
478	.	.	WRIGHT
	.	.	V

494	.	.	V		
	.	.	WRGHTP		
	.	.	V		
	.	.	V		
501	.	.	RT16		
	.	.	.		
504	.	.	.	B18	
	
520	.	.	.	.	B19

536	.	RAYLNG.....			
	.	V			
	.	V			
539	.	RT17			
	.	.			
	.	.			
542	.	.	BATJER		
	.	.	.		
	.	.	.		
558	.	BTJOUT.....			

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION


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*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
*   FEBRUARY 1981                 *
*   REVISED 02 AUG 88             *
*
* RUN DATE 09/14/1990 TIME 10:31:42 *
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*
* U.S. ARMY CORPS OF ENGINEERS *
* THE HYDROLOGIC ENGINEERING CENTER *
*   609 SECOND STREET           *
*   DAVIS, CALIFORNIA 95616     *
*
*****

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MARTIN COUNTY FLOOD CONTROL STUDY JOB NO. 06901-001-036
HDR ENGINEERING, INC. AUSTIN, TEXAS

BROWN AREA PROPOSED ALTERNATIVES

COMPUTING 2-YR, 5-YR, 10-YR, 25-YR, 50-YR, AND 100-YR FLOOD EVENTS
FOR BROWN AREA USING PLAN OPTION IN HEC-1.

- PLAN 1: 2-YEAR EVENT
- PLAN 2: 5-YEAR EVENT
- PLAN 3: 10-YEAR EVENT
- PLAN 4: 25-YEAR EVENT
- PLAN 5: 50-YEAR EVENT
- PLAN 6: 100-YEAR EVENT

18 IO

OUTPUT CONTROL VARIABLES

IPRNT 5 PRINT CONTROL
IPLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

IT

HYDROGRAPH TIME DATA

NMIN 5 MINUTES IN COMPUTATION INTERVAL
IDATE 1 0 STARTING DATE
ITIME 0000 STARTING TIME
NQ 300 NUMBER OF HYDROGRAPH ORDINATES
NDDATE 2 0 ENDING DATE
NDTIME 0055 ENDING TIME
ICENT 19 CENTURY MARK

COMPUTATION INTERVAL .08 HOURS
TOTAL TIME BASE 24.92 HOURS

ENGLISH UNITS

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

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
 FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
 TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS		
					RATIO 1	
					1.00	
HYDROGRAPH AT	BECKMY	1.01	1	FLOW	106.	
				TIME	13.08	
				2	FLOW	308.
					TIME	13.00
				3	FLOW	459.
					TIME	13.00
				4	FLOW	625.
					TIME	13.00
				5	FLOW	786.
					TIME	12.92
				6	FLOW	946.
					TIME	12.92
ROUTED TO	BECKPL	1.01	1	FLOW	9.	
				TIME	23.17	
				2	FLOW	19.
					TIME	23.42
				3	FLOW	23.
					TIME	24.25
				4	FLOW	27.
					TIME	21.58
				5	FLOW	30.
					TIME	24.08
				6	FLOW	43.
					TIME	22.83
** PEAK STAGES IN FEET **						
			1	STAGE	2755.57	
				TIME	22.75	
			2	STAGE	2756.54	
				TIME	23.58	
			3	STAGE	2757.35	
				TIME	24.25	
			4	STAGE	2758.21	
				TIME	21.75	
			5	STAGE	2759.15	
				TIME	24.08	
			6	STAGE	2760.03	
				TIME	22.83	
ROUTED TO	RT01	1.01	1	FLOW	9.	
				TIME	23.50	
				2	FLOW	19.
					TIME	23.83
				3	FLOW	23.
					TIME	24.58
				4	FLOW	27.
					TIME	21.92
				5	FLOW	30.

TIME 24.42
 6 FLOW 43.
 TIME 23.17

HYDROGRAPH AT MULLIN 1.94

1	FLOW	157.
	TIME	13.50
2	FLOW	457.
	TIME	13.42
3	FLOW	686.
	TIME	13.42
4	FLOW	937.
	TIME	13.42
5	FLOW	1174.
	TIME	13.33
6	FLOW	1420.
	TIME	13.33

2 COMBINED AT MULLIN 2.95

1	FLOW	157.
	TIME	13.50
2	FLOW	463.
	TIME	13.42
3	FLOW	697.
	TIME	13.42
4	FLOW	953.
	TIME	13.42
5	FLOW	1191.
	TIME	13.33
6	FLOW	1440.
	TIME	13.33

ROUTED TO MULLPL 2.95

1	FLOW	27.
	TIME	22.00
2	FLOW	91.
	TIME	17.67
3	FLOW	155.
	TIME	16.58
4	FLOW	255.
	TIME	15.58
5	FLOW	572.
	TIME	14.58
6	FLOW	944.
	TIME	14.17

** PEAK STAGES IN FEET **

1	STAGE	2736.49
	TIME	21.92
2	STAGE	2738.33
	TIME	17.67
3	STAGE	2739.75
	TIME	16.58
4	STAGE	2740.61
	TIME	15.58
5	STAGE	2740.92
	TIME	14.58
6	STAGE	2741.16
	TIME	14.17

ROUTED TO RT02 2.95

1	FLOW	27.
	TIME	22.33
2	FLOW	91.

				TIME	17.92
			3	FLOW	154.
				TIME	16.75
			4	FLOW	255.
				TIME	15.75
			5	FLOW	572.
				TIME	14.75
			6	FLOW	941.
				TIME	14.33
HYDROGRAPH AT	COOK	.84	1	FLOW	79.
				TIME	13.25
			2	FLOW	230.
				TIME	13.17
			3	FLOW	344.
				TIME	13.17
			4	FLOW	469.
				TIME	13.08
			5	FLOW	590.
				TIME	13.08
			6	FLOW	712.
				TIME	13.08
2 COMBINED AT	CKOUT	3.79	1	FLOW	79.
				TIME	13.25
			2	FLOW	230.
				TIME	13.17
			3	FLOW	344.
				TIME	13.17
			4	FLOW	481.
				TIME	13.25
			5	FLOW	750.
				TIME	14.67
			6	FLOW	1248.
				TIME	14.25
ROUTED TO	RT03	3.79	1	FLOW	79.
				TIME	13.50
			2	FLOW	230.
				TIME	13.33
			3	FLOW	344.
				TIME	13.33
			4	FLOW	480.
				TIME	13.42
			5	FLOW	749.
				TIME	14.75
			6	FLOW	1247.
				TIME	14.33
HYDROGRAPH AT	BOND	.74	1	FLOW	68.
				TIME	13.25
			2	FLOW	199.
				TIME	13.17
			3	FLOW	297.
				TIME	13.17
			4	FLOW	406.
				TIME	13.17
			5	FLOW	509.
				TIME	13.17
			6	FLOW	613.

TIME 13.17

2 COMBINED AT BONDIN 4.53

1	FLOW	145.
	TIME	13.42
2	FLOW	424.
	TIME	13.25
3	FLOW	638.
	TIME	13.25
4	FLOW	874.
	TIME	13.25
5	FLOW	1113.
	TIME	13.25
6	FLOW	1511.
	TIME	14.25

ROUTED TO BONDLK 4.53

1	FLOW	12.
	TIME	24.92
2	FLOW	22.
	TIME	24.92
3	FLOW	139.
	TIME	24.58
4	FLOW	254.
	TIME	19.58
5	FLOW	465.
	TIME	16.58
6	FLOW	902.
	TIME	15.42

** PEAK STAGES IN FEET **

1	STAGE	2700.75
	TIME	24.92
2	STAGE	2702.26
	TIME	24.92
3	STAGE	2703.19
	TIME	24.50
4	STAGE	2703.31
	TIME	19.58
5	STAGE	2703.48
	TIME	16.58
6	STAGE	2703.76
	TIME	15.42

ROUTED TO RT04 4.53

1	FLOW	11.
	TIME	24.92
2	FLOW	22.
	TIME	24.92
3	FLOW	139.
	TIME	24.92
4	FLOW	254.
	TIME	19.92
5	FLOW	465.
	TIME	16.83
6	FLOW	901.
	TIME	15.67

HYDROGRAPH AT B5 2.00

1	FLOW	99.
	TIME	15.08
2	FLOW	277.
	TIME	14.75
3	FLOW	425.

	TIME	14.75
4	FLOW	575.
	TIME	14.67
5	FLOW	722.
	TIME	14.67
6	FLOW	888.
	TIME	14.67

ROUTED TO RT06 2.00

1	FLOW	99.
	TIME	15.25
2	FLOW	277.
	TIME	14.92
3	FLOW	425.
	TIME	14.83
4	FLOW	574.
	TIME	14.75
5	FLOW	722.
	TIME	14.75
6	FLOW	887.
	TIME	14.75

HYDROGRAPH AT

B6 1.16

1	FLOW	97.
	TIME	13.42
2	FLOW	282.
	TIME	13.33
3	FLOW	423.
	TIME	13.33
4	FLOW	578.
	TIME	13.33
5	FLOW	723.
	TIME	13.33
6	FLOW	874.
	TIME	13.25

2 COMBINED AT LANGHM

3.16

1	FLOW	147.
	TIME	14.75
2	FLOW	424.
	TIME	13.75
3	FLOW	654.
	TIME	13.83
4	FLOW	900.
	TIME	13.75
5	FLOW	1132.
	TIME	13.75
6	FLOW	1391.
	TIME	13.75

2 COMBINED AT LANGIN

7.69

1	FLOW	147.
	TIME	14.75
2	FLOW	424.
	TIME	13.75
3	FLOW	654.
	TIME	13.83
4	FLOW	900.
	TIME	13.75
5	FLOW	1135.
	TIME	13.83
6	FLOW	1942.
	TIME	15.42

ROUTED TO	LANGPL	7.69	1	FLOW	25.
				TIME	24.92
			2	FLOW	201.
				TIME	17.58
			3	FLOW	518.
				TIME	15.67
			4	FLOW	779.
				TIME	15.00
			5	FLOW	1053.
				TIME	14.58
			6	FLOW	1924.
				TIME	15.58

** PEAK STAGES IN FEET **

1	STAGE	2672.72
	TIME	24.92
2	STAGE	2675.25
	TIME	17.58
3	STAGE	2675.51
	TIME	15.67
4	STAGE	2675.68
	TIME	15.00
5	STAGE	2675.84
	TIME	14.58
6	STAGE	2676.28
	TIME	15.58

HYDROGRAPH AT	DRYWLS	.73	1	FLOW	65.
				TIME	13.33
			2	FLOW	188.
				TIME	13.25
			3	FLOW	282.
				TIME	13.25
			4	FLOW	385.
				TIME	13.25
			5	FLOW	482.
				TIME	13.17
			6	FLOW	582.
				TIME	13.17

2 COMBINED AT	DRYIN	8.42	1	FLOW	68.
				TIME	13.42
			2	FLOW	228.
				TIME	17.50
			3	FLOW	587.
				TIME	15.67
			4	FLOW	890.
				TIME	14.92
			5	FLOW	1244.
				TIME	14.50
			6	FLOW	2061.
				TIME	15.50

ROUTED TO	DRYWPL	8.42	1	FLOW	7.
				TIME	24.92
			2	FLOW	46.
				TIME	24.92
			3	FLOW	109.
				TIME	24.92
			4	FLOW	386.

	TIME	21.75
5	FLOW	875.
	TIME	18.00
6	FLOW	1671.
	TIME	16.42

** PEAK STAGES IN FEET **

1	STAGE	2765.61
	TIME	24.92
2	STAGE	2767.11
	TIME	24.92
3	STAGE	2768.76
	TIME	24.92
4	STAGE	2770.18
	TIME	21.67
5	STAGE	2770.40
	TIME	18.00
6	STAGE	2770.67
	TIME	16.42

HYDROGRAPH AT DAVIS 1.34

1	FLOW	79.
	TIME	14.33
2	FLOW	227.
	TIME	14.08
3	FLOW	346.
	TIME	14.08
4	FLOW	472.
	TIME	14.08
5	FLOW	589.
	TIME	14.08
6	FLOW	719.
	TIME	14.08

ROUTED TO DAVPLY 1.34

1	FLOW	12.
	TIME	23.67
2	FLOW	23.
	TIME	24.92
3	FLOW	28.
	TIME	24.92
4	FLOW	32.
	TIME	24.25
5	FLOW	117.
	TIME	18.83
6	FLOW	252.
	TIME	16.75

** PEAK STAGES IN FEET **

1	STAGE	2760.81
	TIME	23.58
2	STAGE	2762.29
	TIME	24.92
3	STAGE	2763.49
	TIME	24.92
4	STAGE	2764.74
	TIME	24.25
5	STAGE	2765.15
	TIME	18.83
6	STAGE	2765.29
	TIME	16.75

ROUTED TO	RT07	1.34	1	FLOW	12.
				TIME	24.75
			2	FLOW	22.
				TIME	24.92
			3	FLOW	28.
				TIME	24.92
			4	FLOW	32.
				TIME	24.83
			5	FLOW	117.
				TIME	19.33
			6	FLOW	251.
				TIME	17.17

HYDROGRAPH AT	STAFFD	.57	1	FLOW	54.
				TIME	13.25
			2	FLOW	157.
				TIME	13.17
			3	FLOW	235.
				TIME	13.08
			4	FLOW	321.
				TIME	13.08
			5	FLOW	404.
				TIME	13.08
			6	FLOW	486.
				TIME	13.08

ROUTED TO	STAFPL	.57	1	FLOW	8.
				TIME	17.92
			2	FLOW	17.
				TIME	18.33
			3	FLOW	22.
				TIME	18.08
			4	FLOW	26.
				TIME	19.25
			5	FLOW	29.
				TIME	19.58
			6	FLOW	32.
				TIME	19.92

** PEAK STAGES IN FEET **

1	STAGE	2740.50
	TIME	17.83
2	STAGE	2741.34
	TIME	18.33
3	STAGE	2742.09
	TIME	18.08
4	STAGE	2742.95
	TIME	19.33
5	STAGE	2743.79
	TIME	19.50
6	STAGE	2744.68
	TIME	19.83

ROUTED TO	RT08	.57	1	FLOW	8.
				TIME	18.75
			2	FLOW	17.
				TIME	19.00
			3	FLOW	22.
				TIME	18.58
			4	FLOW	26.

	TIME	19.75
5	FLOW	29.
	TIME	19.92
6	FLOW	32.
	TIME	20.33

HYDROGRAPH AT

HALE

1.15

1	FLOW	67.
	TIME	14.33
2	FLOW	192.
	TIME	14.17
3	FLOW	292.
	TIME	14.17
4	FLOW	398.
	TIME	14.17
5	FLOW	497.
	TIME	14.08
6	FLOW	608.
	TIME	14.08

3 COMBINED AT

HALEIN

3.06

1	FLOW	70.
	TIME	14.50
2	FLOW	203.
	TIME	14.25
3	FLOW	309.
	TIME	14.17
4	FLOW	417.
	TIME	14.17
5	FLOW	523.
	TIME	14.33
6	FLOW	645.
	TIME	14.17

ROUTED TO

HALEPL

3.06

1	FLOW	17.
	TIME	24.92
2	FLOW	28.
	TIME	24.92
3	FLOW	51.
	TIME	24.92
4	FLOW	119.
	TIME	20.17
5	FLOW	234.
	TIME	19.42
6	FLOW	447.
	TIME	17.42

** PEAK STAGES IN FEET **

1	STAGE	2701.30
	TIME	24.92
2	STAGE	2703.56
	TIME	24.92
3	STAGE	2705.05
	TIME	24.92
4	STAGE	2705.15
	TIME	20.17
5	STAGE	2705.28
	TIME	19.33
6	STAGE	2705.46
	TIME	17.42

ROUTED TO

RT09

3.06

1	FLOW	17.
---	------	-----

	TIME	24.92
2	FLOW	28.
	TIME	24.92
3	FLOW	44.
	TIME	24.92
4	FLOW	119.
	TIME	20.50
5	FLOW	234.
	TIME	19.67
6	FLOW	446.
	TIME	17.67

HYDROGRAPH AT	HUNT	.93	1	FLOW	68.
				TIME	13.75
			2	FLOW	197.
				TIME	13.58
			3	FLOW	298.
				TIME	13.58
			4	FLOW	407.
				TIME	13.58
			5	FLOW	508.
				TIME	13.58
			6	FLOW	616.
				TIME	13.50

3 COMBINED AT	HWY26	12.41	1	FLOW	68.
				TIME	13.75
			2	FLOW	200.
				TIME	13.58
			3	FLOW	303.
				TIME	13.58
			4	FLOW	525.
				TIME	21.50
			5	FLOW	1150.
				TIME	17.92
			6	FLOW	2116.
				TIME	16.42

ROUTED TO	RT10	12.41	1	FLOW	68.
				TIME	14.00
			2	FLOW	199.
				TIME	13.83
			3	FLOW	303.
				TIME	13.75
			4	FLOW	525.
				TIME	21.67
			5	FLOW	1150.
				TIME	18.08
			6	FLOW	2115.
				TIME	16.50

HYDROGRAPH AT	MARILN	1.32	1	FLOW	168.
				TIME	12.83
			2	FLOW	483.
				TIME	12.75
			3	FLOW	719.
				TIME	12.75
			4	FLOW	978.
				TIME	12.75
			5	FLOW	1231.

TIME 12.75
 6 FLOW 1477.
 TIME 12.75

2 COMBINED AT MRLIN 13.73
 1 FLOW 168.
 TIME 12.83
 2 FLOW 528.
 TIME 12.92
 3 FLOW 809.
 TIME 12.83
 4 FLOW 1119.
 TIME 12.83
 5 FLOW 1427.
 TIME 12.83
 6 FLOW 2231.
 TIME 16.50

ROUTED TO MRLNPL 13.73
 1 FLOW 10.
 TIME 24.92
 2 FLOW 20.
 TIME 24.92
 3 FLOW 25.
 TIME 24.92
 4 FLOW 545.
 TIME 22.33
 5 FLOW 1208.
 TIME 18.50
 6 FLOW 2168.
 TIME 16.92

** PEAK STAGES IN FEET **

1 STAGE 2640.65
 TIME 24.92
 2 STAGE 2641.74
 TIME 24.92
 3 STAGE 2642.81
 TIME 24.92
 4 STAGE 2643.26
 TIME 22.33
 5 STAGE 2643.43
 TIME 18.50
 6 STAGE 2643.66
 TIME 16.92

ROUTED TO RT11 13.73
 1 FLOW 10.
 TIME 24.92
 2 FLOW 19.
 TIME 24.92
 3 FLOW 24.
 TIME 24.92
 4 FLOW 545.
 TIME 22.58
 5 FLOW 1208.
 TIME 18.75
 6 FLOW 2166.
 TIME 17.17

HYDROGRAPH AT ELLSBY 2.28
 1 FLOW 145.
 TIME 14.08
 2 FLOW 418.

	TIME	13.92
3	FLOW	635.
	TIME	13.92
4	FLOW	866.
	TIME	13.92
5	FLOW	1082.
	TIME	13.83
6	FLOW	1318.
	TIME	13.83

2 COMBINED AT	ELLSIN	16.01	1	FLOW	145.
				TIME	14.08
			2	FLOW	418.
				TIME	13.92
			3	FLOW	635.
				TIME	13.92
			4	FLOW	866.
				TIME	13.92
			5	FLOW	1400.
				TIME	18.67
			6	FLOW	2500.
				TIME	17.00

ROUTED TO	ELLSPL	16.01	1	FLOW	8.
				TIME	24.92
			2	FLOW	17.
				TIME	24.92
			3	FLOW	21.
				TIME	24.92
			4	FLOW	31.
				TIME	24.92
			5	FLOW	962.
				TIME	21.50
			6	FLOW	1950.
				TIME	18.50

** PEAK STAGES IN FEET **

1	STAGE	2620.53
	TIME	24.92
2	STAGE	2621.36
	TIME	24.92
3	STAGE	2622.00
	TIME	24.92
4	STAGE	2624.22
	TIME	24.92
5	STAGE	2625.50
	TIME	21.42
6	STAGE	2625.81
	TIME	18.50

ROUTED TO	RT12	16.01	1	FLOW	8.
				TIME	24.92
			2	FLOW	17.
				TIME	24.92
			3	FLOW	21.
				TIME	24.92
			4	FLOW	29.
				TIME	24.92
			5	FLOW	962.
				TIME	21.75

			6	FLOW	1948.
				TIME	18.75
HYDROGRAPH AT	HUGHES	2.05	1	FLOW	118.
				TIME	14.42
			2	FLOW	337.
				TIME	14.17
			3	FLOW	515.
				TIME	14.17
			4	FLOW	701.
				TIME	14.17
			5	FLOW	876.
				TIME	14.17
			6	FLOW	1071.
				TIME	14.17

2 COMBINED AT	HUGHIN	18.06	1	FLOW	118.
				TIME	14.42
			2	FLOW	337.
				TIME	14.17
			3	FLOW	515.
				TIME	14.17
			4	FLOW	701.
				TIME	14.17
			5	FLOW	1056.
				TIME	21.67
			6	FLOW	2149.
				TIME	18.67

ROUTED TO	HUGHPL	18.06	1	FLOW	20.
				TIME	24.92
			2	FLOW	34.
				TIME	24.92
			3	FLOW	36.
				TIME	24.92
			4	FLOW	145.
				TIME	19.92
			5	FLOW	970.
				TIME	22.67
			6	FLOW	1976.
				TIME	19.42

** PEAK STAGES IN FEET **

1	STAGE	2591.77
	TIME	24.92
2	STAGE	2595.06
	TIME	24.92
3	STAGE	2595.83
	TIME	24.92
4	STAGE	2596.17
	TIME	19.92
5	STAGE	2596.80
	TIME	22.67
6	STAGE	2597.29
	TIME	19.33

ROUTED TO	RT13	18.06	1	FLOW	20.
				TIME	24.92
			2	FLOW	34.
				TIME	24.92

3 FLOW 36.
TIME 24.92
4 FLOW 145.
TIME 20.17
5 FLOW 970.
TIME 22.83
6 FLOW 1976.
TIME 19.50

HYDROGRAPH AT SH846B .47

1 FLOW 46.
TIME 13.17
2 FLOW 134.
TIME 13.08
3 FLOW 200.
TIME 13.08
4 FLOW 273.
TIME 13.08
5 FLOW 342.
TIME 13.08
6 FLOW 411.
TIME 13.00

2 COMBINED AT SH846X 18.53

1 FLOW 46.
TIME 13.17
2 FLOW 134.
TIME 13.08
3 FLOW 200.
TIME 13.08
4 FLOW 273.
TIME 13.08
5 FLOW 986.
TIME 22.83
6 FLOW 2004.
TIME 19.50

HYDROGRAPH AT CURRIE 2.54

1 FLOW 108.
TIME 15.92
2 FLOW 296.
TIME 15.50
3 FLOW 454.
TIME 15.50
4 FLOW 607.
TIME 15.42
5 FLOW 768.
TIME 15.42
6 FLOW 949.
TIME 15.42

ROUTED TO CURDET 2.54

1 FLOW 23.
TIME 24.92
2 FLOW 28.
TIME 24.92
3 FLOW 32.
TIME 24.92
4 FLOW 135.
TIME 22.08
5 FLOW 308.
TIME 19.33
6 FLOW 515.
TIME 18.00

** PEAK STAGES IN FEET **

1	STAGE	2670.29
	TIME	24.92
2	STAGE	2671.55
	TIME	24.92
3	STAGE	2672.52
	TIME	24.92
4	STAGE	2673.17
	TIME	22.00
5	STAGE	2673.34
	TIME	19.33
6	STAGE	2673.50
	TIME	18.00

ROUTED TO	RT14	2.54	1	FLOW	23.
				TIME	24.92
			2	FLOW	28.
				TIME	24.92
			3	FLOW	31.
				TIME	24.92
			4	FLOW	135.
				TIME	22.50
			5	FLOW	308.
				TIME	19.75
			6	FLOW	515.
				TIME	18.33

HYDROGRAPH AT	BLGRAV	1.90	1	FLOW	113.
				TIME	14.25
			2	FLOW	324.
				TIME	14.08
			3	FLOW	495.
				TIME	14.08
			4	FLOW	674.
				TIME	14.08
			5	FLOW	842.
				TIME	14.00
			6	FLOW	1027.
				TIME	14.00

2 COMBINED AT	BLGIN	4.44	1	FLOW	113.
				TIME	14.25
			2	FLOW	324.
				TIME	14.08
			3	FLOW	495.
				TIME	14.08
			4	FLOW	674.
				TIME	14.08
			5	FLOW	856.
				TIME	14.08
			6	FLOW	1046.
				TIME	14.08

ROUTED TO	BLGRPL	4.44	1	FLOW	25.
				TIME	24.92
			2	FLOW	35.
				TIME	24.92
			3	FLOW	38.
				TIME	24.92

4	FLOW	182.
	TIME	23.17
5	FLOW	419.
	TIME	20.17
6	FLOW	682.
	TIME	18.67

** PEAK STAGES IN FEET **

1	STAGE	2632.81
	TIME	24.92
2	STAGE	2635.60
	TIME	24.92
3	STAGE	2636.59
	TIME	24.92
4	STAGE	2637.22
	TIME	23.17
5	STAGE	2637.43
	TIME	20.17
6	STAGE	2637.62
	TIME	18.67

ROUTED TO	RT15	4.44	1	FLOW	24.
				TIME	24.92
			2	FLOW	35.
				TIME	24.92
			3	FLOW	38.
				TIME	24.92
			4	FLOW	182.
				TIME	24.00
			5	FLOW	418.
				TIME	20.83
			6	FLOW	682.
				TIME	19.25

HYDROGRAPH AT	WRIGHT	.73	1	FLOW	88.
				TIME	12.92
			2	FLOW	255.
				TIME	12.83
			3	FLOW	378.
				TIME	12.83
			4	FLOW	515.
				TIME	12.83
			5	FLOW	648.
				TIME	12.75
			6	FLOW	780.
				TIME	12.75

ROUTED TO	WRGHTP	.73	1	FLOW	4.
				TIME	24.42
			2	FLOW	11.
				TIME	24.33
			3	FLOW	15.
				TIME	24.25
			4	FLOW	18.
				TIME	22.17
			5	FLOW	20.
				TIME	24.25
			6	FLOW	23.
				TIME	24.42

** PEAK STAGES IN FEET **

1	STAGE	2622.29
	TIME	24.42
2	STAGE	2622.74
	TIME	24.25
3	STAGE	2623.08
	TIME	24.25
4	STAGE	2623.46
	TIME	22.00
5	STAGE	2623.88
	TIME	24.25
6	STAGE	2624.33
	TIME	24.42

ROUTED TO	RT16	.73	1	FLOW	4.
				TIME	24.92
			2	FLOW	11.
				TIME	24.92
			3	FLOW	15.
				TIME	24.83
			4	FLOW	18.
				TIME	22.75
			5	FLOW	20.
				TIME	24.83
			6	FLOW	23.
				TIME	24.92

HYDROGRAPH AT	B18	1.95	1	FLOW	111.
				TIME	14.42
			2	FLOW	317.
				TIME	14.25
			3	FLOW	484.
				TIME	14.25
			4	FLOW	659.
				TIME	14.17
			5	FLOW	824.
				TIME	14.17
			6	FLOW	1008.
				TIME	14.17

HYDROGRAPH AT	B19	1.60	1	FLOW	143.
				TIME	13.33
			2	FLOW	418.
				TIME	13.25
			3	FLOW	625.
				TIME	13.25
			4	FLOW	854.
				TIME	13.17
			5	FLOW	1072.
				TIME	13.17
			6	FLOW	1293.
				TIME	13.17

4 COMBINED AT	RAYLNG	8.72	1	FLOW	218.
				TIME	13.58
			2	FLOW	635.
				TIME	13.50
			3	FLOW	962.
				TIME	13.50
			4	FLOW	1321.

				TIME	13.50
			5	FLOW	1656.
				TIME	13.42
			6	FLOW	2019.
				TIME	13.42
ROUTED TO	RT17	8.72	1	FLOW	218.
				TIME	13.75
			2	FLOW	634.
				TIME	13.58
			3	FLOW	961.
				TIME	13.58
			4	FLOW	1320.
				TIME	13.58
			5	FLOW	1654.
				TIME	13.50
			6	FLOW	2017.
				TIME	13.50
HYDROGRAPH AT	BATJER	.91	1	FLOW	84.
				TIME	13.25
			2	FLOW	244.
				TIME	13.17
			3	FLOW	366.
				TIME	13.17
			4	FLOW	500.
				TIME	13.17
			5	FLOW	625.
				TIME	13.17
			6	FLOW	754.
				TIME	13.17
2 COMBINED AT	BTJOUT	9.63	1	FLOW	289.
				TIME	13.58
			2	FLOW	848.
				TIME	13.50
			3	FLOW	1283.
				TIME	13.42
			4	FLOW	1763.
				TIME	13.42
			5	FLOW	2212.
				TIME	13.42
			6	FLOW	2692.
				TIME	13.42

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

APPENDIX H

*
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
* FEBRUARY 1981 *
* REVISED 02 AUG 88 *
*
* RUN DATE 09/13/1990 TIME 11:36:44 *
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*
* U.S. ARMY CORPS OF ENGINEERS *
* THE HYDROLOGIC ENGINEERING CENTER *
* 609 SECOND STREET *
* DAVIS, CALIFORNIA 95616 *
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::: Full Microcomputer Implementation :::
::: by :::
::: Haestad Methods, Inc. :::
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:::~::~:

37 Brookside Road * Waterbury, Connecticut 06708 * (203) 755-1666

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.
THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

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

*DIAGRAM

1	ID	MARTIN COUNTY FLOOD CONTROL STUDY	JOB NO. 06901-001-036								
2	ID	HDR ENGINEERING, INC.	AUSTIN, TEXAS								
3	ID										
4	ID	THREE LEAGUE ARE MAODEL TO HWY 137 CROSSING, EXISTING									
5	ID										
6	ID	COMPUTING 2-YR, 5-YR, 10-YR, 25-YR, 50-YR, AND 100-YR FLOOD EVENTS FOR									
7	ID	THREE LEAGUE AREA USING PLAN OPTION IN HEC-1.									
8	ID										
9	ID	PLAN 1: 2-YEAR EVENT									
10	ID	PLAN 2: 5-YEAR EVENT									
11	ID	PLAN 3: 10-YEAR EVENT									
12	ID	PLAN 4: 25-YEAR EVENT									
13	ID	PLAN 5: 50-YEAR EVENT									
14	ID	PLAN 6: 100-YEAR EVENT									
15	ID										
16	ID										
17	IT	10	300								
18	IO	5	0								
19	JP	6									
20	KK	TL1									
21	KM	RUNOFF HYDROGRAPH FOR TL1 SUBBASIN									
22	PH	50	78.9	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
23	BA	4.65									
24	LS	0	72								
25	UD	1.11									
26	KP	2									
27	PH	20	78.9	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
28	KP	3									
29	PH	10	78.9	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
30	KP	4									
31	PH	4	78.9	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
32	KP	5									
33	PH	2	78.9	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
34	KP	6									
35	PH	1	78.9	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
36	KK	TL2									
37	KM	RUNOFF HYDROGRAPH FOR TL2 SUBBASIN									
38	PH	50	78.9	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
39	BA	1.04									
40	LS	0	72								
41	UD	0.87									
42	KP	2									
43	PH	20	78.9	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
44	KP	3									
45	PH	10	78.9	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
46	KP	4									
47	PH	4	78.9	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
48	KP	5									
49	PH	2	78.9	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
50	KP	6									
51	PH	1	78.9	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9

LINE	ID	1	2	3	4	5	6	7	8	9	10
101	PH	10	78.9	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
102	KP	4									
103	PH	4	78.9	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
104	KP	5									
105	PH	2	78.9	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
106	KP	6									
107	PH	1	78.9	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
108	KK	829A									
109	KM	COMBINE TL7 AND TL8									
110	HC	2									
111	KK	RT2									
112	KM	ROUTE 829A TO 2002W									
113	RK	8200	.0052	.030		TRAP	20	6			
114	KK	TL9									
115	KM	RUNOFF HYDROGRAPH FOR TL9 SUBBASIN									
116	PH	50	78.9	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
117	BA	0.93									
118	LS	0	72								
119	UD	0.45									
120	KP	2									
121	PH	20	78.9	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
122	KP	3									
123	PH	10	78.9	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
124	KP	4									
125	PH	4	78.9	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
126	KP	5									
127	PH	2	78.9	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
128	KP	6									
129	PH	1	78.9	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
130	KK	RT3									
131	KM	ROUTE TL9 TO 2002W									
132	RK	4000	.0073	.030		TRAP	50	8			
133	KK	TL10									
134	KM	RUNOFF HYDROGRAPH FOR TL10 SUBBASIN									
135	PH	50	78.9	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
136	BA	0.96									
137	LS	0	72								
138	UD	0.38									
139	KP	2									
140	PH	20	78.9	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
141	KP	3									
142	PH	10	78.9	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
143	KP	4									
144	PH	4	78.9	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
145	KP	5									
146	PH	2	78.9	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
147	KP	6									
148	PH	1	78.9	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9

LINE	ID	1	2	3	4	5	6	7	8	9	10
149	KK	2002W									
150	KM	COMBINE RT2 WITH RT3 AND TL10									
151	HC	3									
152	KK	RT4									
153	KM	ROUTE 2002W TO PXWEST									
154	RK	10000	.0052	.030		TRAP	50		8		
155	KK	TL12									
156	KM	RUNOFF HYDROGRAPH FOR TL12 SUBBASIN									
157	PH	50	78.9	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
158	BA	1.60									
159	LS	0	72								
160	UD	0.96									
161	KP	2									
162	PH	20	78.9	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
163	KP	3									
164	PH	10	78.9	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
165	KP	4									
166	PH	4	78.9	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
167	KP	5									
168	PH	2	78.9	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
169	KP	6									
170	PH	1	78.9	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
171	KK	RT5									
172	KM	ROUTE TL12 TO PXWEST									
173	RK	6600	.0064	.030		TRAP	50		8		
174	KK	TL13									
175	KM	RUNOFF HYDROGRAPH FOR TL13 SUBBASIN									
176	PH	50	78.9	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
177	BA	3.99									
178	LS	0	72								
179	UD	1.23									
180	KP	2									
181	PH	20	78.9	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
182	KP	3									
183	PH	10	78.9	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
184	KP	4									
185	PH	4	78.9	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
186	KP	5									
187	PH	2	78.9	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
188	KP	6									
189	PH	1	78.9	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
190	KK	RT6									
191	KM	ROUTE TL13 TO PXWEST									
192	RK	9600	.0052	.030		TRAP	50		8		

LINE	ID	1	2	3	4	5	6	7	8	9	10
193	KK	TL11									
194	KM	RUNOFF	HYDROGRAPH FOR TL11 SUBBASIN								
195	PH	50	78.9	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
196	BA	4.28									
197	LS	0	72								
198	UD	1.18									
199	KP	2									
200	PH	20	78.9	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
201	KP	3									
202	PH	10	78.9	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
203	KP	4									
204	PH	4	78.9	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
205	KP	5									
206	PH	2	78.9	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
207	KP	6									
208	PH	1	78.9	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
209	KK	PXWEST									
210	KM	COMBINE RT5 WITH RT6 AND RT4									
211	HC	4									
212	KK	TL6A									
213	KM	RUNOFF	HYDROGRAPH FOR TL6A SUBBASIN								
214	PH	50	78.9	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
215	BA	2.53									
216	LS	0	72								
217	UD	0.86									
218	KP	2									
219	PH	20	78.9	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
220	KP	3									
221	PH	10	78.9	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
222	KP	4									
223	PH	4	78.9	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
224	KP	5									
225	PH	2	78.9	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
226	KP	6									
227	PH	1	78.9	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
228	KK	RT7									
229	KM	ROUTE TL6A TO PXNW									
230	RK	9000	.0048	.030		TRAP	50	8			
231	KK	TL6B									
232	KM	RUNOFF	HYDROGRAPH FOR TL6B SUBBASIN								
233	PH	50	78.9	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
234	BA	0.85									
235	LS	0	72								
236	UD	0.46									
237	KP	2									
238	PH	20	78.9	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
239	KP	3									
240	PH	10	78.9	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
241	KP	4									
242	PH	4	78.9	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3

LINE	ID	1	2	3	4	5	6	7	8	9	10
288	KK	TL5									
289	KM	RUNOFF HYDROGRAPH FOR TL5 SUBBASIN									
290	PH	50	78.9	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
291	BA	1.88									
292	LS	0	72								
293	UD	0.52									
294	KP	2									
295	PH	20	78.9	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
296	KP	3									
297	PH	10	78.9	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
298	KP	4									
299	PH	4	78.9	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
300	KP	5									
301	PH	2	78.9	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
302	KP	6									
303	PH	1	78.9	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
304	KK	PLAYAX									
305	KM	COMBINE K2002 - TL5 - PXNE - PXNW - PXWEST									
306	HC	5									
307	KK	TLPLAY									
308	KM	ROUTE INFLOW HYDROGRAPH THROUGH THREE LEAGUE PLAYA									
309	RS	1	ELEV	2725							
310	SV	0	362	1172	2679	5066					
311	SQ	0	0	0	15000	100000					
312	SE	2725	2730	2735	2740	2745					
313	KK	RT9									
314	KM	ROUTE TLPLAY OUTFLOW TO ALKRD									
315	RK	4000	.0030	.030		TRAP	20	6			
316	KK	TL14									
317	KM	RUNOFF HYDROGRAPH FOR TL14 SUBBASIN									
318	PH	50	78.9	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
319	BA	12.70									
320	LS	0	72								
321	UD	1.29									
322	KP	2									
323	PH	20	78.9	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
324	KP	3									
325	PH	10	78.9	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
326	KP	4									
327	PH	4	78.9	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
328	KP	5									
329	PH	2	78.9	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
330	KP	6									
331	PH	1	78.9	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9

LINE	ID	1	2	3	4	5	6	7	8	9	10
381	PH	10	78.9	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
382	KP	4									
383	PH	4	78.9	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
384	KP	5									
385	PH	2	78.9	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
386	KP	6									
387	PH	1	78.9	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
388	KK ALKALI										
389	KM COMBINE TL18 - RT12 - TL17 AND RT11										
390	HC	3									
391	KK ALKLAK										
392	KM ROUTE INFLOW HYDROGRAPH THROUGH ALKALI LAKE										
393	RS	1	ELEV	2708							
394	SV	0	77	346	813	1682	3130				
395	SQ	0	0	0	0	17000	100000				
396	SE	2708	2710	2715	2720	2725	2730				
397	KK TL20E										
398	KM RUNOFF HYDROGRAPH FOR TL20E SUBBASIN										
399	PH	50	78.9	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
400	BA	1.53									
401	LS	0	72								
402	UD	2.00									
403	KP	2									
404	PH	20	78.9	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
405	KP	3									
406	PH	10	78.9	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
407	KP	4									
408	PH	4	78.9	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
409	KP	5									
410	PH	2	78.9	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
411	KP	6									
412	PH	1	78.9	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
413	KK SP11N										
414	KM COMBINE ALKLAK OUTFLOW HYDROGRAPH WITH SP11N										
415	HC	2									
416	KK SPILL1										
417	KM ROUTE SP11N INFLOW HYDROGRAPH THROUGH SPILL1 PLAYA										
418	RS	1	ELEV	2710							
419	SV	0	101	369	837	1495					
420	SQ	0	0	0	14000	100000					
421	SE	2710	2715	2720	2725	2730					
422	KK TL20F										
423	KM RUNOFF HYDROGRAPH FOR TL20F SUBBASIN										
424	PH	50	78.9	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
425	BA	0.66									
426	LS	0	72								
427	UD	0.74									
428	KP	2									
429	PH	20	78.9	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9

LINE	ID	1	2	3	4	5	6	7	8	9	10
480	PH	1	78.9	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
481	KK TL11N										
482	KM COMBINE RT13 WITH TL20A										
483	HC	2									
484	KK TL20-1										
485	KM ROUTE TL11N INFLOW HYDROGRAPH THROUGH TL20-1 PLAYA										
486	RS	1	ELEV	2755							
487	SV	0	351	1286	3240						
488	SQ	0	0	0	100000						
489	SE	2755	2760	2765	2770						
490	KK TL20B										
491	KM RUNOFF HYDROGRAPH FOR TL20B SUBBASIN										
492	PH	50	78.9	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
493	BA	0.40									
494	LS	0	72								
495	UD	0.67									
496	KP	2									
497	PH	20	78.9	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
498	KP	3									
499	PH	10	78.9	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
500	KP	4									
501	PH	4	78.9	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
502	KP	5									
503	PH	2	78.9	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
504	KP	6									
505	PH	1	78.9	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
506	KK TL21N										
507	KM COMBINE TL20-1 OUTFLOW HYDROGRAPH WITH TL20B										
508	HC	2									
509	KK TL20-2										
510	KM ROUTE TL21N INFLOW HYDROGRAPH THROUGH TL20-2 PLAYA										
511	RS	1	ELEV	2750							
512	SV	0	56	212	537						
513	SQ	0	0	0	100000						
514	SE	2750	2755	2760	2765						
515	KK RT15										
516	KM ROUTE TL20-2 TO TL31N										
517	RK	6800	.0015	.030	TRAP	50	8				
518	KK TL20C										
519	KM RUNOFF HYDROGRAPH FOR TL20C SUBBASIN										
520	PH	50	78.9	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
521	BA	3.48									
522	LS	0	72								
523	UD	0.67									
524	KP	2									
525	PH	20	78.9	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
526	KP	3									
527	PH	10	78.9	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6

LINE	ID	1	2	3	4	5	6	7	8	9	10
528	KP	4									
529	PH	4	78.9	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
530	KP	5									
531	PH	2	78.9	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
532	KP	6									
533	PH	1	78.9	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
534	KK	TL31N									
535	KM	COMBINE TL20-2 OUTFLOW HYDROGRAPH WITH TL20C									
536	HC	2									
537	KK	TL20-3									
538	KM	ROUTE TL31N INFLOW HYDROGRAPH THROUGH TL20-3 PLAYA									
539	RS	1	ELEV	2740							
540	SV	0	1198	4620							
541	SQ	0	0	100000							
542	SE	2740	2745	2750							
543	KK	RT16									
544	KM	ROUTE TL20-3 OUTFLOW HYDROGRAPH TO TL41N									
545	RK	8000	.0038	0.030		TRAP	50		8		
546	KK	TL20D									
547	KM	RUNOFF HYDROGRAPH FOR TL20D SUBBASIN									
548	PH	50	78.9	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
549	BA	2.08									
550	LS	0	72								
551	UD	2.00									
552	KP	2									
553	PH	20	78.9	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
554	KP	3									
555	PH	10	78.9	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
556	KP	4									
557	PH	4	78.9	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
558	KP	5									
559	PH	2	78.9	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
560	KP	6									
561	PH	1	78.9	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
562	KK	TL41N									
563	KM	COMBINE TL20-3 OUTFLOW HYDROGRAPH WITH TL20D									
564	HC	2									
565	KK	TL20-4									
566	KM	ROUTE TL41N INFLOW HYDROGRAPH THROUGH TL20-4 PLAYA									
567	RS	1	ELEV	2700							
568	SV	0	112	354	880	1929	3674				
569	SQ	0	0	0	0	100000	200000				
570	SE	2700	2705	2710	2715	2720	2725				

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE NO.	(V) ROUTING	(--->) DIVERSION OR PUMP FLOW
	(.) CONNECTOR	(<---) RETURN OF DIVERTED OR PUMPED FLOW
20	TL1	
	.	
36	.	TL2
	.	.
52	KDRAW.....	
	V	
	V	
55	RT1	
	.	
58	.	TL3
	.	.
73	K2002.....	
	.	
76	.	TL7
	.	.
92	.	TL8
	.	.
108	.	829A.....
	V	
	V	
111	RT2	
	.	
114	.	TL9
	.	V
	.	V
130	.	RT3
	.	.
133	.	TL10
	.	.
149	.	2002W.....
	V	
	V	
152	RT4	
	.	
155	.	TL12
	.	V
	.	V
171	.	RT5
	.	.
174	.	TL13
	.	V

190	.	.	.	V	
	.	.	.	RT6	
	
193	.	.	.	.	TL11

209	.	PXWEST	.....	
	.	.	.		
212	.	.	TL6A		
	.	.	V		
	.	.	V		
228	.	.	RT7		
	.	.	.		
231	.	.	.	TL6B	
	
	
247	.	PXNW	.....	
	.	.	.		
250	.	.	.	TL4A	
	.	.	.	V	
	.	.	.	V	
266	.	.	.	RT8	
	
	
269	.	.	.	.	TL4B

285	.	.	.	PXNE	.....
	
	
288	.	.	.	.	TL5

304	PLAYAX	.....		
	V				
	V				
307	TLPLAY				
	V				
	V				
313	RT9				
	.				
	.				
316	.	TL14			
	.	V			
	.	V			
332	.	RT10			
	.	.			
	.	.			
334	.	.	TL16		
	.	.	.		
	.	.	.		
350	ALKRD	.....		
	V				
	V				
353	RT11				
	.				

356	.	TL18	.
	.	.	.
372	.	.	TL17
	.	.	.
	.	.	.
388	ALKALI.....		
	V		
	V		
391	ALKLAK		
	.		
	.		
397	.	TL20E	.
	.	.	.
	.	.	.
413	SP1IN.....		
	V		
	V		
416	SPILL1		
	.		
	.		
422	.	TL20F	.
	.	.	.
	.	.	.
438	SP2IN.....		
	V		
	V		
441	SPILL2		
	.		
	.		
447	.	TL19	.
	.	V	.
	.	V	.
463	.	RT13	.
	.	.	.
	.	.	.
465	.	.	TL20A
	.	.	.
	.	.	.
481	.	TL11N.....	
	.	V	
	.	V	
484	.	TL20-1	.
	.	.	.
	.	.	.
490	.	.	TL20B
	.	.	.
	.	.	.
506	.	TL2IN.....	
	.	V	
	.	V	
509	.	TL20-2	.
	.	V	.
	.	V	.
515	.	RT15	.
	.	.	.
	.	.	.
518	.	.	TL20C
	.	.	.

```

534 . TL3IN.....
    . V
    . V
537 . TL20-3
    . V
    . V
543 . RT16
    .
    .
546 . TL20D
    .
    .
562 . TL4IN.....
    . V
    . V
565 . TL20-4
    .
    .
571 . TL20G
    .
    .
587 4OUT.....
    . V
    . V
590 RT14
    .
    .
593 . TL20H
    .
    .
609 HW137X.....

```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

*
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
* FEBRUARY 1981 *
* REVISED 02 AUG 88 *
*
* RUN DATE 09/13/1990 TIME 11:36:44 *
*

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

MARTIN COUNTY FLOOD CONTROL STUDY JOB NO. 06901-001-036
HDR ENGINEERING, INC. AUSTIN, TEXAS

THREE LEAGUE ARE MAODEL TO HWY 137 CROSSING

COMPUTING 2-YR, 5-YR, 10-YR, 25-YR, 50-YR, AND 100-YR FLOOD EVENTS FOR
THREE LEAGUE AREA USING PLAN OPTION IN HEC-1.

- PLAN 1: 2-YEAR EVENT
- PLAN 2: 5-YEAR EVENT
- PLAN 3: 10-YEAR EVENT
- PLAN 4: 25-YEAR EVENT
- PLAN 5: 50-YEAR EVENT
- PLAN 6: 100-YEAR EVENT

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

IT HYDROGRAPH TIME DATA
 NMIN 10 MINUTES IN COMPUTATION INTERVAL
 IDATE 1 0 STARTING DATE
 ITIME 0000 STARTING TIME
 NQ 300 NUMBER OF HYDROGRAPH ORDINATES
 NDDATE 3 0 ENDING DATE
 NDTIME 0150 ENDING TIME
 ICENT 19 CENTURY MARK

COMPUTATION INTERVAL .17 HOURS
TOTAL TIME BASE 49.83 HOURS

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

JP MULTI-PLAN OPTION
 NPLAN 6 NUMBER OF PLANS

JR MULTI-RATIO OPTION
 RATIOS OF RUNOFF
 1.00

*** FLOGRD - MAXIMUM NUMBER OF DX INTERVALS REACHED. MDX= 51
THIS MAY AFFECT ACCURACY OF KW SOLUTION. TO REDUCE ERRORS SHORTEN CHANNEL ELEMENT = 3

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
 FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
 TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS	
				RATIO 1	
					1.00
HYDROGRAPH AT	TL1	4.65	1	FLOW	320.
				TIME	13.50
			2	FLOW	963.
				TIME	13.33
			3	FLOW	1458.
				TIME	13.33
			4	FLOW	2003.
				TIME	13.33
			5	FLOW	2506.
				TIME	13.33
			6	FLOW	3035.
				TIME	13.33
HYDROGRAPH AT	TL2	1.04	1	FLOW	83.
				TIME	13.17
			2	FLOW	249.
				TIME	13.17
			3	FLOW	375.
				TIME	13.00
			4	FLOW	515.
				TIME	13.00
			5	FLOW	651.
				TIME	13.00
			6	FLOW	786.
				TIME	13.00
2 COMBINED AT	KDRAW	5.69	1	FLOW	396.
				TIME	13.33
			2	FLOW	1198.
				TIME	13.33
			3	FLOW	1808.
				TIME	13.33
			4	FLOW	2481.
				TIME	13.33
			5	FLOW	3109.
				TIME	13.17
			6	FLOW	3768.
				TIME	13.17
ROUTED TO	RT1	5.69	1	FLOW	396.
				TIME	14.17
			2	FLOW	1188.
				TIME	13.83
			3	FLOW	1807.
				TIME	13.83
			4	FLOW	2470.
				TIME	13.67
			5	FLOW	3102.
				TIME	13.67

			6	FLOW	3752.
				TIME	13.67
HYDROGRAPH AT	TL3	3.11	1	FLOW	302.
				TIME	12.83
			2	FLOW	908.
				TIME	12.83
			3	FLOW	1353.
				TIME	12.83
			4	FLOW	1848.
				TIME	12.83
			5	FLOW	2331.
				TIME	12.83
			6	FLOW	2794.
				TIME	12.83
2 COMBINED AT	K2002	8.80	1	FLOW	514.
				TIME	14.17
			2	FLOW	1527.
				TIME	13.67
			3	FLOW	2403.
				TIME	13.67
			4	FLOW	3352.
				TIME	13.50
			5	FLOW	4201.
				TIME	13.50
			6	FLOW	5165.
				TIME	13.33
HYDROGRAPH AT	TL7	3.39	1	FLOW	319.
				TIME	13.00
			2	FLOW	966.
				TIME	12.83
			3	FLOW	1445.
				TIME	12.83
			4	FLOW	1977.
				TIME	12.83
			5	FLOW	2496.
				TIME	12.83
			6	FLOW	2998.
				TIME	12.83
HYDROGRAPH AT	TL8	.55	1	FLOW	77.
				TIME	12.50
			2	FLOW	221.
				TIME	12.50
			3	FLOW	333.
				TIME	12.33
			4	FLOW	456.
				TIME	12.33
			5	FLOW	568.
				TIME	12.33
			6	FLOW	689.
				TIME	12.33
2 COMBINED AT	829A	3.94	1	FLOW	368.
				TIME	12.83
			2	FLOW	1099.
				TIME	12.83
			3	FLOW	1636.

	TIME	12.83
4	FLOW	2235.
	TIME	12.83
5	FLOW	2839.
	TIME	12.67
6	FLOW	3422.
	TIME	12.67

ROUTED TO	RT2	3.94	1	FLOW	367.
				TIME	13.17
			2	FLOW	1091.
				TIME	13.00
			3	FLOW	1633.
				TIME	13.00
			4	FLOW	2235.
				TIME	13.00
			5	FLOW	2833.
				TIME	12.83
			6	FLOW	3420.
				TIME	12.83

HYDROGRAPH AT	TL9	.93	1	FLOW	107.
				TIME	12.67
			2	FLOW	316.
				TIME	12.67
			3	FLOW	467.
				TIME	12.67
			4	FLOW	636.
				TIME	12.67
			5	FLOW	804.
				TIME	12.67
			6	FLOW	961.
				TIME	12.50

ROUTED TO	RT3	.93	1	FLOW	103.
				TIME	12.83
			2	FLOW	312.
				TIME	12.83
			3	FLOW	460.
				TIME	12.67
			4	FLOW	631.
				TIME	12.67
			5	FLOW	798.
				TIME	12.67
			6	FLOW	961.
				TIME	12.67

HYDROGRAPH AT	TL10	.96	1	FLOW	117.
				TIME	12.67
			2	FLOW	351.
				TIME	12.50
			3	FLOW	526.
				TIME	12.50
			4	FLOW	718.
				TIME	12.50
			5	FLOW	905.
				TIME	12.50
			6	FLOW	1088.
				TIME	12.50

3 COMBINED AT	2002W	5.83	1	FLOW	522.
				TIME	13.00
			2	FLOW	1604.
				TIME	12.83
			3	FLOW	2431.
				TIME	12.83
			4	FLOW	3349.
				TIME	12.83
			5	FLOW	4257.
				TIME	12.83
			6	FLOW	5105.
				TIME	12.83

ROUTED TO	RT4	5.83	1	FLOW	520.
				TIME	13.50
			2	FLOW	1596.
				TIME	13.17
			3	FLOW	2383.
				TIME	13.17
			4	FLOW	3308.
				TIME	13.00
			5	FLOW	4236.
				TIME	13.00
			6	FLOW	5101.
				TIME	13.00

HYDROGRAPH AT	TL12	1.60	1	FLOW	121.
				TIME	13.33
			2	FLOW	364.
				TIME	13.17
			3	FLOW	549.
				TIME	13.17
			4	FLOW	753.
				TIME	13.17
			5	FLOW	945.
				TIME	13.17
			6	FLOW	1141.
				TIME	13.17

ROUTED TO	RT5	1.60	1	FLOW	120.
				TIME	13.67
			2	FLOW	361.
				TIME	13.50
			3	FLOW	541.
				TIME	13.33
			4	FLOW	747.
				TIME	13.33
			5	FLOW	941.
				TIME	13.33
			6	FLOW	1139.
				TIME	13.33

HYDROGRAPH AT	TL13	3.99	1	FLOW	257.
				TIME	13.67
			2	FLOW	772.
				TIME	13.50
			3	FLOW	1171.
				TIME	13.50
			4	FLOW	1608.
				TIME	13.50

5 FLOW 2007.
TIME 13.50
6 FLOW 2435.
TIME 13.50

ROUTED TO RT6 3.99
1 FLOW 256.
TIME 14.17
2 FLOW 771.
TIME 13.83
3 FLOW 1165.
TIME 13.83
4 FLOW 1597.
TIME 13.67
5 FLOW 2005.
TIME 13.67
6 FLOW 2435.
TIME 13.67

HYDROGRAPH AT TL11 4.28
1 FLOW 282.
TIME 13.50
2 FLOW 848.
TIME 13.50
3 FLOW 1284.
TIME 13.50
4 FLOW 1767.
TIME 13.33
5 FLOW 2220.
TIME 13.33
6 FLOW 2694.
TIME 13.33

4 COMBINED AT PXWEST 15.70
1 FLOW 1110.
TIME 13.67
2 FLOW 3325.
TIME 13.33
3 FLOW 5026.
TIME 13.33
4 FLOW 6882.
TIME 13.33
5 FLOW 8636.
TIME 13.17
6 FLOW 10459.
TIME 13.17

HYDROGRAPH AT TL6A 2.53
1 FLOW 204.
TIME 13.17
2 FLOW 609.
TIME 13.00
3 FLOW 920.
TIME 13.00
4 FLOW 1264.
TIME 13.00
5 FLOW 1596.
TIME 13.00
6 FLOW 1926.
TIME 13.00

ROUTED TO RT7 2.53
1 FLOW 204.
TIME 13.67
2 FLOW 609.

				TIME	13.50
			3	FLOW	918.
				TIME	13.33
			4	FLOW	1258.
				TIME	13.33
			5	FLOW	1576.
				TIME	13.33
			6	FLOW	1895.
				TIME	13.33
HYDROGRAPH AT	TL6B	.85	1	FLOW	97.
				TIME	12.67
			2	FLOW	287.
				TIME	12.67
			3	FLOW	424.
				TIME	12.67
			4	FLOW	578.
				TIME	12.67
			5	FLOW	731.
				TIME	12.67
			6	FLOW	873.
				TIME	12.67
2 COMBINED AT	PXNW	3.38	1	FLOW	239.
				TIME	13.67
			2	FLOW	733.
				TIME	13.33
			3	FLOW	1114.
				TIME	13.33
			4	FLOW	1543.
				TIME	13.17
			5	FLOW	1937.
				TIME	13.17
			6	FLOW	2351.
				TIME	13.17
HYDROGRAPH AT	TL4A	4.65	1	FLOW	250.
				TIME	14.17
			2	FLOW	741.
				TIME	14.00
			3	FLOW	1135.
				TIME	13.83
			4	FLOW	1560.
				TIME	13.83
			5	FLOW	1955.
				TIME	13.83
			6	FLOW	2388.
				TIME	13.83
ROUTED TO	RTB	4.65	1	FLOW	250.
				TIME	14.67
			2	FLOW	740.
				TIME	14.17
			3	FLOW	1135.
				TIME	14.17
			4	FLOW	1555.
				TIME	14.17
			5	FLOW	1943.
				TIME	14.17
			6	FLOW	2377.

				TIME	14.00
HYDROGRAPH AT	TL4B	.52	1	FLOW	44.
				TIME	13.17
			2	FLOW	133.
				TIME	13.00
			3	FLOW	199.
				TIME	13.00
			4	FLOW	273.
				TIME	13.00
			5	FLOW	343.
				TIME	13.00
			6	FLOW	413.
				TIME	13.00
2 COMBINED AT	PXNE	5.17	1	FLOW	269.
				TIME	14.50
			2	FLOW	793.
				TIME	14.17
			3	FLOW	1218.
				TIME	14.17
			4	FLOW	1664.
				TIME	14.00
			5	FLOW	2092.
				TIME	14.00
			6	FLOW	2563.
				TIME	14.00
HYDROGRAPH AT	TL5	1.88	1	FLOW	200.
				TIME	12.83
			2	FLOW	600.
				TIME	12.67
			3	FLOW	897.
				TIME	12.67
			4	FLOW	1226.
				TIME	12.67
			5	FLOW	1552.
				TIME	12.67
			6	FLOW	1863.
				TIME	12.67
5 COMBINED AT	PLAYAX	34.93	1	FLOW	2031.
				TIME	14.00
			2	FLOW	6331.
				TIME	13.50
			3	FLOW	9743.
				TIME	13.50
			4	FLOW	13577.
				TIME	13.33
			5	FLOW	17015.
				TIME	13.33
			6	FLOW	20725.
				TIME	13.17
ROUTED TO	TLPLAY	34.93	1	FLOW	0.
				TIME	.17
			2	FLOW	1432.
				TIME	17.67
			3	FLOW	3638.
				TIME	15.67

4	FLOW	5958.
	TIME	15.00
5	FLOW	8641.
	TIME	14.67
6	FLOW	11643.
	TIME	14.67

** PEAK STAGES IN FEET **

1	STAGE	2732.73
	TIME	49.67
2	STAGE	2735.48
	TIME	17.67
3	STAGE	2736.21
	TIME	15.67
4	STAGE	2736.99
	TIME	15.00
5	STAGE	2737.88
	TIME	14.67
6	STAGE	2738.88
	TIME	14.67

ROUTED TO	RT9	34.93	1	FLOW	0.
				TIME	.17
			2	FLOW	1431.
				TIME	17.67
			3	FLOW	3635.
				TIME	15.83
			4	FLOW	5941.
				TIME	15.00
			5	FLOW	8641.
				TIME	14.83
			6	FLOW	11639.
				TIME	14.67

HYDROGRAPH AT	TL14	12.70	1	FLOW	793.
				TIME	13.67
			2	FLOW	2375.
				TIME	13.50
			3	FLOW	3617.
				TIME	13.50
			4	FLOW	4973.
				TIME	13.50
			5	FLOW	6226.
				TIME	13.50
			6	FLOW	7565.
				TIME	13.50

ROUTED TO	RT10	12.70	1	FLOW	789.
				TIME	14.17
			2	FLOW	2371.
				TIME	13.83
			3	FLOW	3600.
				TIME	13.83
			4	FLOW	4930.
				TIME	13.83
			5	FLOW	6190.
				TIME	13.67
			6	FLOW	7535.
				TIME	13.67

HYDROGRAPH AT	TL16	2.86	1	FLOW	224.
				TIME	13.17
			2	FLOW	675.
				TIME	13.17
			3	FLOW	1012.
				TIME	13.17
			4	FLOW	1387.
				TIME	13.17
			5	FLOW	1747.
				TIME	13.00
			6	FLOW	2113.
				TIME	13.00

3 COMBINED AT	ALKRD	50.49	1	FLOW	931.
				TIME	14.00
			2	FLOW	2810.
				TIME	13.67
			3	FLOW	5591.
				TIME	15.33
			4	FLOW	9536.
				TIME	14.50
			5	FLOW	13810.
				TIME	14.33
			6	FLOW	18519.
				TIME	14.17

ROUTED TO	RT11	50.49	1	FLOW	928.
				TIME	14.17
			2	FLOW	2809.
				TIME	13.83
			3	FLOW	5586.
				TIME	15.33
			4	FLOW	9500.
				TIME	14.67
			5	FLOW	13790.
				TIME	14.33
			6	FLOW	18431.
				TIME	14.17

HYDROGRAPH AT	TL18	.62	1	FLOW	66.
				TIME	12.83
			2	FLOW	200.
				TIME	12.67
			3	FLOW	299.
				TIME	12.67
			4	FLOW	408.
				TIME	12.67
			5	FLOW	516.
				TIME	12.67
			6	FLOW	619.
				TIME	12.67

HYDROGRAPH AT	TL17	2.42	1	FLOW	261.
				TIME	12.67
			2	FLOW	788.
				TIME	12.67
			3	FLOW	1175.
				TIME	12.67
			4	FLOW	1604.
				TIME	12.67

5 FLOW 2030.
 TIME 12.67
 6 FLOW 2433.
 TIME 12.67

3 COMBINED AT ALKALI 53.53

1 FLOW 1035.
 TIME 14.17
 2 FLOW 3070.
 TIME 13.83
 3 FLOW 5816.
 TIME 15.33
 4 FLOW 9817.
 TIME 14.50
 5 FLOW 14270.
 TIME 14.33
 6 FLOW 19114.
 TIME 14.17

ROUTED TO ALKLAK 53.53

1 FLOW 0.
 TIME .17
 2 FLOW 1967.
 TIME 18.83
 3 FLOW 5060.
 TIME 16.50
 4 FLOW 8294.
 TIME 15.67
 5 FLOW 12254.
 TIME 15.33
 6 FLOW 16651.
 TIME 15.00

** PEAK STAGES IN FEET **

1 STAGE 2715.89
 TIME 43.33
 2 STAGE 2720.58
 TIME 18.83
 3 STAGE 2721.49
 TIME 16.50
 4 STAGE 2722.44
 TIME 15.67
 5 STAGE 2723.60
 TIME 15.33
 6 STAGE 2724.90
 TIME 15.00

HYDROGRAPH AT TL20E 1.53

1 FLOW 72.
 TIME 14.67
 2 FLOW 210.
 TIME 14.33
 3 FLOW 325.
 TIME 14.33
 4 FLOW 443.
 TIME 14.33
 5 FLOW 556.
 TIME 14.33
 6 FLOW 682.
 TIME 14.33

2 COMBINED AT SP11N 55.06

1 FLOW 72.
 TIME 14.67

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

90	KK	CKOUT									
91	KM	COMBINE RT02 WITH COOK HYDROGRAPH TO GIVE TOTAL HYDROGRAPH AT COOK OUTLET									
92	HC	2									
93	KK	RT03									
94	KM	ROUTE COOK OUTFLOW HYDROGRAPH TO BOND LAKE									
95	RK	4000	.0037	0.030		TRAP	30	4			
96	KK	BOND									
97	KM	RUNOFF HYDROGRAPH FOR BOND LAKE SUBBASIN									
98	PH	50	28.2	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
99	BA	0.74									
100	LS	0	72								
101	UD	1.00									
102	KP	2									
103	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
104	KP	3									
105	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
106	KP	4									
107	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
108	KP	5									
109	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
110	KP	6									
111	PH	1	28.2	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
112	KK	BONDIN									
113	KM	COMBINE RT03 WITH BOND HYDROGRAPH TO GIVE INFLOW HYDROGRAPH TO BOND LAKE									
114	HC	2									
115	KK	BONDLK									
116	KM	ROUTE BOND LAKE INFLOW HYDROGRAPH THROUGH BOND LAKE									
117	RS	1	ELEV	2700							
118	SV	0	342								
119	SE	2700	2705								
120	SS	2700	500	2.6	1.5						
121	KK	RT04									
122	KM	ROUTE BOND LAKE OUTFLOW HYDROGRAPH TO LANGHAM PLAYA									
123	RK	5500	.0027	0.030		TRAP	30	4			
124	KK	B5									
125	KM	RUNOFF HYDROGRAPH FOR B5 SUBBASIN									
126	PH	50	28.2	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
127	BA	2.00									
128	LS	0	72								
129	UD	2.40									
130	KP	2									
131	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
132	KP	3									
133	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
134	KP	4									
135	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
136	KP	5									
137	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1

LINE	ID	1	2	3	4	5	6	7	8	9	10
138	KP	6									
139	PH	1	28.2	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
140	KK	RT06									
141	KM	ROUTE B5 RUNOFF HYDROGRAPH TO LANGHAM PLAYA									
142	RK	5000	.0060	0.030		TRAP	5	1			
143	KK	B6									
144	KM	RUNOFF HYDROGRAPH FOR B6 SUBBASIN									
145	PH	50	28.2	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
146	BA	1.16									
147	LS	0	72								
148	UD	1.15									
149	KP	2									
150	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
151	KP	3									
152	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
153	KP	4									
154	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
155	KP	5									
156	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
157	KP	6									
158	PH	1	28.2	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
159	KK	LANGHM									
160	KM	COMBINE RT06 AND B6 HYDROGRAPHS TO GIVE LANGHAM SUBBASIN RUNOFF HYDROGRAPH									
161	HC	2									
162	KK	LANGIN									
163	KM	COMBINE LANGHM AND RT04 HYDROGRAPH TO GIVE INFLOW HYDROGRAPH TO LANGHAM LAKE									
164	HC	2									
165	KK	LANGPL									
166	KM	ROUTE LANGHAM PLAYA INFLOW HYDROGRAPH THROUGH LANGHAM PLAYA									
167	RS	1	ELEV	2675							
168	SV	0	114	228							
169	SE	2670	2675	2680							
170	SS	2675	500	2.6	1.5						
171	KK	DRYWLS									
172	KM	RUNOFF HYDROGRAPH FOR DRY WELLS SUBBASIN									
173	PH	50	28.2	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
174	BA	0.73									
175	LS	0	72								
176	UD	1.06									
177	KP	2									
178	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
179	KP	3									
180	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
181	KP	4									
182	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
183	KP	5									
184	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
185	KP	6									
186	PH	1	28.2	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9

LINE	ID	1	2	3	4	5	6	7	8	9	10	
187	KK	DRYIN										
188	KM	COMBINE LANGHAM PLAYA OUTFLOW HYDROGRAPH WITH DRY WELLS RUNOFF HYDROGRAPH										
189	KM	TO GIVE INFLOW HYDROGRAPH TO DRY WELLS PLAYA										
190	HC	2										
191	KK	DRYWPL										
192	KM	ROUTE DRY WELLS PLAYA INFLOW HYDROGRAPH THROUGH DRY WELLS PLAYA										
193	RS	1	ELEV	2670								
194	SV	0	68	208	485	970						
195	SE	2755	2760	2765	2770	2775						
196	SS	2770	1000	2.6	1.5							
197	KK	DAVIS										
198	KM	RUNOFF HYDROGRAPH FOR DAVIS SUBBASIN										
199	PH	50	28.2	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8	
200	BA	1.34										
201	LS	0	72									
202	UD	1.85										
203	KP	2										
204	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9	
205	KP	3										
206	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6	
207	KP	4										
208	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3	
209	KP	5										
210	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1	
211	KP	6										
212	PH	1	28.2	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9	
213	KK	DAVPLY										
214	KM	ROUTE DAVIS RUNOFF HYDROGRAPH THROUGH DAVIS PLAYA										
215	RS	1	ELEV	2760								
216	SV	0	68	208	485							
217	SE	2755	2760	2765	2770							
218	SS	2760	500	2.6	1.5							
219	KK	RT07										
220	KM	ROUTE DAVIS PLAYA OUTFLOW HYDROGRAPH TO HALE PLAYA										
221	RK	9300	.0060	0.030	TRAP		30	4				
222	KK	STAFFD										
223	KM	RUNOFF HYDROGRAPH FOR STAFFORD SUBBASIN										
224	PH	50	28.2	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8	
225	BA	0.57										
226	LS	0	72									
227	UD	0.96										
228	KP	2										
229	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9	
230	KP	3										
231	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6	
232	KP	4										
233	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3	
234	KP	5										
235	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1	

LINE	ID	1	2	3	4	5	6	7	8	9	10
332	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
333	KP	3									
334	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
335	KP	4									
336	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
337	KP	5									
338	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
339	KP	6									
340	PH	1	28.2	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
341	KK	ELLSIN									
342	KM	COMBINE ELLSBY RUNOFF HYDROGRAPH WITH RT11 TO GIVE HYDROGRAPH AT ELLSBERRY									
343	KM	PLAYA									
344	HC	2									
345	KK	ELLSPL									
346	KM	ROUTE ELLSBERRY INFLOW HYDROGRAPH THROUGH ELLSBERRY PLAYA									
347	RS	1	ELEV	2625							
348	SV	0	522	1044							
349	SE	2620	2625	2630							
350	SS	2625	1000	2.6	1.5						
351	KK	RT12									
352	KM	ROUTE COUNTY ROAD CROSSING HYDROGRAPH TO HUGHES PLAYA									
353	RK	8000	.0030	0.030	TRAP	30	4				
354	KK	HUGHES									
355	KM	RUNOFF HYDROGRAPH FOR HUGHES SUBBASIN									
356	PH	50	28.2	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
357	BA	2.05									
358	LS	0	72								
359	UD	1.92									
360	KP	2									
361	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
362	KP	3									
363	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
364	KP	4									
365	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
366	KP	5									
367	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
368	KP	6									
369	PH	1	28.2	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
370	KK	HUGHIN									
371	KM	COMBIE RT12 WITH HUGHES RUNOFF HYDROGRAPH TO GIVE INFLOW HYDROGRAPH INTO									
372	KM	HUGHES PLAYA									
373	HC	2									
374	KK	HUGHPL									
375	KM	ROUTE HUGHES PLAYA INFLOW HYDROGRAPH THROUGH HUGHES PLAYA									
376	RS	1	ELEV	2590							
377	SV	0	106	480	1328						
378	SE	2590	2595	2600	2605						
379	SS	2590	500	2.6	1.5						

LINE	ID	1	2	3	4	5	6	7	8	9	10
429	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
430	KP	3									
431	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
432	KP	4									
433	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
434	KP	5									
435	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
436	KP	6									
437	PH	1	28.2	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
438	KK BLGIN										
439	KM COMBINE RT14 HYDROGRAPH WITH BLGRAV HYDROGRAPH TO GIVE INFLOW HYDROGRAPH										
440	KM FOR BLAGRAVE PLAYA										
441	HC	2									
442	KK BLGRPL										
443	KM ROUTE BLAGRAVE PLAYA INFLOW HYDROGRAPH THROUGH BLAGRAVE PLAYA										
444	RS	1	ELEV	2635							
445	SV	0	76	347							
446	SE	2630	2635	2640							
447	SS	2635	500	2.6	1.5						
448	KK RT15										
449	KM ROUTE BLAGRAVE PLAYA OUTFLOW HYDROGRAPH TO RAYLONG PLAYAS										
450	RK	14000	.0028	0.030		TRAP	30	4			
451	KK WRIGHT										
452	KM RUNOFF HYDROGRAPH FOR WRIGHT SUBBASIN										
453	PH	50	28.2	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
454	BA	0.73									
455	LS	0	72								
456	UD	0.67									
457	KP	2									
458	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
459	KP	3									
460	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
461	KP	4									
462	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
463	KP	5									
464	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
465	KP	6									
466	PH	1	28.2	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
467	KK WRGHTP										
468	KM ROUTE WRIGHT RUNOFF HYDROGRAPH THROUGH WRIGHT PLAYA										
469	RS	1	ELEV	2625							
470	SV	0	10	72	322	572					
471	SE	2613	2615	2620	2625	2630					
472	SS	2625	500	2.6	1.5						

LINE	ID	1	2	3	4	5	6	7	8	9	10
473	KK	RT16									
474	KM	ROUTE WRIGHT PLAYA OUTFLOW HYDROGRAPH TO RAYLONG PLAYAS									
475	RK	6000	.0050	0.030		TRAP	20	4			
476	KK	B18									
477	KM	RUNOFF HYDROGRAPH FOR B18 SUBBASIN									
478	PH	50	28.2	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
479	BA	1.95									
480	LS	0	72								
481	UD	1.95									
482	KP	2									
483	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
484	KP	3									
485	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
486	KP	4									
487	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
488	KP	5									
489	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
490	KP	6									
491	PH	1	28.2	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
492	KK	B19									
493	KM	RUNOFF HYDROGRAPH FOR B19 SUBBASIN									
494	PH	50	28.2	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
495	BA	1.60									
496	LS	0	72								
497	UD	1.04									
498	KP	2									
499	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
500	KP	3									
501	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
502	KP	4									
503	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
504	KP	5									
505	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
506	KP	6									
507	PH	1	28.2	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
508	KK	RAYLNG									
509	KM	COMBINE B18 - B19 - RT15 - RT16 TO GIVE INFLOW HYDROGRAPH TO RAYLONG PLAYAS									
510	HC	4									
511	KK	RT17									
512	KM	ROUTE RAYLONG HYDROGRAPH TO S.H. 846									
513	RK	4000	.0038	0.030		TRAP	10	4			
514	KK	BATJER									
515	KM	RUNOFF HYDROGRAPH FOR BATJER SUBBASIN									
516	PH	50	28.2	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
517	BA	0.91									
518	LS	0	72								
519	UD	1.00									
520	KP	2									
521	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE NO.	(V) ROUTING (.) CONNECTOR	(--->) DIVERSION OR PUMP FLOW (<---) RETURN OF DIVERTED OR PUMPED FLOW
20	BECKMY V V	
37	BECKPL V V	
43	RT01 .	
46	. MULLIN .	
62	MULLIN..... V V	
65	MULLPL V V	
71	RT02 .	
74	. COOK .	
90	CKOUT..... V V	
93	RT03 .	
96	. BOND .	
112	BONDIN..... V V	
115	BONDLK V V	
121	RT04 .	
124	. B5 V V	
140	. RT06 .	
143	. B6 .	
159	. LANGHM..... .	

162	LANGIN.....		
	V		
	V		
165	LANGPL		
	.		
	.		
171		DRYWLS	
	.		
	.		
187	DRYIN.....		
	V		
	V		
191	DRYWPL		
	.		
	.		
197		DAVIS	
	.	V	
	.	V	
213		DAVPLY	
	.	V	
	.	V	
219		RT07	
	.		
	.		
222		STAFFD	
	.	V	
	.	V	
238		STAFPL	
	.	V	
	.	V	
244		RT08	
	.		
	.		
247			HALE
	.		.
	.		.
263		HALEIN.....	
	.	V	
	.	V	
266		HALEPL	
	.	V	
	.	V	
272		RT09	
	.		
	.		
275			HUNT
	.		.
	.		.
291		HWY26.....	
	.	V	
	.	V	
294		RT10	
	.		
	.		
297		MARILN	
	.		.
	.		.
313		MRLIN.....	
	.	V	

317	MRLNPL	V	
		V	
		V	
322	RT11		
325		ELLSBY	
341	ELLSIN.....		
		V	
		V	
345	ELLSPL		
		V	
		V	
351	RT12		
354		HUGHES	
370	HUGHIN.....		
		V	
		V	
374	HUGHPL		
		V	
		V	
380	RT13		
383		SH846B	
399	SH846X.....		
403		CURRIE	
		V	
		V	
419		RT14	
422			BLGRAV
438		BLGIN.....	
		V	
		V	
442		BLGRPL	
		V	
		V	
448		RT15	
451			WRIGHT
			V
			V
467			WRGHTP
			V

473	.	.	V		
	.	.	RT16		
	.	.	.		
476	.	.	.	B18	
	
492	.	.	.	.	B19

508	.	RAYLNG.....			
	.	V			
	.	V			
511	.	RT17			
	.	.			
514	.	.	BATJER		
	.	.	.		
	.	.	.		
530	.	BTJOUT.....			

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION


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*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
*   FEBRUARY 1981                   *
*   REVISED 02 AUG 88               *
*
* RUN DATE 09/14/1990 TIME 09:37:30 *
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*
* U.S. ARMY CORPS OF ENGINEERS
* THE HYDROLOGIC ENGINEERING CENTER
*   609 SECOND STREET
*   DAVIS, CALIFORNIA 95616
*
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MARTIN COUNTY FLOOD CONTROL STUDY JOB NO. 06901-001-036
HDR ENGINEERING, INC. AUSTIN, TEXAS

BROWN AREA EXISTING CONDITIONS

COMPUTING 2-YR, 5-YR, 10-YR, 25-YR, 50-YR, AND 100-YR FLOOD EVENTS FOR BROWN AREA USING PLAN OPTION IN HEC-1.

- PLAN 1: 2-YEAR EVENT
- PLAN 2: 5-YEAR EVENT
- PLAN 3: 10-YEAR EVENT
- PLAN 4: 25-YEAR EVENT
- PLAN 5: 50-YEAR EVENT
- PLAN 6: 100-YEAR EVENT

18 IO OUTPUT CONTROL VARIABLES

IPRNT 5 PRINT CONTROL
IPLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

IT HYDROGRAPH TIME DATA

NMIN 5 MINUTES IN COMPUTATION INTERVAL
IDATE 1 0 STARTING DATE
ITIME 0000 STARTING TIME
NQ 300 NUMBER OF HYDROGRAPH ORDINATES
NDDATE 2 0 ENDING DATE
NDTIME 0055 ENDING TIME
ICENT 19 CENTURY MARK

COMPUTATION INTERVAL .08 HOURS
TOTAL TIME BASE 24.92 HOURS

ENGLISH UNITS

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

JP

MULTI-PLAN OPTION
NPLAN

6 NUMBER OF PLANS

JR

MULTI-RATIO OPTION
RATIOS OF RUNOFF
1.00

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
 FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
 TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS	
				RATIO 1	
					1.00
HYDROGRAPH AT	BECKMY	1.01	1	FLOW	106.
				TIME	13.08
			2	FLOW	308.
				TIME	13.00
			3	FLOW	459.
				TIME	13.00
			4	FLOW	625.
				TIME	13.00
			5	FLOW	786.
				TIME	12.92
			6	FLOW	946.
				TIME	12.92
ROUTED TO	BECKPL	1.01	1	FLOW	55.
				TIME	13.92
			2	FLOW	198.
				TIME	13.58
			3	FLOW	321.
				TIME	13.50
			4	FLOW	464.
				TIME	13.42
			5	FLOW	601.
				TIME	13.42
			6	FLOW	748.
				TIME	13.33
** PEAK STAGES IN FEET **					
			1	STAGE	2760.12
				TIME	13.92
			2	STAGE	2760.28
				TIME	13.58
			3	STAGE	2760.39
				TIME	13.50
			4	STAGE	2760.50
				TIME	13.42
			5	STAGE	2760.60
				TIME	13.42
			6	STAGE	2760.69
				TIME	13.33
ROUTED TO	RT01	1.01	1	FLOW	54.
				TIME	14.25
			2	FLOW	198.
				TIME	13.83
			3	FLOW	320.
				TIME	13.67
			4	FLOW	464.
				TIME	13.58
			5	FLOW	600.

				TIME	13.50
			6	FLOW	747.
				TIME	13.50
HYDROGRAPH AT	MULLIN	1.94	1	FLOW	157.
				TIME	13.50
			2	FLOW	457.
				TIME	13.42
			3	FLOW	686.
				TIME	13.42
			4	FLOW	937.
				TIME	13.42
			5	FLOW	1174.
				TIME	13.33
			6	FLOW	1420.
				TIME	13.33

2 COMBINED AT	MULLIN	2.95	1	FLOW	198.
				TIME	13.67
			2	FLOW	633.
				TIME	13.58
			3	FLOW	986.
				TIME	13.50
			4	FLOW	1384.
				TIME	13.50
			5	FLOW	1757.
				TIME	13.42
			6	FLOW	2153.
				TIME	13.42

ROUTED TO	MULLPL	2.95	1	FLOW	172.
				TIME	14.17
			2	FLOW	587.
				TIME	13.83
			3	FLOW	935.
				TIME	13.75
			4	FLOW	1321.
				TIME	13.75
			5	FLOW	1686.
				TIME	13.67
			6	FLOW	2081.
				TIME	13.58

** PEAK STAGES IN FEET **

1	STAGE	2740.26
	TIME	14.17
2	STAGE	2740.59
	TIME	13.83
3	STAGE	2740.80
	TIME	13.75
4	STAGE	2741.01
	TIME	13.75
5	STAGE	2741.19
	TIME	13.67
6	STAGE	2741.36
	TIME	13.58

ROUTED TO	RT02	2.95	1	FLOW	172.
				TIME	14.33
			2	FLOW	587.

	TIME	14.00
3	FLOW	933.
	TIME	13.92
4	FLOW	1321.
	TIME	13.83
5	FLOW	1686.
	TIME	13.75
6	FLOW	2080.
	TIME	13.67

HYDROGRAPH AT	COOK	.84	1	FLOW	79.
				TIME	13.25
			2	FLOW	230.
				TIME	13.17
			3	FLOW	344.
				TIME	13.17
			4	FLOW	469.
				TIME	13.08
			5	FLOW	590.
				TIME	13.08
			6	FLOW	712.
				TIME	13.08

2 COMBINED AT	CKOUT	3.79	1	FLOW	212.
				TIME	14.25
			2	FLOW	720.
				TIME	13.83
			3	FLOW	1158.
				TIME	13.75
			4	FLOW	1645.
				TIME	13.67
			5	FLOW	2109.
				TIME	13.58
			6	FLOW	2614.
				TIME	13.58

ROUTED TO	RT03	3.79	1	FLOW	212.
				TIME	14.50
			2	FLOW	720.
				TIME	14.00
			3	FLOW	1156.
				TIME	13.92
			4	FLOW	1641.
				TIME	13.75
			5	FLOW	2107.
				TIME	13.67
			6	FLOW	2613.
				TIME	13.67

HYDROGRAPH AT	BOND	.74	1	FLOW	68.
				TIME	13.25
			2	FLOW	199.
				TIME	13.17
			3	FLOW	297.
				TIME	13.17
			4	FLOW	406.
				TIME	13.17
			5	FLOW	509.
				TIME	13.17
			6	FLOW	613.

TIME 13.17

2 COMBINED AT BONDIN 4.53

1	FLOW	247.
	TIME	14.42
2	FLOW	838.
	TIME	13.92
3	FLOW	1357.
	TIME	13.75
4	FLOW	1938.
	TIME	13.67
5	FLOW	2493.
	TIME	13.58
6	FLOW	3097.
	TIME	13.58

ROUTED TO BONDLK 4.53

1	FLOW	202.
	TIME	15.42
2	FLOW	703.
	TIME	14.50
3	FLOW	1173.
	TIME	14.33
4	FLOW	1700.
	TIME	14.17
5	FLOW	2217.
	TIME	14.00
6	FLOW	2792.
	TIME	14.00

** PEAK STAGES IN FEET **

1	STAGE	2700.29
	TIME	15.42
2	STAGE	2700.66
	TIME	14.50
3	STAGE	2700.93
	TIME	14.33
4	STAGE	2701.19
	TIME	14.17
5	STAGE	2701.42
	TIME	14.00
6	STAGE	2701.66
	TIME	14.00

ROUTED TO RT04 4.53

1	FLOW	202.
	TIME	15.75
2	FLOW	702.
	TIME	14.67
3	FLOW	1173.
	TIME	14.50
4	FLOW	1699.
	TIME	14.33
5	FLOW	2217.
	TIME	14.17
6	FLOW	2792.
	TIME	14.08

HYDROGRAPH AT B5 2.00

1	FLOW	99.
	TIME	15.08
2	FLOW	277.
	TIME	14.75
3	FLOW	425.

	TIME	14.75
4	FLOW	575.
	TIME	14.67
5	FLOW	722.
	TIME	14.67
6	FLOW	888.
	TIME	14.67

ROUTED TO	RT06	2.00	1	FLOW	99.
				TIME	15.25
			2	FLOW	277.
				TIME	14.92
			3	FLOW	425.
				TIME	14.83
			4	FLOW	574.
				TIME	14.75
			5	FLOW	722.
				TIME	14.75
			6	FLOW	887.
				TIME	14.75

HYDROGRAPH AT	B6	1.16	1	FLOW	97.
				TIME	13.42
			2	FLOW	282.
				TIME	13.33
			3	FLOW	423.
				TIME	13.33
			4	FLOW	578.
				TIME	13.33
			5	FLOW	723.
				TIME	13.33
			6	FLOW	874.
				TIME	13.25

2 COMBINED AT	LANGHM	3.16	1	FLOW	147.
				TIME	14.75
			2	FLOW	424.
				TIME	13.75
			3	FLOW	654.
				TIME	13.83
			4	FLOW	900.
				TIME	13.75
			5	FLOW	1132.
				TIME	13.75
			6	FLOW	1391.
				TIME	13.75

2 COMBINED AT	LANGIN	7.69	1	FLOW	339.
				TIME	15.50
			2	FLOW	1100.
				TIME	14.67
			3	FLOW	1799.
				TIME	14.42
			4	FLOW	2556.
				TIME	14.25
			5	FLOW	3306.
				TIME	14.17
			6	FLOW	4146.
				TIME	14.08

ROUTED TO	LANGPL	7.69	1	FLOW	336.
				TIME	15.75
			2	FLOW	1091.
				TIME	14.83
			3	FLOW	1785.
				TIME	14.58
			4	FLOW	2538.
				TIME	14.42
			5	FLOW	3286.
				TIME	14.25
			6	FLOW	4123.
				TIME	14.17

** PEAK STAGES IN FEET **

1	STAGE	2675.40
	TIME	15.75
2	STAGE	2675.89
	TIME	14.83
3	STAGE	2676.23
	TIME	14.58
4	STAGE	2676.56
	TIME	14.42
5	STAGE	2676.85
	TIME	14.25
6	STAGE	2677.16
	TIME	14.17

HYDROGRAPH AT	DRYWLS	.73	1	FLOW	65.
				TIME	13.33
			2	FLOW	188.
				TIME	13.25
			3	FLOW	282.
				TIME	13.25
			4	FLOW	385.
				TIME	13.25
			5	FLOW	482.
				TIME	13.17
			6	FLOW	582.
				TIME	13.17

2 COMBINED AT	DRYIN	8.42	1	FLOW	358.
				TIME	15.67
			2	FLOW	1158.
				TIME	14.75
			3	FLOW	1904.
				TIME	14.50
			4	FLOW	2713.
				TIME	14.33
			5	FLOW	3522.
				TIME	14.17
			6	FLOW	4437.
				TIME	14.08

ROUTED TO	DRYWPL	8.42	1	FLOW	0.
				TIME	.08
			2	FLOW	62.
				TIME	24.92
			3	FLOW	541.
				TIME	18.42
			4	FLOW	1231.

	TIME	16.58
5	FLOW	2161.
	TIME	15.75
6	FLOW	3234.
	TIME	15.25

** PEAK STAGES IN FEET **

1	STAGE	2764.18
	TIME	24.92
2	STAGE	2770.08
	TIME	24.92
3	STAGE	2770.35
	TIME	18.42
4	STAGE	2770.60
	TIME	16.58
5	STAGE	2770.88
	TIME	15.75
6	STAGE	2771.15
	TIME	15.25

HYDROGRAPH AT DAVIS 1.34

1	FLOW	79.
	TIME	14.33
2	FLOW	227.
	TIME	14.08
3	FLOW	346.
	TIME	14.08
4	FLOW	472.
	TIME	14.08
5	FLOW	589.
	TIME	14.08
6	FLOW	719.
	TIME	14.08

ROUTED TO DAVPLY 1.34

1	FLOW	74.
	TIME	14.83
2	FLOW	217.
	TIME	14.50
3	FLOW	334.
	TIME	14.42
4	FLOW	456.
	TIME	14.33
5	FLOW	576.
	TIME	14.33
6	FLOW	705.
	TIME	14.25

** PEAK STAGES IN FEET **

1	STAGE	2760.14
	TIME	14.83
2	STAGE	2760.30
	TIME	14.50
3	STAGE	2760.40
	TIME	14.42
4	STAGE	2760.50
	TIME	14.33
5	STAGE	2760.57
	TIME	14.25
6	STAGE	2760.66
	TIME	14.25

ROUTED TO	RT07	1.34	1	FLOW	74.
				TIME	15.42
			2	FLOW	217.
				TIME	14.92
			3	FLOW	334.
				TIME	14.75
			4	FLOW	456.
				TIME	14.67
			5	FLOW	576.
				TIME	14.58
			6	FLOW	705.
				TIME	14.58

HYDROGRAPH AT	STAFFD	.57	1	FLOW	54.
				TIME	13.25
			2	FLOW	157.
				TIME	13.17
			3	FLOW	235.
				TIME	13.08
			4	FLOW	321.
				TIME	13.08
			5	FLOW	404.
				TIME	13.08
			6	FLOW	486.
				TIME	13.08

ROUTED TO	STAFPL	.57	1	FLOW	46.
				TIME	13.58
			2	FLOW	146.
				TIME	13.42
			3	FLOW	224.
				TIME	13.33
			4	FLOW	309.
				TIME	13.33
			5	FLOW	388.
				TIME	13.25
			6	FLOW	471.
				TIME	13.25

** PEAK STAGES IN FEET **

1	STAGE	2740.10
	TIME	13.58
2	STAGE	2740.23
	TIME	13.42
3	STAGE	2740.31
	TIME	13.33
4	STAGE	2740.38
	TIME	13.33
5	STAGE	2740.44
	TIME	13.25
6	STAGE	2740.51
	TIME	13.25

ROUTED TO	RT08	.57	1	FLOW	46.
				TIME	14.00
			2	FLOW	146.
				TIME	13.67
			3	FLOW	224.
				TIME	13.58
			4	FLOW	308.

	TIME	13.50
5	FLOW	386.
	TIME	13.50
6	FLOW	470.
	TIME	13.42

HYDROGRAPH AT	HALE	1.15	1	FLOW	67.
				TIME	14.33
			2	FLOW	192.
				TIME	14.17
			3	FLOW	292.
				TIME	14.17
			4	FLOW	398.
				TIME	14.17
			5	FLOW	497.
				TIME	14.08
			6	FLOW	608.
				TIME	14.08

3 COMBINED AT	HALEIN	3.06	1	FLOW	159.
				TIME	15.00
			2	FLOW	471.
				TIME	14.50
			3	FLOW	742.
				TIME	14.33
			4	FLOW	1010.
				TIME	14.25
			5	FLOW	1279.
				TIME	14.17
			6	FLOW	1574.
				TIME	14.17

ROUTED TO	HALEPL	3.06	1	FLOW	153.
				TIME	15.33
			2	FLOW	464.
				TIME	14.75
			3	FLOW	733.
				TIME	14.58
			4	FLOW	1003.
				TIME	14.42
			5	FLOW	1269.
				TIME	14.33
			6	FLOW	1564.
				TIME	14.25

** PEAK STAGES IN FEET **

1	STAGE	2700.24
	TIME	15.33
2	STAGE	2700.50
	TIME	14.67
3	STAGE	2700.68
	TIME	14.58
4	STAGE	2700.84
	TIME	14.42
5	STAGE	2700.98
	TIME	14.33
6	STAGE	2701.13
	TIME	14.25

ROUTED TO	RT09	3.06	1	FLOW	153.
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				TIME	15.67
			2	FLOW	464.
				TIME	14.92
			3	FLOW	733.
				TIME	14.75
			4	FLOW	1002.
				TIME	14.58
			5	FLOW	1268.
				TIME	14.50
			6	FLOW	1563.
				TIME	14.42
HYDROGRAPH AT	HUNT	.93	1	FLOW	68.
				TIME	13.75
			2	FLOW	197.
				TIME	13.58
			3	FLOW	298.
				TIME	13.58
			4	FLOW	407.
				TIME	13.58
			5	FLOW	508.
				TIME	13.58
			6	FLOW	616.
				TIME	13.50
3 COMBINED AT	HWY26	12.41	1	FLOW	189.
				TIME	15.50
			2	FLOW	572.
				TIME	14.75
			3	FLOW	921.
				TIME	14.50
			4	FLOW	1847.
				TIME	16.42
			5	FLOW	3264.
				TIME	15.58
			6	FLOW	4876.
				TIME	15.08
ROUTED TO	RT10	12.41	1	FLOW	188.
				TIME	15.75
			2	FLOW	572.
				TIME	14.92
			3	FLOW	921.
				TIME	14.58
			4	FLOW	1846.
				TIME	16.50
			5	FLOW	3263.
				TIME	15.67
			6	FLOW	4876.
				TIME	15.17
HYDROGRAPH AT	MARILN	1.32	1	FLOW	168.
				TIME	12.83
			2	FLOW	483.
				TIME	12.75
			3	FLOW	719.
				TIME	12.75
			4	FLOW	978.
				TIME	12.75
			5	FLOW	1231.

TIME 12.75
6 FLOW 1477.
TIME 12.75

2 COMBINED AT MRLIN 13.73
1 FLOW 221.
TIME 15.50
2 FLOW 660.
TIME 14.75
3 FLOW 1061.
TIME 14.50
4 FLOW 1952.
TIME 16.50
5 FLOW 3399.
TIME 15.67
6 FLOW 5082.
TIME 15.17

ROUTED TO MRLNPL 13.73
1 FLOW 211.
TIME 16.00
2 FLOW 640.
TIME 15.17
3 FLOW 1031.
TIME 14.83
4 FLOW 1890.
TIME 16.83
5 FLOW 3285.
TIME 15.92
6 FLOW 4926.
TIME 15.42

** PEAK STAGES IN FEET **

1 STAGE 2640.14
TIME 15.92
2 STAGE 2640.30
TIME 15.17
3 STAGE 2640.40
TIME 14.83
4 STAGE 2640.61
TIME 16.83
5 STAGE 2640.88
TIME 15.92
6 STAGE 2641.16
TIME 15.42

ROUTED TO RT11 13.73
1 FLOW 211.
TIME 16.42
2 FLOW 639.
TIME 15.42
3 FLOW 1031.
TIME 15.08
4 FLOW 1889.
TIME 17.00
5 FLOW 3284.
TIME 16.08
6 FLOW 4919.
TIME 15.58

HYDROGRAPH AT ELLSBY 2.28
1 FLOW 145.
TIME 14.08
2 FLOW 418.

	TIME	13.92
3	FLOW	635.
	TIME	13.92
4	FLOW	866.
	TIME	13.92
5	FLOW	1082.
	TIME	13.83
6	FLOW	1318.
	TIME	13.83

2 COMBINED AT	ELLSIN	16.01	1	FLOW	288.
				TIME	16.08
			2	FLOW	889.
				TIME	15.08
			3	FLOW	1495.
				TIME	14.67
			4	FLOW	2128.
				TIME	17.00
			5	FLOW	3701.
				TIME	16.00
			6	FLOW	5585.
				TIME	15.50

ROUTED TO	ELLSPL	16.01	1	FLOW	273.
				TIME	16.75
			2	FLOW	866.
				TIME	15.50
			3	FLOW	1446.
				TIME	15.08
			4	FLOW	2053.
				TIME	17.33
			5	FLOW	3543.
				TIME	16.33
			6	FLOW	5354.
				TIME	15.83

** PEAK STAGES IN FEET **

1	STAGE	2625.22
	TIME	16.67
2	STAGE	2625.48
	TIME	15.50
3	STAGE	2625.67
	TIME	15.08
4	STAGE	2625.85
	TIME	17.33
5	STAGE	2626.23
	TIME	16.33
6	STAGE	2626.62
	TIME	15.83

ROUTED TO	RT12	16.01	1	FLOW	273.
				TIME	17.08
			2	FLOW	865.
				TIME	15.75
			3	FLOW	1445.
				TIME	15.33
			4	FLOW	2052.
				TIME	17.58
			5	FLOW	3541.
				TIME	16.50

6 FLOW 5349.
TIME 16.00

HYDROGRAPH AT HUGHES 2.05

1 FLOW 118.
TIME 14.42
2 FLOW 337.
TIME 14.17
3 FLOW 515.
TIME 14.17
4 FLOW 701.
TIME 14.17
5 FLOW 876.
TIME 14.17
6 FLOW 1071.
TIME 14.17

2 COMBINED AT HUGHIN 18.06

1 FLOW 332.
TIME 16.75
2 FLOW 1088.
TIME 15.17
3 FLOW 1849.
TIME 15.00
4 FLOW 2625.
TIME 14.83
5 FLOW 3905.
TIME 16.50
6 FLOW 5920.
TIME 15.92

ROUTED TO HUGHPL 18.06

1 FLOW 331.
TIME 17.00
2 FLOW 1086.
TIME 15.42
3 FLOW 1844.
TIME 15.08
4 FLOW 2617.
TIME 14.92
5 FLOW 3892.
TIME 16.58
6 FLOW 5900.
TIME 16.00

** PEAK STAGES IN FEET **

1 STAGE 2590.40
TIME 17.00
2 STAGE 2590.88
TIME 15.33
3 STAGE 2591.25
TIME 15.08
4 STAGE 2591.59
TIME 14.92
5 STAGE 2592.07
TIME 16.58
6 STAGE 2592.73
TIME 16.00

ROUTED TO RT13 18.06

1 FLOW 331.
TIME 17.25
2 FLOW 1086.
TIME 15.58

3	FLOW	1844.
	TIME	15.25
4	FLOW	2615.
	TIME	15.08
5	FLOW	3888.
	TIME	16.67
6	FLOW	5895.
	TIME	16.08

HYDROGRAPH AT SH846B .47

1	FLOW	46.
	TIME	13.17
2	FLOW	134.
	TIME	13.08
3	FLOW	200.
	TIME	13.08
4	FLOW	273.
	TIME	13.08
5	FLOW	342.
	TIME	13.08
6	FLOW	411.
	TIME	13.00

2 COMBINED AT SH846X 18.53

1	FLOW	338.
	TIME	17.17
2	FLOW	1116.
	TIME	15.50
3	FLOW	1892.
	TIME	15.25
4	FLOW	2673.
	TIME	15.00
5	FLOW	3932.
	TIME	16.67
6	FLOW	5955.
	TIME	16.08

HYDROGRAPH AT CURRIE 2.54

1	FLOW	108.
	TIME	15.92
2	FLOW	296.
	TIME	15.50
3	FLOW	454.
	TIME	15.50
4	FLOW	607.
	TIME	15.42
5	FLOW	768.
	TIME	15.42
6	FLOW	949.
	TIME	15.42

ROUTED TO RT14 2.54

1	FLOW	108.
	TIME	16.42
2	FLOW	296.
	TIME	15.92
3	FLOW	454.
	TIME	15.83
4	FLOW	607.
	TIME	15.67
5	FLOW	768.
	TIME	15.67
6	FLOW	949.
	TIME	15.67

HYDROGRAPH AT	BLGRAV	1.90	1	FLOW	113.
				TIME	14.25
			2	FLOW	324.
				TIME	14.08
			3	FLOW	495.
				TIME	14.08
			4	FLOW	674.
				TIME	14.08
			5	FLOW	842.
				TIME	14.00
			6	FLOW	1027.
				TIME	14.00

2 COMBINED AT	BLGIN	4.44	1	FLOW	181.
				TIME	15.58
			2	FLOW	516.
				TIME	14.83
			3	FLOW	803.
				TIME	14.75
			4	FLOW	1091.
				TIME	14.67
			5	FLOW	1383.
				TIME	14.67
			6	FLOW	1711.
				TIME	14.67

ROUTED TO	BLGRPL	4.44	1	FLOW	172.
				TIME	16.42
			2	FLOW	490.
				TIME	15.50
			3	FLOW	771.
				TIME	15.33
			4	FLOW	1052.
				TIME	15.08
			5	FLOW	1343.
				TIME	15.00
			6	FLOW	1670.
				TIME	15.00

** PEAK STAGES IN FEET **

1	STAGE	2635.26
	TIME	16.42
2	STAGE	2635.52
	TIME	15.50
3	STAGE	2635.70
	TIME	15.25
4	STAGE	2635.86
	TIME	15.08
5	STAGE	2636.02
	TIME	15.00
6	STAGE	2636.18
	TIME	15.00

ROUTED TO	RT15	4.44	1	FLOW	172.
				TIME	17.33
			2	FLOW	490.
				TIME	16.17
			3	FLOW	771.
				TIME	15.83

4	FLOW	1052.
	TIME	15.58
5	FLOW	1342.
	TIME	15.50
6	FLOW	1670.
	TIME	15.42

HYDROGRAPH AT WRIGHT .73

1	FLOW	88.
	TIME	12.92
2	FLOW	255.
	TIME	12.83
3	FLOW	378.
	TIME	12.83
4	FLOW	515.
	TIME	12.83
5	FLOW	648.
	TIME	12.75
6	FLOW	780.
	TIME	12.75

ROUTED TO WRGHTP .73

1	FLOW	43.
	TIME	13.67
2	FLOW	154.
	TIME	13.42
3	FLOW	254.
	TIME	13.33
4	FLOW	368.
	TIME	13.25
5	FLOW	479.
	TIME	13.17
6	FLOW	596.
	TIME	13.17

** PEAK STAGES IN FEET **

1	STAGE	2625.10
	TIME	13.67
2	STAGE	2625.24
	TIME	13.42
3	STAGE	2625.33
	TIME	13.25
4	STAGE	2625.43
	TIME	13.25
5	STAGE	2625.51
	TIME	13.17
6	STAGE	2625.59
	TIME	13.17

ROUTED TO RT16 .73

1	FLOW	43.
	TIME	14.08
2	FLOW	154.
	TIME	13.67
3	FLOW	254.
	TIME	13.50
4	FLOW	366.
	TIME	13.50
5	FLOW	477.
	TIME	13.42
6	FLOW	595.
	TIME	13.33

HYDROGRAPH AT	B18	1.95	1	FLOW	111.
				TIME	14.42
			2	FLOW	317.
				TIME	14.25
			3	FLOW	484.
				TIME	14.25
			4	FLOW	659.
				TIME	14.17
			5	FLOW	824.
				TIME	14.17
			6	FLOW	1008.
				TIME	14.17

HYDROGRAPH AT	B19	1.60	1	FLOW	143.
				TIME	13.33
			2	FLOW	418.
				TIME	13.25
			3	FLOW	625.
				TIME	13.25
			4	FLOW	854.
				TIME	13.17
			5	FLOW	1072.
				TIME	13.17
			6	FLOW	1293.
				TIME	13.17

4 COMBINED AT	RAYLNG	8.72	1	FLOW	284.
				TIME	16.25
			2	FLOW	857.
				TIME	15.33
			3	FLOW	1387.
				TIME	15.08
			4	FLOW	1883.
				TIME	14.83
			5	FLOW	2460.
				TIME	14.67
			6	FLOW	3111.
				TIME	14.67

ROUTED TO	RT17	8.72	1	FLOW	284.
				TIME	16.42
			2	FLOW	856.
				TIME	15.42
			3	FLOW	1387.
				TIME	15.17
			4	FLOW	1883.
				TIME	14.92
			5	FLOW	2460.
				TIME	14.75
			6	FLOW	3110.
				TIME	14.75

HYDROGRAPH AT	BATJER	.91	1	FLOW	84.
				TIME	13.25
			2	FLOW	244.
				TIME	13.17
			3	FLOW	366.
				TIME	13.17
			4	FLOW	500.
				TIME	13.17

5	FLOW	625.
	TIME	13.17
6	FLOW	754.
	TIME	13.17

2 COMBINED AT BTJOUT 9.63

1	FLOW	316.
	TIME	13.75
2	FLOW	987.
	TIME	13.58
3	FLOW	1531.
	TIME	13.50
4	FLOW	2123.
	TIME	13.50
5	FLOW	2686.
	TIME	13.42
6	FLOW	3366.
	TIME	14.58

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

HEC1 S/N: 1090525070

HMVersion: 5.20

Data File: BRWN-ALT.HC1

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*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
*   FEBRUARY 1981                   *
*   REVISED 02 AUG 88               *
*
* RUN DATE 09/14/1990 TIME 10:31:42 *
*
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*****
*
* U.S. ARMY CORPS OF ENGINEERS
* THE HYDROLOGIC ENGINEERING CENTER
*   609 SECOND STREET
*   DAVIS, CALIFORNIA 95616
*
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X   X  XXXXXXXX  XXXXX           X
X   X  X         X   X           XX
X   X  X         X                 X
XXXXXXX XXXX   X           XXXXX  X
X   X  X         X                 X
X   X  X         X   X           X
X   X  XXXXXXXX  XXXXX           XXX

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:::::::::::::::::::::::::::::::::::::
:::::::::::::::::::::::::::::::::::::
:::
::: Full Microcomputer Implementation :::
:::           by                       :::
:::   Haestad Methods, Inc.           :::
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37 Brookside Road * Waterbury, Connecticut 06708 * (203) 755-1666

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

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

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

*DIAGRAM

1 ID MARTIN COUNTY FLOOD CONTROL STUDY JOB NO. 06901-001-036
 2 ID HDR ENGINEERING, INC. AUSTIN, TEXAS
 3 ID
 4 ID BROWN AREA PROPOSED ALTERNATIVES
 5 ID
 6 ID COMPUTING 2-YR, 5-YR, 10-YR, 25-YR, 50-YR, AND 100-YR FLOOD EVENTS
 7 ID FOR BROWN AREA USING PLAN OPTION IN HEC-1.
 8 ID
 9 ID PLAN 1: 2-YEAR EVENT
 10 ID PLAN 2: 5-YEAR EVENT
 11 ID PLAN 3: 10-YEAR EVENT
 12 ID PLAN 4: 25-YEAR EVENT
 13 ID PLAN 5: 50-YEAR EVENT
 14 ID PLAN 6: 100-YEAR EVENT
 15 ID
 16 ID
 17 IT 5 300
 18 IO 5 0
 19 JP 6

20 KK BECKMY

21 KM RUNOFF HYDROGRAPH FOR BECKMEYER SUBBASIN

22	KP	1									
23	PH	50	28.2	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
24	BA	1.01									
25	LS	0	72								
26	UD	0.83									
27	KP	2									
28	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
29	KP	3									
30	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
31	KP	4									
32	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
33	KP	5									
34	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
35	KP	6									
36	PH	1	28.2	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9

37 KK BECKPL

38 KM ROUTE BECKMEYER RUNOFF HYDROGRAPH THROUGH BECKMEYER PLAYA

39 KM PIPE INVERT AT EL 2655

40 KM SPILL AT 2660

41	RS	1	ELEV	2755						
42	SV	0	154	438						
43	SE	2755	2760	2765						
44	SL	2755	3.1	0.6	0.5					
45	SS	2760	500	2.6	1.5					

46 KK RT01

47 KM ROUTE BECKMEYER PLAYA OUTFLOW HYDROGRAPH TO MULLINS PLAYA

48 RK 4500 .0044 0.030 TRAP 30 4

LINE	ID	1	2	3	4	5	6	7	8	9	10	
49	KK	MULLIN										
50	KM	RUNOFF HYDROGRAPH FOR MULLINS SUBBASIN										
51	PH	50	28.2	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8	
52	BA	1.94										
53	LS	0	72									
54	UD	1.20										
55	KP	2										
56	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9	
57	KP	3										
58	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6	
59	KP	4										
60	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3	
61	KP	5										
62	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1	
63	KP	6										
64	PH	1	28.2	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9	
65	KK	MULLIN										
66	KM	COMBINE RT01 WITH MULLINS HYDROGRAPH TO GIVE INFLOW TO MULLINS PLAYA										
67	HC	2										
68	KK	MULLPL										
69	KM	ROUTE MULLIN INFLOW HYDROGRAPH THROUGH MULLINS PLAYA										
70	KM	PIPE INVERT AT 2735										
71	KM	SPILL AT 2740.5										
72	RS	1	ELEV	2735								
73	SV	0	111	276								
74	SE	2735	2740	2745								
75	SL	2735	3.1	0.6	1.5							
76	SS	2740.5	500	2.6	1.5							
77	KK	RT02										
78	KM	ROUTE MULLPL TO COOK OUTLET										
79	RK	4000	.0062	0.030		TRAP	30	4				
80	KK	COOK										
81	KM	RUNOFF HYDROGRAPH FOR COOK SUBBASIN										
82	PH	50	28.2	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8	
83	BA	0.84										
84	LS	0	72									
85	UD	0.97										
86	KP	2										
87	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9	
88	KP	3										
89	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6	
90	KP	4										
91	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3	
92	KP	5										
93	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1	
94	KP	6										
95	PH	1	28.2	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9	

LINE	ID	1	2	3	4	5	6	7	8	9	10
144	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
145	KP	5									
146	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
147	KP	6									
148	PH	1	28.2	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
149	KK	RT06									
150	KM	ROUTE B5 RUNOFF HYDROGRAPH TO LANGHAM PLAYA									
151	RK	5000	.0060	0.030		TRAP	5	1			
152	KK	B6									
153	KM	RUNOFF HYDROGRAPH FOR B6 SUBBASIN									
154	PH	50	28.2	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
155	BA	1.16									
156	LS	0	72								
157	UD	1.15									
158	KP	2									
159	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
160	KP	3									
161	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
162	KP	4									
163	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
164	KP	5									
165	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
166	KP	6									
167	PH	1	28.2	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
168	KK	LANGHM									
169	KM	COMBINE RT06 AND B6 HYDROGRAPHS TO GIVE LANGHAM SUBBASIN RUNOFF HYDROGRAPH									
170	HC	2									
171	KK	LANGIN									
172	KM	COMBINE LANGHM AND RT04 HYDROGRAPH TO GIVE INFLOW HYDROGRAPH TO LANGHAM LAKE									
173	HC	2									
174	KK	LANGPL									
175	KM	ROUTE LANGHAM PLAYA INFLOW HYDROGRAPH THROUGH LANGHAM PLAYA									
176	KM	PIPE INVERT AT 2670									
177	KM	SPILL AT 2675									
178	RS	1	ELEV	2670							
179	SV	0	114	228							
180	SE	2670	2675	2680							
181	SL	2670	3.1	0.6	0.5						
182	SS	2675	500	2.6	1.5						
183	KK	DRYWLS									
184	KM	RUNOFF HYDROGRAPH FOR DRY WELLS SUBBASIN									
185	PH	50	28.2	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
186	BA	0.73									
187	LS	0	72								
188	UD	1.06									
189	KP	2									
190	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
191	KP	3									
192	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6

LINE	ID	1	2	3	4	5	6	7	8	9	10	
333	KK	MRLNPL										
334	RS	1	ELEV	2640								
335	SV	0	122	602	1706							
336	SE	2635	2640	2645	2650							
337	SL	2640	3.1	0.6	0.5							
338	SS	2643	1500	2.6	1.5							
339	KK	RT11										
340	KM	ROUTE MARILYN PLAYA OUTFLOW HYDORGRAPH TO COUNTY ROAD B1 CROSSING										
341	RK	7000	.0028	0.030	TRAP	30	4					
342	KK	ELLSBY										
343	KM	RUNOFF HYDROGRAPH FOR ELLSBERRY SUBBASIN										
344	PH	50	28.2	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8	
345	BA	2.28										
346	LS	0	72									
347	UD	1.67										
348	KP	2										
349	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9	
350	KP	3										
351	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6	
352	KP	4										
353	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3	
354	KP	5										
355	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1	
356	KP	6										
357	PH	1	28.2	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9	
358	KK	ELLSIN										
359	KM	COMBINE ELLSBY RUNOFF HYDROGRAPH WITH RT11 TO GIVE HYDROGRAPH AT ELLSBERRY										
360	KM	PLAYA										
361	HC	2										
362	KK	ELLSPL										
363	KM	ROUTE ELLSBERRY INFLOW HYDROGRAPH THROUGH ELLSBERRY PLAYA										
364	RS	1	ELEV	2620								
365	SV	0	522	1044								
366	SE	2620	2625	2630								
367	SL	2620	3.1	0.6	0.5							
368	SS	2625	1000	2.6	1.5							
369	KK	RT12										
370	KM	ROUTE COUNTY ROAD CROSSING HYDROGRAPH TO HUGHES PLAYA										
371	RK	8000	.0030	0.030	TRAP	30	4					
372	KK	HUGHES										
373	KM	RUNOFF HYDROGRAPH FOR HUGHES SUBBASIN										
374	PH	50	28.2	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8	
375	BA	2.05										
376	LS	0	72									
377	UD	1.92										
378	KP	2										
379	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9	
380	KP	3										

LINE	ID	1	2	3	4	5	6	7	8	9	10
381	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
382	KP	4									
383	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
384	KP	5									
385	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
386	KP	6									
387	PH	1	28.2	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
388	KK HUGHIN										
389	KM COMBIE RT12 WITH HUGHES RUNOFF HYDROGRAPH TO GIVE INFLOW HYDROGRAPH INTO										
390	KM HUGHES PLAYA										
391	HC	2									
392	KK HUGHPL										
393	KM ROUTE HUGHES PLAYA INFLOW HYDROGRAPH THROUGH HUGHES PLAYA										
394	RS	1	ELEV	2590							
395	SV	0	106	480	1328						
396	SE	2590	2595	2600	2605						
397	SL	2590	3.1	0.6	0.5						
398	SS	2596	500	2.6	1.5						
399	KK RT13										
400	KM ROUTE HUGHES PLAYA OUTFLOW HYDROGRAPH TO HWY 846 CROSSING										
401	RK	5500	.0030	0.030				TRAP	20	4	
402	KK SH846B										
403	KM RUNOFF HYDROGRAPH FOR S.H. 846 B SUBBASIN										
404	PH	50	28.2	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
405	BA	0.47									
406	LS	0	72								
407	UD	0.92									
408	KP	2									
409	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
410	KP	3									
411	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
412	KP	4									
413	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
414	KP	5									
415	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
416	KP	6									
417	PH	1	28.2	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
418	KK SH846X										
419	KM COMBINE RT13 WITH SH846B RUNOFF HYDROGRAPH TO GIVE HYDROGRAPH AT										
420	KM S.H. 846 CROSSING WEST OF BATJER PLAYA										
421	HC	2									
422	KK CURRIE										
423	KM RUNOFF HYDROGRAPH FOR CURRIE SUBBASIN										
424	PH	50	28.2	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
425	BA	2.54									
426	LS	0	72								
427	UD	3.03									
428	KP	2									
429	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9

LINE	ID	1	2	3	4	5	6	7	8	9	10
430	KP	3									
431	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
432	KP	4									
433	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
434	KP	5									
435	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
436	KP	6									
437	PH	1	28.2	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
438	KK CURDET										
439	KM	ROUTE CURRIE RUNOFF HYDROGRAPH THROUGH CURRIE DETENTION BASIN									
440	RS	1	ELEV	2668							
441	SV	0	19	366	1447						
442	SE	2668	2670	2675	2680						
443	SL	2668	3.1	0.6	0.5						
444	SS	2673	500	2.6	1.5						
445	KK RT14										
446	KM	ROUTE CURRIE RUNOFF HYDROGRAPH TO BLAGRAVE PLAYA									
447	RK	8000	.0038	0.030		TRAP	30	4			
448	KK BLGRAV										
449	KM	RUNOFF HYDROGRAPH FOR BLAGRAVE SUBBASIN									
450	PH	50	28.2	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
451	BA	1.90									
452	LS	0	72								
453	UD	1.83									
454	KP	2									
455	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
456	KP	3									
457	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
458	KP	4									
459	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
460	KP	5									
461	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
462	KP	6									
463	PH	1	28.2	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
464	KK BLGIN										
465	KM	COMBINE RT14 HYDROGRAPH WITH BLGRAV HYDROGRAPH TO GIVE INFLOW HYDROGRAPH									
466	KM	FOR BLAGRAVE PLAYA									
467	HC	2									
468	KK BLGRPL										
469	KM	ROUTE BLAGRAVE PLAYA INFLOW HYDROGRAPH THROUGH BLAGRAVE PLAYA									
470	RS	1	ELEV	2630							
471	SV	0	76	347							
472	SE	2630	2635	2640							
473	SL	2630	3.1	0.6	0.5						
474	SS	2637	500	2.6	1.5						

LINE	ID	1	2	3	4	5	6	7	8	9	10
475	KK	RT15									
476	KM	ROUTE	BLAGRAVE	PLAYA	OUTFLOW	HYDROGRAPH	TO	RAYLONG	PLAYAS		
477	RK	14000	.0028	0.030		TRAP	30	4			
478	KK	WRIGHT									
479	KM	RUNOFF	HYDROGRAPH	FOR	WRIGHT	SUBBASIN					
480	PH	50	28.2	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
481	BA	0.73									
482	LS	0	72								
483	UD	0.67									
484	KP	2									
485	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
486	KP	3									
487	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
488	KP	4									
489	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
490	KP	5									
491	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
492	KP	6									
493	PH	1	28.2	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
494	KK	WRGHTP									
495	KM	ROUTE	WRIGHT	RUNOFF	HYDROGRAPH	THROUGH	WRIGHT	PLAYA			
496	RS	1	ELEV	2622							
497	SV	0	10	72	322	572					
498	SE	2613	2615	2620	2625	2630					
499	SL	2622	3.1	0.6	0.5						
500	SS	2625	500	2.6	1.5						
501	KK	RT16									
502	KM	ROUTE	WRIGHT	PLAYA	OUTFLOW	HYDROGRAPH	TO	RAYLONG	PLAYAS		
503	RK	6000	.0050	0.030		TRAP	20	4			
504	KK	B18									
505	KM	RUNOFF	HYDROGRAPH	FOR	B18	SUBBASIN					
506	PH	50	28.2	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
507	BA	1.95									
508	LS	0	72								
509	UD	1.95									
510	KP	2									
511	PH	20	28.2	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
512	KP	3									
513	PH	10	28.2	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
514	KP	4									
515	PH	4	28.2	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
516	KP	5									
517	PH	2	28.2	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
518	KP	6									
519	PH	1	28.2	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9

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

520 KK B19
 521 KM RUNOFF HYDROGRAPH FOR B19 SUBBASIN
 522 PH 50 28.2 0.42 0.8 1.4 1.6 1.7 2.1 2.4 2.8
 523 BA 1.60
 524 LS 0 72
 525 UD 1.04
 526 KP 2
 527 PH 20 28.2 0.51 1.0 1.9 2.2 2.3 2.8 3.3 3.9
 528 KP 3
 529 PH 10 28.2 0.58 1.2 2.2 2.6 2.8 3.4 3.9 4.6
 530 KP 4
 531 PH 4 28.2 0.67 1.4 2.6 3.1 3.3 3.8 4.7 5.3
 532 KP 5
 533 PH 2 28.2 0.75 1.5 3.0 3.4 3.7 4.4 5.3 6.1
 534 KP 6
 535 PH 1 28.2 0.82 1.7 3.3 3.8 4.2 5.1 5.9 6.9

536 KK RAYLNG
 537 KM COMBINE B18 - B19 - RT15 - RT16 TO GIVE INFLOW HYDROGRAPH TO RAYLONG PLAYAS
 538 HC 4

539 KK RT17
 540 KM ROUTE RAYLONG HYDROGRAPH TO S.H. 846
 541 RK 4000 .0038 0.030 TRAP 10 4

542 KK BATJER
 543 KM RUNOFF HYDROGRAPH FOR BATJER SUBBASIN
 544 PH 50 28.2 0.42 0.8 1.4 1.6 1.7 2.1 2.4 2.8
 545 BA 0.91
 546 LS 0 72
 547 UD 1.00
 548 KP 2
 549 PH 20 28.2 0.51 1.0 1.9 2.2 2.3 2.8 3.3 3.9
 550 KP 3
 551 PH 10 28.2 0.58 1.2 2.2 2.6 2.8 3.4 3.9 4.6
 552 KP 4
 553 PH 4 28.2 0.67 1.4 2.6 3.1 3.3 3.8 4.7 5.3
 554 KP 5
 555 PH 2 28.2 0.75 1.5 3.0 3.4 3.7 4.4 5.3 6.1
 556 KP 6
 557 PH 1 28.2 0.82 1.7 3.3 3.8 4.2 5.1 5.9 6.9

558 KK BTJOUT
 559 HC 2
 560 ZZ

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE	(V) ROUTING	(--->) DIVERSION OR PUMP FLOW
NO.	(.) CONNECTOR	(<---) RETURN OF DIVERTED OR PUMPED FLOW
20	BECKMY V V	
37	BECKPL V V	
46	RT01 . .	
49	. MULLIN . .	
65	MULLIN..... V V	
68	MULLPL V V	
77	RT02 . .	
80	. COOK . .	
96	CKOUT..... V V	
99	RT03 . .	
102	. BOND . .	
118	BOND IN..... V V	
121	BOND LK V V	
130	RT04 . .	
133	. B5 . V V	
149	. RT06 . .	
152	. . .	B6 . .
168	. LANGHM..... . .	

171	LANGIN.....			
	V			
	V			
174	LANGPL			
	.			
	.			
183		DRYWLS		
	.			
	.			
199	DRYIN.....			
	V			
	V			
203	DRYWPL			
	.			
	.			
210		DAVIS		
	.	V		
	.	V		
226		DAVPLY		
	.	V		
	.	V		
233		RT07		
	.			
	.			
236			STAFFD	
	.		V	
	.		V	
252			STAFPL	
	.		V	
	.		V	
259			RT08	
	.			
	.			
262				HALE
	.			.
	.			.
278		HALEIN.....		
	.	V		
	.	V		
281		HALEPL		
	.	V		
	.	V		
288		RT09		
	.			
	.			
291			HUNT	
	.			.
	.			.
307	HWY26.....			
	V			
	V			
310	RT10			
	.			
	.			
313		MARILN		
	.			.
	.			.
329	MRLIN.....			
	V			

	V		
333	MRLNPL		
	V		
	V		
339	RT11		
	.		
	.		
342	.	ELLSBY	
	.	.	
	.	.	
358	ELLSIN.....		
	V		
	V		
362	ELLSPL		
	V		
	V		
369	RT12		
	.		
	.		
372	.	HUGHES	
	.	.	
	.	.	
388	HUGHIN.....		
	V		
	V		
392	HUGHPL		
	V		
	V		
399	RT13		
	.		
	.		
402	.	SH846B	
	.	.	
	.	.	
418	SH846X.....		
	.		
	.		
422	.	CURRIE	
	.	V	
	.	V	
438	.	CURDET	
	.	V	
	.	V	
445	.	RT14	
	.	.	
	.	.	
448	.	.	BLGRAV
	.	.	.
	.	.	.
464	.	BLGIN.....	
	.	V	
	.	V	
468	.	BLGRPL	
	.	V	
	.	V	
475	.	RT15	
	.	.	
	.	.	
478	.	.	WRIGHT
	.	.	V

494	.	.	V		
	.	.	WRGHTP		
	.	.	V		
	.	.	V		
501	.	.	RT16		
	.	.	.		
504	.	.	.	B18	
	
520	.	.	.	.	B19

536	.	RAYLNG.....			
	.	V			
	.	V			
539	.	RT17			
	.	.			
	.	.			
542	.	.	BATJER		
	.	.	.		
	.	.	.		
558	.	BTJOUT.....			

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

*
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
* FEBRUARY 1981 *
* REVISED 02 AUG 88 *
*
* RUN DATE 09/14/1990 TIME 10:31:42 *
*

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

MARTIN COUNTY FLOOD CONTROL STUDY JOB NO. 06901-001-036
HDR ENGINEERING, INC. AUSTIN, TEXAS

BROWN AREA PROPOSED ALTERNATIVES

COMPUTING 2-YR, 5-YR, 10-YR, 25-YR, 50-YR, AND 100-YR FLOOD EVENTS
FOR BROWN AREA USING PLAN OPTION IN HEC-1.

- PLAN 1: 2-YEAR EVENT
- PLAN 2: 5-YEAR EVENT
- PLAN 3: 10-YEAR EVENT
- PLAN 4: 25-YEAR EVENT
- PLAN 5: 50-YEAR EVENT
- PLAN 6: 100-YEAR EVENT

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

IT HYDROGRAPH TIME DATA
 NMIN 5 MINUTES IN COMPUTATION INTERVAL
 IDATE 1 0 STARTING DATE
 ITIME 0000 STARTING TIME
 NQ 300 NUMBER OF HYDROGRAPH ORDINATES
 NDDATE 2 0 ENDING DATE
 NDTIME 0055 ENDING TIME
 ICENT 19 CENTURY MARK

COMPUTATION INTERVAL .08 HOURS
TOTAL TIME BASE 24.92 HOURS

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

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
 FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
 TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS		
					RATIO 1	
					1.00	
HYDROGRAPH AT	BECKMY	1.01	1	FLOW	106.	
				TIME	13.08	
				2	FLOW	308.
					TIME	13.00
				3	FLOW	459.
					TIME	13.00
				4	FLOW	625.
					TIME	13.00
				5	FLOW	786.
					TIME	12.92
				6	FLOW	946.
					TIME	12.92
ROUTED TO	BECKPL	1.01	1	FLOW	9.	
				TIME	23.17	
				2	FLOW	19.
					TIME	23.42
				3	FLOW	23.
					TIME	24.25
				4	FLOW	27.
					TIME	21.58
				5	FLOW	30.
					TIME	24.08
				6	FLOW	43.
					TIME	22.83
** PEAK STAGES IN FEET **						
			1	STAGE	2755.57	
				TIME	22.75	
			2	STAGE	2756.54	
				TIME	23.58	
			3	STAGE	2757.35	
				TIME	24.25	
			4	STAGE	2758.21	
				TIME	21.75	
			5	STAGE	2759.15	
				TIME	24.08	
			6	STAGE	2760.03	
				TIME	22.83	
ROUTED TO	RT01	1.01	1	FLOW	9.	
				TIME	23.50	
				2	FLOW	19.
					TIME	23.83
				3	FLOW	23.
					TIME	24.58
				4	FLOW	27.
					TIME	21.92
				5	FLOW	30.

TIME 24.42
 6 FLOW 43.
 TIME 23.17

HYDROGRAPH AT MULLIN 1.94

1	FLOW	157.
	TIME	13.50
2	FLOW	457.
	TIME	13.42
3	FLOW	686.
	TIME	13.42
4	FLOW	937.
	TIME	13.42
5	FLOW	1174.
	TIME	13.33
6	FLOW	1420.
	TIME	13.33

2 COMBINED AT MULLIN 2.95

1	FLOW	157.
	TIME	13.50
2	FLOW	463.
	TIME	13.42
3	FLOW	697.
	TIME	13.42
4	FLOW	953.
	TIME	13.42
5	FLOW	1191.
	TIME	13.33
6	FLOW	1440.
	TIME	13.33

ROUTED TO MULLPL 2.95

1	FLOW	27.
	TIME	22.00
2	FLOW	91.
	TIME	17.67
3	FLOW	155.
	TIME	16.58
4	FLOW	255.
	TIME	15.58
5	FLOW	572.
	TIME	14.58
6	FLOW	944.
	TIME	14.17

** PEAK STAGES IN FEET **

1	STAGE	2736.49
	TIME	21.92
2	STAGE	2738.33
	TIME	17.67
3	STAGE	2739.75
	TIME	16.58
4	STAGE	2740.61
	TIME	15.58
5	STAGE	2740.92
	TIME	14.58
6	STAGE	2741.16
	TIME	14.17

ROUTED TO RT02 2.95

1	FLOW	27.
	TIME	22.33
2	FLOW	91.

				TIME	17.92
			3	FLOW	154.
				TIME	16.75
			4	FLOW	255.
				TIME	15.75
			5	FLOW	572.
				TIME	14.75
			6	FLOW	941.
				TIME	14.33
HYDROGRAPH AT	COOK	.84	1	FLOW	79.
				TIME	13.25
			2	FLOW	230.
				TIME	13.17
			3	FLOW	344.
				TIME	13.17
			4	FLOW	469.
				TIME	13.08
			5	FLOW	590.
				TIME	13.08
			6	FLOW	712.
				TIME	13.08
2 COMBINED AT	CKOUT	3.79	1	FLOW	79.
				TIME	13.25
			2	FLOW	230.
				TIME	13.17
			3	FLOW	344.
				TIME	13.17
			4	FLOW	481.
				TIME	13.25
			5	FLOW	750.
				TIME	14.67
			6	FLOW	1248.
				TIME	14.25
ROUTED TO	RT03	3.79	1	FLOW	79.
				TIME	13.50
			2	FLOW	230.
				TIME	13.33
			3	FLOW	344.
				TIME	13.33
			4	FLOW	480.
				TIME	13.42
			5	FLOW	749.
				TIME	14.75
			6	FLOW	1247.
				TIME	14.33
HYDROGRAPH AT	BOND	.74	1	FLOW	68.
				TIME	13.25
			2	FLOW	199.
				TIME	13.17
			3	FLOW	297.
				TIME	13.17
			4	FLOW	406.
				TIME	13.17
			5	FLOW	509.
				TIME	13.17
			6	FLOW	613.

TIME 13.17

2 COMBINED AT BONDIN 4.53

1	FLOW	145.
	TIME	13.42
2	FLOW	424.
	TIME	13.25
3	FLOW	638.
	TIME	13.25
4	FLOW	874.
	TIME	13.25
5	FLOW	1113.
	TIME	13.25
6	FLOW	1511.
	TIME	14.25

ROUTED TO BONDLK 4.53

1	FLOW	12.
	TIME	24.92
2	FLOW	22.
	TIME	24.92
3	FLOW	139.
	TIME	24.58
4	FLOW	254.
	TIME	19.58
5	FLOW	465.
	TIME	16.58
6	FLOW	902.
	TIME	15.42

** PEAK STAGES IN FEET **

1	STAGE	2700.75
	TIME	24.92
2	STAGE	2702.26
	TIME	24.92
3	STAGE	2703.19
	TIME	24.50
4	STAGE	2703.31
	TIME	19.58
5	STAGE	2703.48
	TIME	16.58
6	STAGE	2703.76
	TIME	15.42

ROUTED TO RT04 4.53

1	FLOW	11.
	TIME	24.92
2	FLOW	22.
	TIME	24.92
3	FLOW	139.
	TIME	24.92
4	FLOW	254.
	TIME	19.92
5	FLOW	465.
	TIME	16.83
6	FLOW	901.
	TIME	15.67

HYDROGRAPH AT B5 2.00

1	FLOW	99.
	TIME	15.08
2	FLOW	277.
	TIME	14.75
3	FLOW	425.

	TIME	14.75
4	FLOW	575.
	TIME	14.67
5	FLOW	722.
	TIME	14.67
6	FLOW	888.
	TIME	14.67

ROUTED TO RT06 2.00

1	FLOW	99.
	TIME	15.25
2	FLOW	277.
	TIME	14.92
3	FLOW	425.
	TIME	14.83
4	FLOW	574.
	TIME	14.75
5	FLOW	722.
	TIME	14.75
6	FLOW	887.
	TIME	14.75

HYDROGRAPH AT

B6 1.16

1	FLOW	97.
	TIME	13.42
2	FLOW	282.
	TIME	13.33
3	FLOW	423.
	TIME	13.33
4	FLOW	578.
	TIME	13.33
5	FLOW	723.
	TIME	13.33
6	FLOW	874.
	TIME	13.25

2 COMBINED AT LANGHM

3.16

1	FLOW	147.
	TIME	14.75
2	FLOW	424.
	TIME	13.75
3	FLOW	654.
	TIME	13.83
4	FLOW	900.
	TIME	13.75
5	FLOW	1132.
	TIME	13.75
6	FLOW	1391.
	TIME	13.75

2 COMBINED AT LANGIN

7.69

1	FLOW	147.
	TIME	14.75
2	FLOW	424.
	TIME	13.75
3	FLOW	654.
	TIME	13.83
4	FLOW	900.
	TIME	13.75
5	FLOW	1135.
	TIME	13.83
6	FLOW	1942.
	TIME	15.42

ROUTED TO	LANGPL	7.69	1	FLOW	25.
				TIME	24.92
			2	FLOW	201.
				TIME	17.58
			3	FLOW	518.
				TIME	15.67
			4	FLOW	779.
				TIME	15.00
			5	FLOW	1053.
				TIME	14.58
			6	FLOW	1924.
				TIME	15.58

** PEAK STAGES IN FEET **

1	STAGE	2672.72
	TIME	24.92
2	STAGE	2675.25
	TIME	17.58
3	STAGE	2675.51
	TIME	15.67
4	STAGE	2675.68
	TIME	15.00
5	STAGE	2675.84
	TIME	14.58
6	STAGE	2676.28
	TIME	15.58

HYDROGRAPH AT	DRYWLS	.73	1	FLOW	65.
				TIME	13.33
			2	FLOW	188.
				TIME	13.25
			3	FLOW	282.
				TIME	13.25
			4	FLOW	385.
				TIME	13.25
			5	FLOW	482.
				TIME	13.17
			6	FLOW	582.
				TIME	13.17

2 COMBINED AT	DRYIN	8.42	1	FLOW	68.
				TIME	13.42
			2	FLOW	228.
				TIME	17.50
			3	FLOW	587.
				TIME	15.67
			4	FLOW	890.
				TIME	14.92
			5	FLOW	1244.
				TIME	14.50
			6	FLOW	2061.
				TIME	15.50

ROUTED TO	DRYWPL	8.42	1	FLOW	7.
				TIME	24.92
			2	FLOW	46.
				TIME	24.92
			3	FLOW	109.
				TIME	24.92
			4	FLOW	386.

	TIME	21.75
5	FLOW	875.
	TIME	18.00
6	FLOW	1671.
	TIME	16.42

** PEAK STAGES IN FEET **

1	STAGE	2765.61
	TIME	24.92
2	STAGE	2767.11
	TIME	24.92
3	STAGE	2768.76
	TIME	24.92
4	STAGE	2770.18
	TIME	21.67
5	STAGE	2770.40
	TIME	18.00
6	STAGE	2770.67
	TIME	16.42

HYDROGRAPH AT DAVIS 1.34

1	FLOW	79.
	TIME	14.33
2	FLOW	227.
	TIME	14.08
3	FLOW	346.
	TIME	14.08
4	FLOW	472.
	TIME	14.08
5	FLOW	589.
	TIME	14.08
6	FLOW	719.
	TIME	14.08

ROUTED TO DAVPLY 1.34

1	FLOW	12.
	TIME	23.67
2	FLOW	23.
	TIME	24.92
3	FLOW	28.
	TIME	24.92
4	FLOW	32.
	TIME	24.25
5	FLOW	117.
	TIME	18.83
6	FLOW	252.
	TIME	16.75

** PEAK STAGES IN FEET **

1	STAGE	2760.81
	TIME	23.58
2	STAGE	2762.29
	TIME	24.92
3	STAGE	2763.49
	TIME	24.92
4	STAGE	2764.74
	TIME	24.25
5	STAGE	2765.15
	TIME	18.83
6	STAGE	2765.29
	TIME	16.75

ROUTED TO	RT07	1.34	1	FLOW	12.
				TIME	24.75
			2	FLOW	22.
				TIME	24.92
			3	FLOW	28.
				TIME	24.92
			4	FLOW	32.
				TIME	24.83
			5	FLOW	117.
				TIME	19.33
			6	FLOW	251.
				TIME	17.17

HYDROGRAPH AT	STAFFD	.57	1	FLOW	54.
				TIME	13.25
			2	FLOW	157.
				TIME	13.17
			3	FLOW	235.
				TIME	13.08
			4	FLOW	321.
				TIME	13.08
			5	FLOW	404.
				TIME	13.08
			6	FLOW	486.
				TIME	13.08

ROUTED TO	STAFPL	.57	1	FLOW	8.
				TIME	17.92
			2	FLOW	17.
				TIME	18.33
			3	FLOW	22.
				TIME	18.08
			4	FLOW	26.
				TIME	19.25
			5	FLOW	29.
				TIME	19.58
			6	FLOW	32.
				TIME	19.92

** PEAK STAGES IN FEET **

1	STAGE	2740.50
	TIME	17.83
2	STAGE	2741.34
	TIME	18.33
3	STAGE	2742.09
	TIME	18.08
4	STAGE	2742.95
	TIME	19.33
5	STAGE	2743.79
	TIME	19.50
6	STAGE	2744.68
	TIME	19.83

ROUTED TO	RT08	.57	1	FLOW	8.
				TIME	18.75
			2	FLOW	17.
				TIME	19.00
			3	FLOW	22.
				TIME	18.58
			4	FLOW	26.

	TIME	19.75
5	FLOW	29.
	TIME	19.92
6	FLOW	32.
	TIME	20.33

HYDROGRAPH AT	HALE	1.15	1	FLOW	67.
				TIME	14.33
			2	FLOW	192.
				TIME	14.17
			3	FLOW	292.
				TIME	14.17
			4	FLOW	398.
				TIME	14.17
			5	FLOW	497.
				TIME	14.08
			6	FLOW	608.
				TIME	14.08

3 COMBINED AT	HALEIN	3.06	1	FLOW	70.
				TIME	14.50
			2	FLOW	203.
				TIME	14.25
			3	FLOW	309.
				TIME	14.17
			4	FLOW	417.
				TIME	14.17
			5	FLOW	523.
				TIME	14.33
			6	FLOW	645.
				TIME	14.17

ROUTED TO	HALEPL	3.06	1	FLOW	17.
				TIME	24.92
			2	FLOW	28.
				TIME	24.92
			3	FLOW	51.
				TIME	24.92
			4	FLOW	119.
				TIME	20.17
			5	FLOW	234.
				TIME	19.42
			6	FLOW	447.
				TIME	17.42

** PEAK STAGES IN FEET **

1	STAGE	2701.30
	TIME	24.92
2	STAGE	2703.56
	TIME	24.92
3	STAGE	2705.05
	TIME	24.92
4	STAGE	2705.15
	TIME	20.17
5	STAGE	2705.28
	TIME	19.33
6	STAGE	2705.46
	TIME	17.42

ROUTED TO	RT09	3.06	1	FLOW	17.
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	TIME	24.92
2	FLOW	28.
	TIME	24.92
3	FLOW	44.
	TIME	24.92
4	FLOW	119.
	TIME	20.50
5	FLOW	234.
	TIME	19.67
6	FLOW	446.
	TIME	17.67

HYDROGRAPH AT	HUNT	.93	1	FLOW	68.
				TIME	13.75
			2	FLOW	197.
				TIME	13.58
			3	FLOW	298.
				TIME	13.58
			4	FLOW	407.
				TIME	13.58
			5	FLOW	508.
				TIME	13.58
			6	FLOW	616.
				TIME	13.50

3 COMBINED AT	HWY26	12.41	1	FLOW	68.
				TIME	13.75
			2	FLOW	200.
				TIME	13.58
			3	FLOW	303.
				TIME	13.58
			4	FLOW	525.
				TIME	21.50
			5	FLOW	1150.
				TIME	17.92
			6	FLOW	2116.
				TIME	16.42

ROUTED TO	RT10	12.41	1	FLOW	68.
				TIME	14.00
			2	FLOW	199.
				TIME	13.83
			3	FLOW	303.
				TIME	13.75
			4	FLOW	525.
				TIME	21.67
			5	FLOW	1150.
				TIME	18.08
			6	FLOW	2115.
				TIME	16.50

HYDROGRAPH AT	MARILN	1.32	1	FLOW	168.
				TIME	12.83
			2	FLOW	483.
				TIME	12.75
			3	FLOW	719.
				TIME	12.75
			4	FLOW	978.
				TIME	12.75
			5	FLOW	1231.

TIME 12.75
 6 FLOW 1477.
 TIME 12.75

2 COMBINED AT MRLIN 13.73
 1 FLOW 168.
 TIME 12.83
 2 FLOW 528.
 TIME 12.92
 3 FLOW 809.
 TIME 12.83
 4 FLOW 1119.
 TIME 12.83
 5 FLOW 1427.
 TIME 12.83
 6 FLOW 2231.
 TIME 16.50

ROUTED TO MRLNPL 13.73
 1 FLOW 10.
 TIME 24.92
 2 FLOW 20.
 TIME 24.92
 3 FLOW 25.
 TIME 24.92
 4 FLOW 545.
 TIME 22.33
 5 FLOW 1208.
 TIME 18.50
 6 FLOW 2168.
 TIME 16.92

** PEAK STAGES IN FEET **

1 STAGE 2640.65
 TIME 24.92
 2 STAGE 2641.74
 TIME 24.92
 3 STAGE 2642.81
 TIME 24.92
 4 STAGE 2643.26
 TIME 22.33
 5 STAGE 2643.43
 TIME 18.50
 6 STAGE 2643.66
 TIME 16.92

ROUTED TO RT11 13.73
 1 FLOW 10.
 TIME 24.92
 2 FLOW 19.
 TIME 24.92
 3 FLOW 24.
 TIME 24.92
 4 FLOW 545.
 TIME 22.58
 5 FLOW 1208.
 TIME 18.75
 6 FLOW 2166.
 TIME 17.17

HYDROGRAPH AT ELLSBY 2.28
 1 FLOW 145.
 TIME 14.08
 2 FLOW 418.

	TIME	13.92
3	FLOW	635.
	TIME	13.92
4	FLOW	866.
	TIME	13.92
5	FLOW	1082.
	TIME	13.83
6	FLOW	1318.
	TIME	13.83

2 COMBINED AT	ELLSIN	16.01	1	FLOW	145.
				TIME	14.08
			2	FLOW	418.
				TIME	13.92
			3	FLOW	635.
				TIME	13.92
			4	FLOW	866.
				TIME	13.92
			5	FLOW	1400.
				TIME	18.67
			6	FLOW	2500.
				TIME	17.00

ROUTED TO	ELLSPL	16.01	1	FLOW	8.
				TIME	24.92
			2	FLOW	17.
				TIME	24.92
			3	FLOW	21.
				TIME	24.92
			4	FLOW	31.
				TIME	24.92
			5	FLOW	962.
				TIME	21.50
			6	FLOW	1950.
				TIME	18.50

** PEAK STAGES IN FEET **

1	STAGE	2620.53
	TIME	24.92
2	STAGE	2621.36
	TIME	24.92
3	STAGE	2622.00
	TIME	24.92
4	STAGE	2624.22
	TIME	24.92
5	STAGE	2625.50
	TIME	21.42
6	STAGE	2625.81
	TIME	18.50

ROUTED TO	RT12	16.01	1	FLOW	8.
				TIME	24.92
			2	FLOW	17.
				TIME	24.92
			3	FLOW	21.
				TIME	24.92
			4	FLOW	29.
				TIME	24.92
			5	FLOW	962.
				TIME	21.75

			6	FLOW	1948.
				TIME	18.75
HYDROGRAPH AT	HUGHES	2.05	1	FLOW	118.
				TIME	14.42
			2	FLOW	337.
				TIME	14.17
			3	FLOW	515.
				TIME	14.17
			4	FLOW	701.
				TIME	14.17
			5	FLOW	876.
				TIME	14.17
			6	FLOW	1071.
				TIME	14.17

2 COMBINED AT	HUGHIN	18.06	1	FLOW	118.
				TIME	14.42
			2	FLOW	337.
				TIME	14.17
			3	FLOW	515.
				TIME	14.17
			4	FLOW	701.
				TIME	14.17
			5	FLOW	1056.
				TIME	21.67
			6	FLOW	2149.
				TIME	18.67

ROUTED TO	HUGHPL	18.06	1	FLOW	20.
				TIME	24.92
			2	FLOW	34.
				TIME	24.92
			3	FLOW	36.
				TIME	24.92
			4	FLOW	145.
				TIME	19.92
			5	FLOW	970.
				TIME	22.67
			6	FLOW	1976.
				TIME	19.42

** PEAK STAGES IN FEET **

1	STAGE	2591.77
	TIME	24.92
2	STAGE	2595.06
	TIME	24.92
3	STAGE	2595.83
	TIME	24.92
4	STAGE	2596.17
	TIME	19.92
5	STAGE	2596.80
	TIME	22.67
6	STAGE	2597.29
	TIME	19.33

ROUTED TO	RT13	18.06	1	FLOW	20.
				TIME	24.92
			2	FLOW	34.
				TIME	24.92

3	FLOW	36.
	TIME	24.92
4	FLOW	145.
	TIME	20.17
5	FLOW	970.
	TIME	22.83
6	FLOW	1976.
	TIME	19.50

HYDROGRAPH AT SH846B .47

1	FLOW	46.
	TIME	13.17
2	FLOW	134.
	TIME	13.08
3	FLOW	200.
	TIME	13.08
4	FLOW	273.
	TIME	13.08
5	FLOW	342.
	TIME	13.08
6	FLOW	411.
	TIME	13.00

2 COMBINED AT SH846X 18.53

1	FLOW	46.
	TIME	13.17
2	FLOW	134.
	TIME	13.08
3	FLOW	200.
	TIME	13.08
4	FLOW	273.
	TIME	13.08
5	FLOW	986.
	TIME	22.83
6	FLOW	2004.
	TIME	19.50

HYDROGRAPH AT CURRIE 2.54

1	FLOW	108.
	TIME	15.92
2	FLOW	296.
	TIME	15.50
3	FLOW	454.
	TIME	15.50
4	FLOW	607.
	TIME	15.42
5	FLOW	768.
	TIME	15.42
6	FLOW	949.
	TIME	15.42

ROUTED TO CURDET 2.54

1	FLOW	23.
	TIME	24.92
2	FLOW	28.
	TIME	24.92
3	FLOW	32.
	TIME	24.92
4	FLOW	135.
	TIME	22.08
5	FLOW	308.
	TIME	19.33
6	FLOW	515.
	TIME	18.00

** PEAK STAGES IN FEET **

1	STAGE	2670.29
	TIME	24.92
2	STAGE	2671.55
	TIME	24.92
3	STAGE	2672.52
	TIME	24.92
4	STAGE	2673.17
	TIME	22.00
5	STAGE	2673.34
	TIME	19.33
6	STAGE	2673.50
	TIME	18.00

ROUTED TO	RT14	2.54	1	FLOW	23.
				TIME	24.92
			2	FLOW	28.
				TIME	24.92
			3	FLOW	31.
				TIME	24.92
			4	FLOW	135.
				TIME	22.50
			5	FLOW	308.
				TIME	19.75
			6	FLOW	515.
				TIME	18.33

HYDROGRAPH AT	BLGRAV	1.90	1	FLOW	113.
				TIME	14.25
			2	FLOW	324.
				TIME	14.08
			3	FLOW	495.
				TIME	14.08
			4	FLOW	674.
				TIME	14.08
			5	FLOW	842.
				TIME	14.00
			6	FLOW	1027.
				TIME	14.00

2 COMBINED AT	BLGIN	4.44	1	FLOW	113.
				TIME	14.25
			2	FLOW	324.
				TIME	14.08
			3	FLOW	495.
				TIME	14.08
			4	FLOW	674.
				TIME	14.08
			5	FLOW	856.
				TIME	14.08
			6	FLOW	1046.
				TIME	14.08

ROUTED TO	BLGRPL	4.44	1	FLOW	25.
				TIME	24.92
			2	FLOW	35.
				TIME	24.92
			3	FLOW	38.
				TIME	24.92

4	FLOW	182.
	TIME	23.17
5	FLOW	419.
	TIME	20.17
6	FLOW	682.
	TIME	18.67

** PEAK STAGES IN FEET **

1	STAGE	2632.81
	TIME	24.92
2	STAGE	2635.60
	TIME	24.92
3	STAGE	2636.59
	TIME	24.92
4	STAGE	2637.22
	TIME	23.17
5	STAGE	2637.43
	TIME	20.17
6	STAGE	2637.62
	TIME	18.67

ROUTED TO	RT15	4.44	1	FLOW	24.
				TIME	24.92
			2	FLOW	35.
				TIME	24.92
			3	FLOW	38.
				TIME	24.92
			4	FLOW	182.
				TIME	24.00
			5	FLOW	418.
				TIME	20.83
			6	FLOW	682.
				TIME	19.25

HYDROGRAPH AT	WRIGHT	.73	1	FLOW	88.
				TIME	12.92
			2	FLOW	255.
				TIME	12.83
			3	FLOW	378.
				TIME	12.83
			4	FLOW	515.
				TIME	12.83
			5	FLOW	648.
				TIME	12.75
			6	FLOW	780.
				TIME	12.75

ROUTED TO	WRGHTP	.73	1	FLOW	4.
				TIME	24.42
			2	FLOW	11.
				TIME	24.33
			3	FLOW	15.
				TIME	24.25
			4	FLOW	18.
				TIME	22.17
			5	FLOW	20.
				TIME	24.25
			6	FLOW	23.
				TIME	24.42

** PEAK STAGES IN FEET **

1	STAGE	2622.29
	TIME	24.42
2	STAGE	2622.74
	TIME	24.25
3	STAGE	2623.08
	TIME	24.25
4	STAGE	2623.46
	TIME	22.00
5	STAGE	2623.88
	TIME	24.25
6	STAGE	2624.33
	TIME	24.42

ROUTED TO	RT16	.73	1	FLOW	4.
				TIME	24.92
			2	FLOW	11.
				TIME	24.92
			3	FLOW	15.
				TIME	24.83
			4	FLOW	18.
				TIME	22.75
			5	FLOW	20.
				TIME	24.83
			6	FLOW	23.
				TIME	24.92

HYDROGRAPH AT	B18	1.95	1	FLOW	111.
				TIME	14.42
			2	FLOW	317.
				TIME	14.25
			3	FLOW	484.
				TIME	14.25
			4	FLOW	659.
				TIME	14.17
			5	FLOW	824.
				TIME	14.17
			6	FLOW	1008.
				TIME	14.17

HYDROGRAPH AT	B19	1.60	1	FLOW	143.
				TIME	13.33
			2	FLOW	418.
				TIME	13.25
			3	FLOW	625.
				TIME	13.25
			4	FLOW	854.
				TIME	13.17
			5	FLOW	1072.
				TIME	13.17
			6	FLOW	1293.
				TIME	13.17

4 COMBINED AT	RAYLNG	8.72	1	FLOW	218.
				TIME	13.58
			2	FLOW	635.
				TIME	13.50
			3	FLOW	962.
				TIME	13.50
			4	FLOW	1321.

				TIME	13.50
			5	FLOW	1656.
				TIME	13.42
			6	FLOW	2019.
				TIME	13.42
ROUTED TO	RT17	8.72	1	FLOW	218.
				TIME	13.75
			2	FLOW	634.
				TIME	13.58
			3	FLOW	961.
				TIME	13.58
			4	FLOW	1320.
				TIME	13.58
			5	FLOW	1654.
				TIME	13.50
			6	FLOW	2017.
				TIME	13.50
HYDROGRAPH AT	BATJER	.91	1	FLOW	84.
				TIME	13.25
			2	FLOW	244.
				TIME	13.17
			3	FLOW	366.
				TIME	13.17
			4	FLOW	500.
				TIME	13.17
			5	FLOW	625.
				TIME	13.17
			6	FLOW	754.
				TIME	13.17
2 COMBINED AT	BTJOUT	9.63	1	FLOW	289.
				TIME	13.58
			2	FLOW	848.
				TIME	13.50
			3	FLOW	1283.
				TIME	13.42
			4	FLOW	1763.
				TIME	13.42
			5	FLOW	2212.
				TIME	13.42
			6	FLOW	2692.
				TIME	13.42

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

APPENDIX H

*
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
* FEBRUARY 1981 *
* REVISED 02 AUG 88 *
*
* RUN DATE 09/13/1990 TIME 11:36:44 *
*

*
* U.S. ARMY CORPS OF ENGINEERS *
* THE HYDROLOGIC ENGINEERING CENTER *
* 609 SECOND STREET *
* DAVIS, CALIFORNIA 95616 *
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:::
::: Full Microcomputer Implementation :::
::: by :::
::: Haestad Methods, Inc. :::
:::
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:::::::::::::::::::::::::::::::::::::

37 Brookside Road * Waterbury, Connecticut 06708 * (203) 755-1666

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

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

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

*DIAGRAM

1	ID	MARTIN COUNTY FLOOD CONTROL STUDY	JOB NO. 06901-001-036								
2	ID	HDR ENGINEERING, INC.	AUSTIN, TEXAS								
3	ID										
4	ID	THREE LEAGUE ARE MAODEL TO HWY 137 CROSSING, EXISTING									
5	ID										
6	ID	COMPUTING 2-YR, 5-YR, 10-YR, 25-YR, 50-YR, AND 100-YR FLOOD EVENTS FOR									
7	ID	THREE LEAGUE AREA USING PLAN OPTION IN HEC-1.									
8	ID										
9	ID	PLAN 1: 2-YEAR EVENT									
10	ID	PLAN 2: 5-YEAR EVENT									
11	ID	PLAN 3: 10-YEAR EVENT									
12	ID	PLAN 4: 25-YEAR EVENT									
13	ID	PLAN 5: 50-YEAR EVENT									
14	ID	PLAN 6: 100-YEAR EVENT									
15	ID										
16	ID										
17	IT	10	300								
18	IO	5	0								
19	JP	6									
20	KK	TL1									
21	KM	RUNOFF HYDROGRAPH FOR TL1 SUBBASIN									
22	PH	50	78.9	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
23	BA	4.65									
24	LS	0	72								
25	UD	1.11									
26	KP	2									
27	PH	20	78.9	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
28	KP	3									
29	PH	10	78.9	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
30	KP	4									
31	PH	4	78.9	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
32	KP	5									
33	PH	2	78.9	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
34	KP	6									
35	PH	1	78.9	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
36	KK	TL2									
37	KM	RUNOFF HYDROGRAPH FOR TL2 SUBBASIN									
38	PH	50	78.9	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
39	BA	1.04									
40	LS	0	72								
41	UD	0.87									
42	KP	2									
43	PH	20	78.9	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
44	KP	3									
45	PH	10	78.9	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
46	KP	4									
47	PH	4	78.9	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
48	KP	5									
49	PH	2	78.9	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
50	KP	6									
51	PH	1	78.9	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9

LINE	ID	1	2	3	4	5	6	7	8	9	10
101	PH	10	78.9	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
102	KP	4									
103	PH	4	78.9	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
104	KP	5									
105	PH	2	78.9	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
106	KP	6									
107	PH	1	78.9	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
108	KK	829A									
109	KM	COMBINE TL7 AND TL8									
110	HC	2									
111	KK	RT2									
112	KM	ROUTE 829A TO 2002W									
113	RK	8200	.0052	.030		TRAP	20	6			
114	KK	TL9									
115	KM	RUNOFF HYDROGRAPH FOR TL9 SUBBASIN									
116	PH	50	78.9	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
117	BA	0.93									
118	LS	0	72								
119	UD	0.45									
120	KP	2									
121	PH	20	78.9	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
122	KP	3									
123	PH	10	78.9	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
124	KP	4									
125	PH	4	78.9	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
126	KP	5									
127	PH	2	78.9	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
128	KP	6									
129	PH	1	78.9	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
130	KK	RT3									
131	KM	ROUTE TL9 TO 2002W									
132	RK	4000	.0073	.030		TRAP	50	8			
133	KK	TL10									
134	KM	RUNOFF HYDROGRAPH FOR TL10 SUBBASIN									
135	PH	50	78.9	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
136	BA	0.96									
137	LS	0	72								
138	UD	0.38									
139	KP	2									
140	PH	20	78.9	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
141	KP	3									
142	PH	10	78.9	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
143	KP	4									
144	PH	4	78.9	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
145	KP	5									
146	PH	2	78.9	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
147	KP	6									
148	PH	1	78.9	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9

LINE	ID	1	2	3	4	5	6	7	8	9	10
149	KK	2002W									
150	KM	COMBINE RT2 WITH RT3 AND TL10									
151	HC	3									
152	KK	RT4									
153	KM	ROUTE 2002W TO PXWEST									
154	RK	10000	.0052	.030		TRAP	50		8		
155	KK	TL12									
156	KM	RUNOFF HYDROGRAPH FOR TL12 SUBBASIN									
157	PH	50	78.9	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
158	BA	1.60									
159	LS	0	72								
160	UD	0.96									
161	KP	2									
162	PH	20	78.9	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
163	KP	3									
164	PH	10	78.9	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
165	KP	4									
166	PH	4	78.9	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
167	KP	5									
168	PH	2	78.9	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
169	KP	6									
170	PH	1	78.9	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
171	KK	RT5									
172	KM	ROUTE TL12 TO PXWEST									
173	RK	6600	.0064	.030		TRAP	50		8		
174	KK	TL13									
175	KM	RUNOFF HYDROGRAPH FOR TL13 SUBBASIN									
176	PH	50	78.9	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
177	BA	3.99									
178	LS	0	72								
179	UD	1.23									
180	KP	2									
181	PH	20	78.9	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
182	KP	3									
183	PH	10	78.9	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
184	KP	4									
185	PH	4	78.9	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
186	KP	5									
187	PH	2	78.9	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
188	KP	6									
189	PH	1	78.9	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
190	KK	RT6									
191	KM	ROUTE TL13 TO PXWEST									
192	RK	9600	.0052	.030		TRAP	50		8		

LINE	ID	1	2	3	4	5	6	7	8	9	10
193	KK	TL11									
194	KM	RUNOFF	HYDROGRAPH FOR TL11 SUBBASIN								
195	PH	50	78.9	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
196	BA	4.28									
197	LS	0	72								
198	UD	1.18									
199	KP	2									
200	PH	20	78.9	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
201	KP	3									
202	PH	10	78.9	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
203	KP	4									
204	PH	4	78.9	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
205	KP	5									
206	PH	2	78.9	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
207	KP	6									
208	PH	1	78.9	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
209	KK	PXWEST									
210	KM	COMBINE RT5 WITH RT6 AND RT4									
211	HC	4									
212	KK	TL6A									
213	KM	RUNOFF	HYDROGRAPH FOR TL6A SUBBASIN								
214	PH	50	78.9	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
215	BA	2.53									
216	LS	0	72								
217	UD	0.86									
218	KP	2									
219	PH	20	78.9	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
220	KP	3									
221	PH	10	78.9	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
222	KP	4									
223	PH	4	78.9	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
224	KP	5									
225	PH	2	78.9	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
226	KP	6									
227	PH	1	78.9	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
228	KK	RT7									
229	KM	ROUTE TL6A TO PXNW									
230	RK	9000	.0048	.030		TRAP	50	8			
231	KK	TL6B									
232	KM	RUNOFF	HYDROGRAPH FOR TL6B SUBBASIN								
233	PH	50	78.9	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
234	BA	0.85									
235	LS	0	72								
236	UD	0.46									
237	KP	2									
238	PH	20	78.9	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
239	KP	3									
240	PH	10	78.9	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
241	KP	4									
242	PH	4	78.9	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3

LINE	ID	1	2	3	4	5	6	7	8	9	10
288	KK	TL5									
289	KM	RUNOFF HYDROGRAPH FOR TL5 SUBBASIN									
290	PH	50	78.9	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
291	BA	1.88									
292	LS	0	72								
293	UD	0.52									
294	KP	2									
295	PH	20	78.9	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
296	KP	3									
297	PH	10	78.9	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
298	KP	4									
299	PH	4	78.9	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
300	KP	5									
301	PH	2	78.9	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
302	KP	6									
303	PH	1	78.9	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
304	KK	PLAYAX									
305	KM	COMBINE K2002 - TL5 - PXNE - PXNW - PXWEST									
306	HC	5									
307	KK	TLPLAY									
308	KM	ROUTE INFLOW HYDROGRAPH THROUGH THREE LEAGUE PLAYA									
309	RS	1	ELEV	2725							
310	SV	0	362	1172	2679	5066					
311	SQ	0	0	0	15000	100000					
312	SE	2725	2730	2735	2740	2745					
313	KK	RT9									
314	KM	ROUTE TLPLAY OUTFLOW TO ALKRD									
315	RK	4000	.0030	.030		TRAP	20	6			
316	KK	TL14									
317	KM	RUNOFF HYDROGRAPH FOR TL14 SUBBASIN									
318	PH	50	78.9	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
319	BA	12.70									
320	LS	0	72								
321	UD	1.29									
322	KP	2									
323	PH	20	78.9	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
324	KP	3									
325	PH	10	78.9	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
326	KP	4									
327	PH	4	78.9	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
328	KP	5									
329	PH	2	78.9	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
330	KP	6									
331	PH	1	78.9	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9

LINE	ID	1	2	3	4	5	6	7	8	9	10
381	PH	10	78.9	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
382	KP	4									
383	PH	4	78.9	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
384	KP	5									
385	PH	2	78.9	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
386	KP	6									
387	PH	1	78.9	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
388	KK ALKALI										
389	KM COMBINE TL18 - RT12 - TL17 AND RT11										
390	HC	3									
391	KK ALKLAK										
392	KM ROUTE INFLOW HYDROGRAPH THROUGH ALKALI LAKE										
393	RS	1	ELEV	2708							
394	SV	0	77	346	813	1682	3130				
395	SQ	0	0	0	0	17000	100000				
396	SE	2708	2710	2715	2720	2725	2730				
397	KK TL20E										
398	KM RUNOFF HYDROGRAPH FOR TL20E SUBBASIN										
399	PH	50	78.9	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
400	BA	1.53									
401	LS	0	72								
402	UD	2.00									
403	KP	2									
404	PH	20	78.9	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
405	KP	3									
406	PH	10	78.9	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
407	KP	4									
408	PH	4	78.9	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
409	KP	5									
410	PH	2	78.9	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
411	KP	6									
412	PH	1	78.9	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
413	KK SP11N										
414	KM COMBINE ALKLAK OUTFLOW HYDROGRAPH WITH SP11N										
415	HC	2									
416	KK SPILL1										
417	KM ROUTE SP11N INFLOW HYDROGRAPH THROUGH SPILL1 PLAYA										
418	RS	1	ELEV	2710							
419	SV	0	101	369	837	1495					
420	SQ	0	0	0	14000	100000					
421	SE	2710	2715	2720	2725	2730					
422	KK TL20F										
423	KM RUNOFF HYDROGRAPH FOR TL20F SUBBASIN										
424	PH	50	78.9	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
425	BA	0.66									
426	LS	0	72								
427	UD	0.74									
428	KP	2									
429	PH	20	78.9	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9

LINE	ID	1	2	3	4	5	6	7	8	9	10
480	PH	1	78.9	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
481	KK TL11N										
482	KM COMBINE RT13 WITH TL20A										
483	HC	2									
484	KK TL20-1										
485	KM ROUTE TL11N INFLOW HYDROGRAPH THROUGH TL20-1 PLAYA										
486	RS	1	ELEV	2755							
487	SV	0	351	1286	3240						
488	SQ	0	0	0	100000						
489	SE	2755	2760	2765	2770						
490	KK TL20B										
491	KM RUNOFF HYDROGRAPH FOR TL20B SUBBASIN										
492	PH	50	78.9	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
493	BA	0.40									
494	LS	0	72								
495	UD	0.67									
496	KP	2									
497	PH	20	78.9	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
498	KP	3									
499	PH	10	78.9	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
500	KP	4									
501	PH	4	78.9	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
502	KP	5									
503	PH	2	78.9	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
504	KP	6									
505	PH	1	78.9	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
506	KK TL21N										
507	KM COMBINE TL20-1 OUTFLOW HYDROGRAPH WITH TL20B										
508	HC	2									
509	KK TL20-2										
510	KM ROUTE TL21N INFLOW HYDROGRAPH THROUGH TL20-2 PLAYA										
511	RS	1	ELEV	2750							
512	SV	0	56	212	537						
513	SQ	0	0	0	100000						
514	SE	2750	2755	2760	2765						
515	KK RT15										
516	KM ROUTE TL20-2 TO TL31N										
517	RK	6800	.0015	.030	TRAP	50	8				
518	KK TL20C										
519	KM RUNOFF HYDROGRAPH FOR TL20C SUBBASIN										
520	PH	50	78.9	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
521	BA	3.48									
522	LS	0	72								
523	UD	0.67									
524	KP	2									
525	PH	20	78.9	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
526	KP	3									
527	PH	10	78.9	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6

LINE	ID	1	2	3	4	5	6	7	8	9	10
528	KP	4									
529	PH	4	78.9	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
530	KP	5									
531	PH	2	78.9	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
532	KP	6									
533	PH	1	78.9	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
534	KK	TL31N									
535	KM	COMBINE TL20-2 OUTFLOW HYDROGRAPH WITH TL20C									
536	HC	2									
537	KK	TL20-3									
538	KM	ROUTE TL31N INFLOW HYDROGRAPH THROUGH TL20-3 PLAYA									
539	RS	1	ELEV	2740							
540	SV	0	1198	4620							
541	SQ	0	0	100000							
542	SE	2740	2745	2750							
543	KK	RT16									
544	KM	ROUTE TL20-3 OUTFLOW HYDROGRAPH TO TL41N									
545	RK	8000	.0038	0.030		TRAP	50		8		
546	KK	TL20D									
547	KM	RUNOFF HYDROGRAPH FOR TL20D SUBBASIN									
548	PH	50	78.9	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
549	BA	2.08									
550	LS	0	72								
551	UD	2.00									
552	KP	2									
553	PH	20	78.9	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
554	KP	3									
555	PH	10	78.9	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
556	KP	4									
557	PH	4	78.9	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
558	KP	5									
559	PH	2	78.9	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
560	KP	6									
561	PH	1	78.9	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
562	KK	TL41N									
563	KM	COMBINE TL20-3 OUTFLOW HYDROGRAPH WITH TL20D									
564	HC	2									
565	KK	TL20-4									
566	KM	ROUTE TL41N INFLOW HYDROGRAPH THROUGH TL20-4 PLAYA									
567	RS	1	ELEV	2700							
568	SV	0	112	354	880	1929	3674				
569	SQ	0	0	0	0	100000	200000				
570	SE	2700	2705	2710	2715	2720	2725				

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE NO.	(V) ROUTING (.) CONNECTOR	(--->) DIVERSION OR PUMP FLOW (<---) RETURN OF DIVERTED OR PUMPED FLOW
20	TL1	
	.	
36	.	TL2
	.	.
52	KDRAW.....	
	V	
	V	
55	RT1	
	.	
58	.	TL3
	.	.
73	K2002.....	
	.	
76	.	TL7
	.	.
92	.	TL8
	.	.
108	.	829A.....
	V	
	V	
111	RT2	
	.	
114	.	TL9
	.	V
	.	V
130	.	RT3
	.	.
133	.	TL10
	.	.
149	.	2002W.....
	V	
	V	
152	RT4	
	.	
155	.	TL12
	.	V
	.	V
171	.	RT5
	.	.
174	.	TL13
	.	V

190	.	.	.	V	
	.	.	.	RT6	
	
193	.	.	.	.	TL11

209	.	PXWEST	.....	
	.	.	.		
212	.	.	TL6A		
	.	.	V		
	.	.	V		
228	.	.	RT7		
	.	.	.		
231	.	.	.	TL6B	
	
247	.	.	PXNW	.....
	.	.	.		
250	.	.	.	TL4A	
	.	.	.	V	
	.	.	.	V	
266	.	.	.	RT8	
	
269	.	.	.	.	TL4B

285	.	.	.	PXNE	.....
	
288	.	.	.	.	TL5

304	.	PLAYAX	.....	
	.	V			
	.	V			
307	.	TLPLAY			
	.	V			
	.	V			
313	.	RT9			
	.	.			
316	.	TL14			
	.	V			
	.	V			
332	.	RT10			
	.	.			
334	.	.	TL16		
	.	.	.		
350	.	ALKRD	.....	
	.	V			
	.	V			
353	.	RT11			
	.	.			

356	.	TL18	.
	.	.	.
372	.	.	TL17
	.	.	.
	.	.	.
388	ALKALI.....		
	V		
	V		
391	ALKLAK		
	.		
	.		
397	.	TL20E	.
	.	.	.
	.	.	.
413	SP1IN.....		
	V		
	V		
416	SPILL1		
	.		
	.		
422	.	TL20F	.
	.	.	.
	.	.	.
438	SP2IN.....		
	V		
	V		
441	SPILL2		
	.		
	.		
447	.	TL19	.
	.	V	.
	.	V	.
463	.	RT13	.
	.	.	.
	.	.	.
465	.	.	TL20A
	.	.	.
	.	.	.
481	.	TL1IN.....	
	.	V	
	.	V	
484	.	TL20-1	.
	.	.	.
	.	.	.
490	.	.	TL20B
	.	.	.
	.	.	.
506	.	TL2IN.....	
	.	V	
	.	V	
509	.	TL20-2	.
	.	V	.
	.	V	.
515	.	RT15	.
	.	.	.
	.	.	.
518	.	.	TL20C
	.	.	.

```

534 .      .      .
      .      TL3IN.....
      .      V
      .      V
537 .      TL20-3
      .      V
      .      V
543 .      RT16
      .      .
      .      .
546 .      .      TL20D
      .      .
      .      .
562 .      TL4IN.....
      .      V
      .      V
565 .      TL20-4
      .      .
      .      .
571 .      .      TL20G
      .      .
      .      .
587 40UT.....
      V
      V
590 RT14
      .
      .
593 .      TL20H
      .      .
      .      .
609 HW137X.....

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(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

*
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
* FEBRUARY 1981 *
* REVISED 02 AUG 88 *
*
* RUN DATE 09/13/1990 TIME 11:36:44 *
*

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

MARTIN COUNTY FLOOD CONTROL STUDY JOB NO. 06901-001-036
HDR ENGINEERING, INC. AUSTIN, TEXAS

THREE LEAGUE ARE MAODEL TO HWY 137 CROSSING

COMPUTING 2-YR, 5-YR, 10-YR, 25-YR, 50-YR, AND 100-YR FLOOD EVENTS FOR
THREE LEAGUE AREA USING PLAN OPTION IN HEC-1.

- PLAN 1: 2-YEAR EVENT
- PLAN 2: 5-YEAR EVENT
- PLAN 3: 10-YEAR EVENT
- PLAN 4: 25-YEAR EVENT
- PLAN 5: 50-YEAR EVENT
- PLAN 6: 100-YEAR EVENT

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

IT HYDROGRAPH TIME DATA
 NMIN 10 MINUTES IN COMPUTATION INTERVAL
 IDATE 1 0 STARTING DATE
 ITIME 0000 STARTING TIME
 NQ 300 NUMBER OF HYDROGRAPH ORDINATES
 NDDATE 3 0 ENDING DATE
 NDTIME 0150 ENDING TIME
 ICENT 19 CENTURY MARK

COMPUTATION INTERVAL .17 HOURS
TOTAL TIME BASE 49.83 HOURS

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

JP MULTI-PLAN OPTION
 NPLAN 6 NUMBER OF PLANS

JR MULTI-RATIO OPTION
 RATIOS OF RUNOFF
 1.00

*** FLOGRD - MAXIMUM NUMBER OF DX INTERVALS REACHED. MDX= 51
THIS MAY AFFECT ACCURACY OF KW SOLUTION. TO REDUCE ERRORS SHORTEN CHANNEL ELEMENT = 3

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
 FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
 TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS	
				RATIO 1	
					1.00
HYDROGRAPH AT	TL1	4.65	1	FLOW	320.
				TIME	13.50
			2	FLOW	963.
				TIME	13.33
			3	FLOW	1458.
				TIME	13.33
			4	FLOW	2003.
				TIME	13.33
			5	FLOW	2506.
				TIME	13.33
			6	FLOW	3035.
				TIME	13.33
HYDROGRAPH AT	TL2	1.04	1	FLOW	83.
				TIME	13.17
			2	FLOW	249.
				TIME	13.17
			3	FLOW	375.
				TIME	13.00
			4	FLOW	515.
				TIME	13.00
			5	FLOW	651.
				TIME	13.00
			6	FLOW	786.
				TIME	13.00
2 COMBINED AT	KDRAW	5.69	1	FLOW	396.
				TIME	13.33
			2	FLOW	1198.
				TIME	13.33
			3	FLOW	1808.
				TIME	13.33
			4	FLOW	2481.
				TIME	13.33
			5	FLOW	3109.
				TIME	13.17
			6	FLOW	3768.
				TIME	13.17
ROUTED TO	RT1	5.69	1	FLOW	396.
				TIME	14.17
			2	FLOW	1188.
				TIME	13.83
			3	FLOW	1807.
				TIME	13.83
			4	FLOW	2470.
				TIME	13.67
			5	FLOW	3102.
				TIME	13.67

			6	FLOW	3752.
				TIME	13.67
HYDROGRAPH AT	TL3	3.11	1	FLOW	302.
				TIME	12.83
			2	FLOW	908.
				TIME	12.83
			3	FLOW	1353.
				TIME	12.83
			4	FLOW	1848.
				TIME	12.83
			5	FLOW	2331.
				TIME	12.83
			6	FLOW	2794.
				TIME	12.83
2 COMBINED AT	K2002	8.80	1	FLOW	514.
				TIME	14.17
			2	FLOW	1527.
				TIME	13.67
			3	FLOW	2403.
				TIME	13.67
			4	FLOW	3352.
				TIME	13.50
			5	FLOW	4201.
				TIME	13.50
			6	FLOW	5165.
				TIME	13.33
HYDROGRAPH AT	TL7	3.39	1	FLOW	319.
				TIME	13.00
			2	FLOW	966.
				TIME	12.83
			3	FLOW	1445.
				TIME	12.83
			4	FLOW	1977.
				TIME	12.83
			5	FLOW	2496.
				TIME	12.83
			6	FLOW	2998.
				TIME	12.83
HYDROGRAPH AT	TL8	.55	1	FLOW	77.
				TIME	12.50
			2	FLOW	221.
				TIME	12.50
			3	FLOW	333.
				TIME	12.33
			4	FLOW	456.
				TIME	12.33
			5	FLOW	568.
				TIME	12.33
			6	FLOW	689.
				TIME	12.33
2 COMBINED AT	829A	3.94	1	FLOW	368.
				TIME	12.83
			2	FLOW	1099.
				TIME	12.83
			3	FLOW	1636.

	TIME	12.83
4	FLOW	2235.
	TIME	12.83
5	FLOW	2839.
	TIME	12.67
6	FLOW	3422.
	TIME	12.67

ROUTED TO	RT2	3.94	1	FLOW	367.
				TIME	13.17
			2	FLOW	1091.
				TIME	13.00
			3	FLOW	1633.
				TIME	13.00
			4	FLOW	2235.
				TIME	13.00
			5	FLOW	2833.
				TIME	12.83
			6	FLOW	3420.
				TIME	12.83

HYDROGRAPH AT	TL9	.93	1	FLOW	107.
				TIME	12.67
			2	FLOW	316.
				TIME	12.67
			3	FLOW	467.
				TIME	12.67
			4	FLOW	636.
				TIME	12.67
			5	FLOW	804.
				TIME	12.67
			6	FLOW	961.
				TIME	12.50

ROUTED TO	RT3	.93	1	FLOW	103.
				TIME	12.83
			2	FLOW	312.
				TIME	12.83
			3	FLOW	460.
				TIME	12.67
			4	FLOW	631.
				TIME	12.67
			5	FLOW	798.
				TIME	12.67
			6	FLOW	961.
				TIME	12.67

HYDROGRAPH AT	TL10	.96	1	FLOW	117.
				TIME	12.67
			2	FLOW	351.
				TIME	12.50
			3	FLOW	526.
				TIME	12.50
			4	FLOW	718.
				TIME	12.50
			5	FLOW	905.
				TIME	12.50
			6	FLOW	1088.
				TIME	12.50

3 COMBINED AT	2002W	5.83	1	FLOW	522.
				TIME	13.00
			2	FLOW	1604.
				TIME	12.83
			3	FLOW	2431.
				TIME	12.83
			4	FLOW	3349.
				TIME	12.83
			5	FLOW	4257.
				TIME	12.83
			6	FLOW	5105.
				TIME	12.83

ROUTED TO	RT4	5.83	1	FLOW	520.
				TIME	13.50
			2	FLOW	1596.
				TIME	13.17
			3	FLOW	2383.
				TIME	13.17
			4	FLOW	3308.
				TIME	13.00
			5	FLOW	4236.
				TIME	13.00
			6	FLOW	5101.
				TIME	13.00

HYDROGRAPH AT	TL12	1.60	1	FLOW	121.
				TIME	13.33
			2	FLOW	364.
				TIME	13.17
			3	FLOW	549.
				TIME	13.17
			4	FLOW	753.
				TIME	13.17
			5	FLOW	945.
				TIME	13.17
			6	FLOW	1141.
				TIME	13.17

ROUTED TO	RT5	1.60	1	FLOW	120.
				TIME	13.67
			2	FLOW	361.
				TIME	13.50
			3	FLOW	541.
				TIME	13.33
			4	FLOW	747.
				TIME	13.33
			5	FLOW	941.
				TIME	13.33
			6	FLOW	1139.
				TIME	13.33

HYDROGRAPH AT	TL13	3.99	1	FLOW	257.
				TIME	13.67
			2	FLOW	772.
				TIME	13.50
			3	FLOW	1171.
				TIME	13.50
			4	FLOW	1608.
				TIME	13.50

5 FLOW 2007.
TIME 13.50
6 FLOW 2435.
TIME 13.50

ROUTED TO RT6 3.99
1 FLOW 256.
TIME 14.17
2 FLOW 771.
TIME 13.83
3 FLOW 1165.
TIME 13.83
4 FLOW 1597.
TIME 13.67
5 FLOW 2005.
TIME 13.67
6 FLOW 2435.
TIME 13.67

HYDROGRAPH AT TL11 4.28
1 FLOW 282.
TIME 13.50
2 FLOW 848.
TIME 13.50
3 FLOW 1284.
TIME 13.50
4 FLOW 1767.
TIME 13.33
5 FLOW 2220.
TIME 13.33
6 FLOW 2694.
TIME 13.33

4 COMBINED AT PXWEST 15.70
1 FLOW 1110.
TIME 13.67
2 FLOW 3325.
TIME 13.33
3 FLOW 5026.
TIME 13.33
4 FLOW 6882.
TIME 13.33
5 FLOW 8636.
TIME 13.17
6 FLOW 10459.
TIME 13.17

HYDROGRAPH AT TL6A 2.53
1 FLOW 204.
TIME 13.17
2 FLOW 609.
TIME 13.00
3 FLOW 920.
TIME 13.00
4 FLOW 1264.
TIME 13.00
5 FLOW 1596.
TIME 13.00
6 FLOW 1926.
TIME 13.00

ROUTED TO RT7 2.53
1 FLOW 204.
TIME 13.67
2 FLOW 609.

				TIME	13.50
			3	FLOW	918.
				TIME	13.33
			4	FLOW	1258.
				TIME	13.33
			5	FLOW	1576.
				TIME	13.33
			6	FLOW	1895.
				TIME	13.33
HYDROGRAPH AT	TL6B	.85	1	FLOW	97.
				TIME	12.67
			2	FLOW	287.
				TIME	12.67
			3	FLOW	424.
				TIME	12.67
			4	FLOW	578.
				TIME	12.67
			5	FLOW	731.
				TIME	12.67
			6	FLOW	873.
				TIME	12.67
2 COMBINED AT	PXNW	3.38	1	FLOW	239.
				TIME	13.67
			2	FLOW	733.
				TIME	13.33
			3	FLOW	1114.
				TIME	13.33
			4	FLOW	1543.
				TIME	13.17
			5	FLOW	1937.
				TIME	13.17
			6	FLOW	2351.
				TIME	13.17
HYDROGRAPH AT	TL4A	4.65	1	FLOW	250.
				TIME	14.17
			2	FLOW	741.
				TIME	14.00
			3	FLOW	1135.
				TIME	13.83
			4	FLOW	1560.
				TIME	13.83
			5	FLOW	1955.
				TIME	13.83
			6	FLOW	2388.
				TIME	13.83
ROUTED TO	RTB	4.65	1	FLOW	250.
				TIME	14.67
			2	FLOW	740.
				TIME	14.17
			3	FLOW	1135.
				TIME	14.17
			4	FLOW	1555.
				TIME	14.17
			5	FLOW	1943.
				TIME	14.17
			6	FLOW	2377.

				TIME	14.00
HYDROGRAPH AT	TL4B	.52	1	FLOW	44.
				TIME	13.17
			2	FLOW	133.
				TIME	13.00
			3	FLOW	199.
				TIME	13.00
			4	FLOW	273.
				TIME	13.00
			5	FLOW	343.
				TIME	13.00
			6	FLOW	413.
				TIME	13.00
2 COMBINED AT	PXNE	5.17	1	FLOW	269.
				TIME	14.50
			2	FLOW	793.
				TIME	14.17
			3	FLOW	1218.
				TIME	14.17
			4	FLOW	1664.
				TIME	14.00
			5	FLOW	2092.
				TIME	14.00
			6	FLOW	2563.
				TIME	14.00
HYDROGRAPH AT	TL5	1.88	1	FLOW	200.
				TIME	12.83
			2	FLOW	600.
				TIME	12.67
			3	FLOW	897.
				TIME	12.67
			4	FLOW	1226.
				TIME	12.67
			5	FLOW	1552.
				TIME	12.67
			6	FLOW	1863.
				TIME	12.67
5 COMBINED AT	PLAYAX	34.93	1	FLOW	2031.
				TIME	14.00
			2	FLOW	6331.
				TIME	13.50
			3	FLOW	9743.
				TIME	13.50
			4	FLOW	13577.
				TIME	13.33
			5	FLOW	17015.
				TIME	13.33
			6	FLOW	20725.
				TIME	13.17
ROUTED TO	TLPLAY	34.93	1	FLOW	0.
				TIME	.17
			2	FLOW	1432.
				TIME	17.67
			3	FLOW	3638.
				TIME	15.67

4	FLOW	5958.
	TIME	15.00
5	FLOW	8641.
	TIME	14.67
6	FLOW	11643.
	TIME	14.67

** PEAK STAGES IN FEET **

1	STAGE	2732.73
	TIME	49.67
2	STAGE	2735.48
	TIME	17.67
3	STAGE	2736.21
	TIME	15.67
4	STAGE	2736.99
	TIME	15.00
5	STAGE	2737.88
	TIME	14.67
6	STAGE	2738.88
	TIME	14.67

ROUTED TO	RT9	34.93	1	FLOW	0.
				TIME	.17
			2	FLOW	1431.
				TIME	17.67
			3	FLOW	3635.
				TIME	15.83
			4	FLOW	5941.
				TIME	15.00
			5	FLOW	8641.
				TIME	14.83
			6	FLOW	11639.
				TIME	14.67

HYDROGRAPH AT	TL14	12.70	1	FLOW	793.
				TIME	13.67
			2	FLOW	2375.
				TIME	13.50
			3	FLOW	3617.
				TIME	13.50
			4	FLOW	4973.
				TIME	13.50
			5	FLOW	6226.
				TIME	13.50
			6	FLOW	7565.
				TIME	13.50

ROUTED TO	RT10	12.70	1	FLOW	789.
				TIME	14.17
			2	FLOW	2371.
				TIME	13.83
			3	FLOW	3600.
				TIME	13.83
			4	FLOW	4930.
				TIME	13.83
			5	FLOW	6190.
				TIME	13.67
			6	FLOW	7535.
				TIME	13.67

HYDROGRAPH AT	TL16	2.86	1	FLOW	224.
				TIME	13.17
			2	FLOW	675.
				TIME	13.17
			3	FLOW	1012.
				TIME	13.17
			4	FLOW	1387.
				TIME	13.17
			5	FLOW	1747.
				TIME	13.00
			6	FLOW	2113.
				TIME	13.00

3 COMBINED AT	ALKRD	50.49	1	FLOW	931.
				TIME	14.00
			2	FLOW	2810.
				TIME	13.67
			3	FLOW	5591.
				TIME	15.33
			4	FLOW	9536.
				TIME	14.50
			5	FLOW	13810.
				TIME	14.33
			6	FLOW	18519.
				TIME	14.17

ROUTED TO	RT11	50.49	1	FLOW	928.
				TIME	14.17
			2	FLOW	2809.
				TIME	13.83
			3	FLOW	5586.
				TIME	15.33
			4	FLOW	9500.
				TIME	14.67
			5	FLOW	13790.
				TIME	14.33
			6	FLOW	18431.
				TIME	14.17

HYDROGRAPH AT	TL18	.62	1	FLOW	66.
				TIME	12.83
			2	FLOW	200.
				TIME	12.67
			3	FLOW	299.
				TIME	12.67
			4	FLOW	408.
				TIME	12.67
			5	FLOW	516.
				TIME	12.67
			6	FLOW	619.
				TIME	12.67

HYDROGRAPH AT	TL17	2.42	1	FLOW	261.
				TIME	12.67
			2	FLOW	788.
				TIME	12.67
			3	FLOW	1175.
				TIME	12.67
			4	FLOW	1604.
				TIME	12.67

5 FLOW 2030.
 TIME 12.67
 6 FLOW 2433.
 TIME 12.67

3 COMBINED AT ALKALI 53.53
 1 FLOW 1035.
 TIME 14.17
 2 FLOW 3070.
 TIME 13.83
 3 FLOW 5816.
 TIME 15.33
 4 FLOW 9817.
 TIME 14.50
 5 FLOW 14270.
 TIME 14.33
 6 FLOW 19114.
 TIME 14.17

ROUTED TO ALKLAK 53.53
 1 FLOW 0.
 TIME .17
 2 FLOW 1967.
 TIME 18.83
 3 FLOW 5060.
 TIME 16.50
 4 FLOW 8294.
 TIME 15.67
 5 FLOW 12254.
 TIME 15.33
 6 FLOW 16651.
 TIME 15.00

** PEAK STAGES IN FEET **

1 STAGE 2715.89
 TIME 43.33
 2 STAGE 2720.58
 TIME 18.83
 3 STAGE 2721.49
 TIME 16.50
 4 STAGE 2722.44
 TIME 15.67
 5 STAGE 2723.60
 TIME 15.33
 6 STAGE 2724.90
 TIME 15.00

HYDROGRAPH AT TL20E 1.53
 1 FLOW 72.
 TIME 14.67
 2 FLOW 210.
 TIME 14.33
 3 FLOW 325.
 TIME 14.33
 4 FLOW 443.
 TIME 14.33
 5 FLOW 556.
 TIME 14.33
 6 FLOW 682.
 TIME 14.33

2 COMBINED AT SP11N 55.06
 1 FLOW 72.
 TIME 14.67

2	FLOW	2029.
	TIME	18.83
3	FLOW	5239.
	TIME	16.33
4	FLOW	8594.
	TIME	15.50
5	FLOW	12693.
	TIME	15.17
6	FLOW	17257.
	TIME	15.00

ROUTED TO SPILL1 55.06

1	FLOW	0.
	TIME	.17
2	FLOW	1739.
	TIME	20.67
3	FLOW	4813.
	TIME	17.17
4	FLOW	8039.
	TIME	16.33
5	FLOW	12024.
	TIME	15.83
6	FLOW	17203.
	TIME	15.17

** PEAK STAGES IN FEET **

1	STAGE	2711.75
	TIME	32.83
2	STAGE	2720.62
	TIME	20.67
3	STAGE	2721.72
	TIME	17.17
4	STAGE	2722.87
	TIME	16.33
5	STAGE	2724.29
	TIME	15.83
6	STAGE	2725.19
	TIME	15.17

HYDROGRAPH AT TL20F .66

1	FLOW	58.
	TIME	13.00
2	FLOW	174.
	TIME	13.00
3	FLOW	260.
	TIME	13.00
4	FLOW	356.
	TIME	13.00
5	FLOW	451.
	TIME	12.83
6	FLOW	544.
	TIME	12.83

2 COMBINED AT SP21N 55.72

1	FLOW	58.
	TIME	13.00
2	FLOW	1754.
	TIME	20.67
3	FLOW	4841.
	TIME	17.17
4	FLOW	8094.
	TIME	16.33
5	FLOW	12095.

TIME 15.83
6 FLOW 17318.
TIME 15.17

ROUTED TO SPILL2 55.72

1 FLOW 0.
TIME .17
2 FLOW 1567.
TIME 22.00
3 FLOW 4469.
TIME 18.00
4 FLOW 8106.
TIME 16.17
5 FLOW 12069.
TIME 15.83
6 FLOW 17289.
TIME 15.33

** PEAK STAGES IN FEET **

1 STAGE 2700.11
TIME 27.17
2 STAGE 2711.57
TIME 22.00
3 STAGE 2714.47
TIME 18.00
4 STAGE 2715.16
TIME 16.17
5 STAGE 2715.37
TIME 15.83
6 STAGE 2715.65
TIME 15.33

HYDROGRAPH AT TL19 4.73

1 FLOW 202.
TIME 15.17
2 FLOW 577.
TIME 14.83
3 FLOW 892.
TIME 14.83
4 FLOW 1209.
TIME 14.67
5 FLOW 1525.
TIME 14.67
6 FLOW 1881.
TIME 14.67

ROUTED TO RT13 4.73

1 FLOW 202.
TIME 15.33
2 FLOW 576.
TIME 14.83
3 FLOW 891.
TIME 14.83
4 FLOW 1207.
TIME 14.83
5 FLOW 1522.
TIME 14.67
6 FLOW 1877.
TIME 14.67

HYDROGRAPH AT TL20A 1.17

1 FLOW 103.
TIME 13.00
2 FLOW 308.

	TIME	13.00
3	FLOW	459.
	TIME	13.00
4	FLOW	628.
	TIME	13.00
5	FLOW	792.
	TIME	12.83
6	FLOW	957.
	TIME	12.83

2 COMBINED AT TL11N 5.90

1	FLOW	239.
	TIME	15.17
2	FLOW	661.
	TIME	14.83
3	FLOW	1020.
	TIME	14.67
4	FLOW	1355.
	TIME	14.67
5	FLOW	1723.
	TIME	14.50
6	FLOW	2137.
	TIME	14.50

ROUTED TO TL20-1 5.90

1	FLOW	0.
	TIME	.17
2	FLOW	0.
	TIME	.17
3	FLOW	0.
	TIME	.17
4	FLOW	0.
	TIME	.17
5	FLOW	0.
	TIME	.17
6	FLOW	0.
	TIME	.17

** PEAK STAGES IN FEET **

1	STAGE	2756.94
	TIME	34.83
2	STAGE	2760.02
	TIME	34.83
3	STAGE	2760.90
	TIME	34.33
4	STAGE	2761.78
	TIME	34.67
5	STAGE	2762.78
	TIME	35.67
6	STAGE	2763.81
	TIME	35.67

HYDROGRAPH AT TL20B .40

1	FLOW	37.
	TIME	13.00
2	FLOW	112.
	TIME	12.83
3	FLOW	168.
	TIME	12.83
4	FLOW	230.
	TIME	12.83
5	FLOW	291.
	TIME	12.83

6 FLOW 350.
TIME 12.83

2 COMBINED AT TL21N 6.30

1 FLOW 37.
TIME 13.00
2 FLOW 112.
TIME 12.83
3 FLOW 168.
TIME 12.83
4 FLOW 230.
TIME 12.83
5 FLOW 291.
TIME 12.83
6 FLOW 350.
TIME 12.83

ROUTED TO TL20-2 6.30

1 FLOW 0.
TIME .17
2 FLOW 0.
TIME .17
3 FLOW 0.
TIME .17
4 FLOW 0.
TIME .17
5 FLOW 0.
TIME .17
6 FLOW 0.
TIME .17

** PEAK STAGES IN FEET **

1 STAGE 2750.82
TIME 26.33
2 STAGE 2752.15
TIME 26.50
3 STAGE 2753.15
TIME 27.00
4 STAGE 2754.14
TIME 27.00
5 STAGE 2755.10
TIME 26.33
6 STAGE 2755.52
TIME 27.17

ROUTED TO RT15 6.30

1 FLOW 0.
TIME .17
2 FLOW 0.
TIME .17
3 FLOW 0.
TIME .17
4 FLOW 0.
TIME .17
5 FLOW 0.
TIME .17
6 FLOW 0.
TIME .17

HYDROGRAPH AT TL20C 3.48

1 FLOW 324.
TIME 13.00
2 FLOW 975.
TIME 12.83

3	FLOW	1462.
	TIME	12.83
4	FLOW	2002.
	TIME	12.83
5	FLOW	2530.
	TIME	12.83
6	FLOW	3042.
	TIME	12.83

2 COMBINED AT TL31N 9.78

1	FLOW	324.
	TIME	13.00
2	FLOW	975.
	TIME	12.83
3	FLOW	1462.
	TIME	12.83
4	FLOW	2002.
	TIME	12.83
5	FLOW	2530.
	TIME	12.83
6	FLOW	3042.
	TIME	12.83

ROUTED TO TL20-3 9.78

1	FLOW	0.
	TIME	.17
2	FLOW	0.
	TIME	.17
3	FLOW	0.
	TIME	.17
4	FLOW	0.
	TIME	.17
5	FLOW	0.
	TIME	.17
6	FLOW	0.
	TIME	.17

** PEAK STAGES IN FEET **

1	STAGE	2740.34
	TIME	26.00
2	STAGE	2740.87
	TIME	26.67
3	STAGE	2741.28
	TIME	27.00
4	STAGE	2741.68
	TIME	26.50
5	STAGE	2742.14
	TIME	26.50
6	STAGE	2742.62
	TIME	27.00

ROUTED TO RT16 9.78

1	FLOW	0.
	TIME	.17
2	FLOW	0.
	TIME	.17
3	FLOW	0.
	TIME	.17
4	FLOW	0.
	TIME	.17
5	FLOW	0.
	TIME	.17
6	FLOW	0.

			TIME	.17
HYDROGRAPH AT	TL20D	2.08	1 FLOW	98.
			TIME	14.67
			2 FLOW	286.
			TIME	14.33
			3 FLOW	441.
			TIME	14.33
			4 FLOW	602.
			TIME	14.33
			5 FLOW	756.
			TIME	14.33
			6 FLOW	928.
			TIME	14.33

2 COMBINED AT	TL4IN	11.86	1 FLOW	98.
			TIME	14.67
			2 FLOW	286.
			TIME	14.33
			3 FLOW	441.
			TIME	14.33
			4 FLOW	602.
			TIME	14.33
			5 FLOW	756.
			TIME	14.33
			6 FLOW	928.
			TIME	14.33

ROUTED TO	TL20-4	11.86	1 FLOW	0.
			TIME	.17
			2 FLOW	0.
			TIME	.17
			3 FLOW	0.
			TIME	.17
			4 FLOW	0.
			TIME	.17
			5 FLOW	0.
			TIME	.17
			6 FLOW	0.
			TIME	.17

** PEAK STAGES IN FEET **

1	STAGE	2702.15
	TIME	32.33
2	STAGE	2705.27
	TIME	33.17
3	STAGE	2706.47
	TIME	32.83
4	STAGE	2707.67
	TIME	32.67
5	STAGE	2709.02
	TIME	33.00
6	STAGE	2710.20
	TIME	33.33

HYDROGRAPH AT	TL20G	.41	1 FLOW	30.
			TIME	13.33
			2 FLOW	90.
			TIME	13.17
			3 FLOW	137.

	TIME	13.17
4	FLOW	188.
	TIME	13.17
5	FLOW	236.
	TIME	13.17
6	FLOW	286.
	TIME	13.17

3 COMBINED AT	4OUT	67.99	1	FLOW	30.
				TIME	13.33
			2	FLOW	1575.
				TIME	22.00
			3	FLOW	4486.
				TIME	18.00
			4	FLOW	8143.
				TIME	16.17
			5	FLOW	12121.
				TIME	15.83
			6	FLOW	17371.
				TIME	15.33

ROUTED TO	RT14	67.99	1	FLOW	30.
				TIME	14.17
			2	FLOW	1573.
				TIME	22.17
			3	FLOW	4484.
				TIME	18.17
			4	FLOW	8140.
				TIME	16.33
			5	FLOW	12120.
				TIME	16.00
			6	FLOW	17298.
				TIME	15.50

HYDROGRAPH AT	TL20H	2.67	1	FLOW	147.
				TIME	14.00
			2	FLOW	438.
				TIME	13.83
			3	FLOW	671.
				TIME	13.83
			4	FLOW	921.
				TIME	13.83
			5	FLOW	1151.
				TIME	13.83
			6	FLOW	1405.
				TIME	13.83

2 COMBINED AT	HW137X	70.66	1	FLOW	177.
				TIME	14.00
			2	FLOW	1633.
				TIME	22.17
			3	FLOW	4619.
				TIME	18.17
			4	FLOW	8456.
				TIME	16.33
			5	FLOW	12580.
				TIME	16.00
			6	FLOW	18064.
				TIME	15.33

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

*
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
* FEBRUARY 1981 *
* REVISED 02 AUG 88 *
*
* RUN DATE 09/13/1990 TIME 12:00:45 *
*

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

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::
:: Full Microcomputer Implementation ::
:: by ::
:: Haestad Methods, Inc. ::
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37 Brookside Road * Waterbury, Connecticut 06708 * (203) 755-1666

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.
THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

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

*DIAGRAM

1 ID MARTIN COUNTY FLOOD CONTROL STUDY JOB NO. 06901-001-036
 2 ID HDR ENGINEERING, INC. AUSTIN, TEXAS
 3 ID
 4 ID THREE LEAGUE AREA MODEL TO HWY 137 CROSSING. ALTERNATIVE 1 INCORPORATED
 5 ID INTO MODEL.
 6 ID
 7 ID COMPUTING 2-YR, 5-YR, 10-YR, 25-YR, 50-YR, AND 100-YR FLOOD EVENTS FOR
 8 ID THREE LEAGUE AREA USING PLAN OPTION IN HEC-1.
 9 ID
 10 ID PLAN 1: 2-YEAR EVENT
 11 ID PLAN 2: 5-YEAR EVENT
 12 ID PLAN 3: 10-YEAR EVENT
 13 ID PLAN 4: 25-YEAR EVENT
 14 ID PLAN 5: 50-YEAR EVENT
 15 ID PLAN 6: 100-YEAR EVENT
 16 ID
 17 ID

18 IT 10 300
 19 IO 5 0
 20 JP 6

21 KK TL1
 22 KM RUNOFF HYDROGRAPH FOR TL1 SUBBASIN
 23 PH 50 78.9 0.42 0.8 1.4 1.6 1.7 2.1 2.4 2.8
 24 BA 4.65
 25 LS 0 72
 26 UD 1.11
 27 KP 2
 28 PH 20 78.9 0.51 1.0 1.9 2.2 2.3 2.8 3.3 3.9
 29 KP 3
 30 PH 10 78.9 0.58 1.2 2.2 2.6 2.8 3.4 3.9 4.6
 31 KP 4
 32 PH 4 78.9 0.67 1.4 2.6 3.1 3.3 3.8 4.7 5.3
 33 KP 5
 34 PH 2 78.9 0.75 1.5 3.0 3.4 3.7 4.4 5.3 6.1
 35 KP 6
 36 PH 1 78.9 0.82 1.7 3.3 3.8 4.2 5.1 5.9 6.9

37 KK TL2
 38 KM RUNOFF HYDROGRAPH FOR TL2 SUBBASIN
 39 PH 50 78.9 0.42 0.8 1.4 1.6 1.7 2.1 2.4 2.8
 40 BA 1.04
 41 LS 0 72
 42 UD 0.87
 43 KP 2
 44 PH 20 78.9 0.51 1.0 1.9 2.2 2.3 2.8 3.3 3.9
 45 KP 3
 46 PH 10 78.9 0.58 1.2 2.2 2.6 2.8 3.4 3.9 4.6
 47 KP 4
 48 PH 4 78.9 0.67 1.4 2.6 3.1 3.3 3.8 4.7 5.3
 49 KP 5
 50 PH 2 78.9 0.75 1.5 3.0 3.4 3.7 4.4 5.3 6.1
 51 KP 6
 52 PH 1 78.9 0.82 1.7 3.3 3.8 4.2 5.1 5.9 6.9

LINE	ID	1	2	3	4	5	6	7	8	9	10
53	KK	KDRAW									
54	KM	COMBINE TL1 AND TL2									
55	HC	2									
56	KK	RT1									
57	KM	ROUTE KDRAW TO K2002									
58	RK	15600	.0035	.030		TRAP	50	8			
59	KK	TL3									
60	PH	50	78.9	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
61	BA	3.11									
62	LS	0	72								
63	UD	0.62									
64	KP	2									
65	PH	20	78.9	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
66	KP	3									
67	PH	10	78.9	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
68	KP	4									
69	PH	4	78.9	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
70	KP	5									
71	PH	2	78.9	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
72	KP	6									
73	PH	1	78.9	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
74	KK	K2002									
75	KM	COMBINE RT1 WITH TL3									
76	HC	2									
77	KK	TL7									
78	KM	RUNOFF HYDROGRAPH FOR TL7 SUBBASIN									
79	PH	50	78.9	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
80	BA	3.39									
81	LS	0	72								
82	UD	0.65									
83	KP	2									
84	PH	20	78.9	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
85	KP	3									
86	PH	10	78.9	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
87	KP	4									
88	PH	4	78.9	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
89	KP	5									
90	PH	2	78.9	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
91	KP	6									
92	PH	1	78.9	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
93	KK	TL8									
94	KM	RUNOFF HYDROGRAPH FOR TL8 SUBBASIN									
95	PH	50	78.9	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
96	BA	0.55									
97	LS	0	72								
98	UD	0.28									
99	KP	2									
100	PH	20	78.9	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
101	KP	3									

LINE	ID	1	2	3	4	5	6	7	8	9	10
102	PH	10	78.9	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
103	KP	4									
104	PH	4	78.9	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
105	KP	5									
106	PH	2	78.9	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
107	KP	6									
108	PH	1	78.9	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
109	KK	829A									
110	KM	COMBINE TL7 AND TL8									
111	HC	2									
112	KK	RT2									
113	KM	ROUTE 829A TO 2002W									
114	RK	8200	.0052	.030		TRAP	20	6			
115	KK	TL9									
116	KM	RUNOFF HYDROGRAPH FOR TL9 SUBBASIN									
117	PH	50	78.9	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
118	BA	0.93									
119	LS	0	72								
120	UD	0.45									
121	KP	2									
122	PH	20	78.9	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
123	KP	3									
124	PH	10	78.9	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
125	KP	4									
126	PH	4	78.9	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
127	KP	5									
128	PH	2	78.9	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
129	KP	6									
130	PH	1	78.9	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
131	KK	RT3									
132	KM	ROUTE TL9 TO 2002W									
133	RK	4000	.0073	.030		TRAP	50	8			
134	KK	TL10									
135	KM	RUNOFF HYDROGRAPH FOR TL10 SUBBASIN									
136	PH	50	78.9	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
137	BA	0.96									
138	LS	0	72								
139	UD	0.38									
140	KP	2									
141	PH	20	78.9	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
142	KP	3									
143	PH	10	78.9	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
144	KP	4									
145	PH	4	78.9	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
146	KP	5									
147	PH	2	78.9	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
148	KP	6									
149	PH	1	78.9	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9

LINE	ID	1	2	3	4	5	6	7	8	9	10
150	KK	2002W									
151	KM	COMBINE RT2 WITH RT3 AND TL10									
152	HC	3									
153	KK	RT4									
154	KM	ROUTE 2002W TO PXWEST									
155	RK	10000	.0052	.030		TRAP	50	8			
156	KK	TL12									
157	KM	RUNOFF HYDROGRAPH FOR TL12 SUBBASIN									
158	PH	50	78.9	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
159	BA	1.60									
160	LS	0	72								
161	UD	0.96									
162	KP	2									
163	PH	20	78.9	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
164	KP	3									
165	PH	10	78.9	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
166	KP	4									
167	PH	4	78.9	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
168	KP	5									
169	PH	2	78.9	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
170	KP	6									
171	PH	1	78.9	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
172	KK	RT5									
173	KM	ROUTE TL12 TO PXWEST									
174	RK	6600	.0064	.030		TRAP	50	8			
175	KK	TL13									
176	KM	RUNOFF HYDROGRAPH FOR TL13 SUBBASIN									
177	PH	50	78.9	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
178	BA	3.99									
179	LS	0	72								
180	UD	1.23									
181	KP	2									
182	PH	20	78.9	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
183	KP	3									
184	PH	10	78.9	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
185	KP	4									
186	PH	4	78.9	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
187	KP	5									
188	PH	2	78.9	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
189	KP	6									
190	PH	1	78.9	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
191	KK	RT6									
192	KM	ROUTE TL13 TO PXWEST									
193	RK	9600	.0052	.030		TRAP	50	8			

LINE	ID	1	2	3	4	5	6	7	8	9	10
194	KK	TL11									
195	KM	RUNOFF HYDROGRAPH FOR TL11 SUBBASIN									
196	PH	50	78.9	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
197	BA	4.28									
198	LS	0	72								
199	UD	1.18									
200	KP	2									
201	PH	20	78.9	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
202	KP	3									
203	PH	10	78.9	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
204	KP	4									
205	PH	4	78.9	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
206	KP	5									
207	PH	2	78.9	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
208	KP	6									
209	PH	1	78.9	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
210	KK	PXWEST									
211	KM	COMBINE RT5 WITH RT6 AND RT4									
212	HC	4									
213	KK	TL6A									
214	KM	RUNOFF HYDROGRAPH FOR TL6A SUBBASIN									
215	PH	50	78.9	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
216	BA	2.53									
217	LS	0	72								
218	UD	0.86									
219	KP	2									
220	PH	20	78.9	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
221	KP	3									
222	PH	10	78.9	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
223	KP	4									
224	PH	4	78.9	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
225	KP	5									
226	PH	2	78.9	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
227	KP	6									
228	PH	1	78.9	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
229	KK	RT7									
230	KM	ROUTE TL6A TO PXNW									
231	RK	9000	.0048	.030		TRAP	50	8			
232	KK	TL6B									
233	KM	RUNOFF HYDROGRAPH FOR TL6B SUBBASIN									
234	PH	50	78.9	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
235	BA	0.85									
236	LS	0	72								
237	UD	0.46									
238	KP	2									
239	PH	20	78.9	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
240	KP	3									
241	PH	10	78.9	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
242	KP	4									
243	PH	4	78.9	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3

LINE	ID	1	2	3	4	5	6	7	8	9	10
388	PH	2	78.9	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
389	KP	6									
390	PH	1	78.9	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
391	KK ALKALI										
392	KM COMBINE TL18 - RT12 - TL17 AND RT11										
393	HC	3									
394	KK ALKLAK										
395	KM ROUTE INFLOW HYDROGRAPH THROUGH ALKALI LAKE										
396	RS	1	ELEV	2708							
397	SV	0	77	346	813	1682	3130				
398	SQ	0	0	0	0	17000	100000				
399	SE	2708	2710	2715	2720	2725	2730				
400	KK TL20E										
401	KM RUNOFF HYDROGRAPH FOR TL20E SUBBASIN										
402	PH	50	78.9	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
403	BA	1.53									
404	LS	0	72								
405	UD	2.00									
406	KP	2									
407	PH	20	78.9	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
408	KP	3									
409	PH	10	78.9	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
410	KP	4									
411	PH	4	78.9	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
412	KP	5									
413	PH	2	78.9	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
414	KP	6									
415	PH	1	78.9	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
416	KK SP11N										
417	KM COMBINE ALKLAK OUTFLOW HYDROGRAPH WITH SP11N										
418	HC	2									
419	KK SPILL1										
420	KM ROUTE SP11N INFLOW HYDROGRAPH THROUGH SPILL1 PLAYA										
421	RS	1	ELEV	2710							
422	SV	0	101	369	837	1495					
423	SQ	0	0	0	14000	100000					
424	SE	2710	2715	2720	2725	2730					
425	KK TL20F										
426	KM RUNOFF HYDROGRAPH FOR TL20F SUBBASIN										
427	PH	50	78.9	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
428	BA	0.66									
429	LS	0	72								
430	UD	0.74									
431	KP	2									
432	PH	20	78.9	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
433	KP	3									
434	PH	10	78.9	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
435	KP	4									
436	PH	4	78.9	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3

LINE	ID	1	2	3	4	5	6	7	8	9	10
437	KP	5									
438	PH	2	78.9	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
439	KP	6									
440	PH	1	78.9	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
441	KK SP2IN										
442	KM COMBINE SPILL1 OUTFLOW HYDROGRAPH WITH TL20F										
443	HC	2									
444	KK SPILL2										
445	KM ROUTE SP2IN INFLOW HYDROGRAPH THROUGH SPILL2 PLAYA										
446	RS	1	ELEV	2698							
447	SV	0	14	70	168	350	875				
448	SQ	0	0	0	0	5000	100000				
449	SE	2698	2700	2705	2710	2715	2720				
450	KK TL19										
451	KM RUNOFF HYDROGRAPH FOR TL19 SUBBASIN										
452	PH	50	78.9	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
453	BA	4.73									
454	LS	0	72								
455	UD	2.37									
456	KP	2									
457	PH	20	78.9	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
458	KP	3									
459	PH	10	78.9	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
460	KP	4									
461	PH	4	78.9	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
462	KP	5									
463	PH	2	78.9	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
464	KP	6									
465	PH	1	78.9	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
466	KK RT13										
467	RK	2000	.0050	0.030		TRAP	50	8			
468	KK TL20A										
469	KM RUNOFF HYDROGRAPH FOR TL20A SUBBASIN										
470	PH	50	78.9	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
471	BA	1.17									
472	LS	0	72								
473	UD	0.75									
474	KP	2									
475	PH	20	78.9	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
476	KP	3									
477	PH	10	78.9	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
478	KP	4									
479	PH	4	78.9	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
480	KP	5									
481	PH	2	78.9	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
482	KP	6									
483	PH	1	78.9	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE	(V) ROUTING	(---->) DIVERSION OR PUMP FLOW	
NO.	(.) CONNECTOR	(<----) RETURN OF DIVERTED OR PUMPED FLOW	
21	TL1		
	.		
37	.	TL2	
	.	.	
	.	.	
53	KDRAW.....		
	V		
	V		
56	RT1		
	.		
59	.	TL3	
	.	.	
	.	.	
74	K2002.....		
	.		
77	.	TL7	
	.	.	
	.	.	
93	.	TL8	
	.	.	
	.	.	
109	.	829A.....	
	V		
	V		
112	.	RT2	
	.	.	
	.	.	
115	.	TL9	
	.	V	
	.	V	
131	.	RT3	
	.	.	
	.	.	
134	.	.	TL10
	.	.	.
	.	.	.
150	.	2002W.....	
	V		
	V		
153	.	RT4	
	.	.	
	.	.	
156	.	.	TL12
	.	.	V
	.	.	V
172	.	.	RT5
	.	.	.
	.	.	.
175	.	.	TL13
	.	.	V

191	.	.	.	V	
	.	.	.	RT6	
	
194	.	.	.	.	TL11

210	.	PXWEST	.....	
	.	.	.		
	.	.	.		
213	.	.	TL6A		
	.	.	V		
	.	.	V		
229	.	.	RT7		
	.	.	.		
	.	.	.		
232	.	.	.	TL6B	
	
	
248	.	.	PXNW	.....
	.	.	.		
	.	.	.		
251	.	.	.	TL4A	
	.	.	.	V	
	.	.	.	V	
267	.	.	.	RT8	
	
	
270	.	.	.	.	TL4B

286	.	.	.	PXNE	.....
	
	
289	.	.	.	.	TL5

305	.	PLAYAX	.....	
	.	.	.		
	.	.	.		
308	.	TL14			
	.	V			
	.	V			
324	.	RT10			
	.	.			
	.	.			
326	.	.	TL16		
	.	.	.		
	.	.	.		
342	.	TLIN	.....	
	.	V			
	.	V			
346	.	TLPLAY			
	.	V			
	.	V			
353	.	ALKRD			
	.	V			
	.	V			
356	.	RT11			
	.	.			

359	.	TL18	.
	.	.	.
375	.	.	TL17
	.	.	.
	.	.	.
391	ALKALI.....		
	V		
	V		
394	ALKLAK		
	.		
	.		
400	.	TL20E	.
	.	.	.
	.	.	.
416	SP1IN.....		
	V		
	V		
419	SPILL1		
	.		
	.		
425	.	TL20F	.
	.	.	.
	.	.	.
441	SP2IN.....		
	V		
	V		
444	SPILL2		
	.		
	.		
450	.	TL19	.
	.	V	.
	.	V	.
466	.	RT13	.
	.	.	.
	.	.	.
468	.	.	TL20A
	.	.	.
	.	.	.
484	.	TL1IN.....	
	.	V	
	.	V	
487	.	TL20-1	.
	.	.	.
	.	.	.
493	.	.	TL20B
	.	.	.
	.	.	.
509	.	TL2IN.....	
	.	V	
	.	V	
512	.	TL20-2	.
	.	V	.
	.	V	.
518	.	RT15	.
	.	.	.
	.	.	.
521	.	.	TL20C
	.	.	.


```

537 .      .      .
      .      TL3IN.....
      .      V
      .      V
540 .      TL20-3
      .      V
      .      V
546 .      RT16
      .      .
      .      .
549 .      .      TL20D
      .      .
      .      .
565 .      TL4IN.....
      .      V
      .      V
568 .      TL20-4
      .      .
      .      .
574 .      .      TL20G
      .      .
      .      .
590 4OUT.....
      V
      V
593 RT14
      .
      .
596 .      TL20H
      .      .
      .      .
612 HW137X.....

```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1)
*   FEBRUARY 1981
*   REVISED 02 AUG 88
*
* RUN DATE 09/13/1990 TIME 12:00:45
*
*****

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*****
*
* U.S. ARMY CORPS OF ENGINEERS
* THE HYDROLOGIC ENGINEERING CENTER
*   609 SECOND STREET
*   DAVIS, CALIFORNIA 95616
*
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MARTIN COUNTY FLOOD CONTROL STUDY JOB NO. 06901-001-036
HDR ENGINEERING, INC. AUSTIN, TEXAS

THREE LEAGUE AREA MODEL TO HWY 137 CROSSING. ALTERNATIVE 1 INCORPORATED
INTO MODEL.

COMPUTING 2-YR, 5-YR, 10-YR, 25-YR, 50-YR, AND 100-YR FLOOD EVENTS FOR
THREE LEAGUE AREA USING PLAN OPTION IN HEC-1.

- PLAN 1: 2-YEAR EVENT
- PLAN 2: 5-YEAR EVENT
- PLAN 3: 10-YEAR EVENT
- PLAN 4: 25-YEAR EVENT
- PLAN 5: 50-YEAR EVENT
- PLAN 6: 100-YEAR EVENT

19 IO

OUTPUT CONTROL VARIABLES

IPRNT 5 PRINT CONTROL
IPLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

IT

HYDROGRAPH TIME DATA

NMIN 10 MINUTES IN COMPUTATION INTERVAL
IDATE 1 0 STARTING DATE
ITIME 0000 STARTING TIME
NQ 300 NUMBER OF HYDROGRAPH ORDINATES
NDDATE 3 0 ENDING DATE
NDTIME 0150 ENDING TIME
ICENT 19 CENTURY MARK

COMPUTATION INTERVAL .17 HOURS
TOTAL TIME BASE 49.83 HOURS

ENGLISH UNITS

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

JP MULTI-PLAN OPTION
 NPLAN 6 NUMBER OF PLANS

JR MULTI-RATIO OPTION
 RATIOS OF RUNOFF
 1.00

*** FLOGRD - MAXIMUM NUMBER OF DX INTERVALS REACHED. MDX= 51
THIS MAY AFFECT ACCURACY OF KW SOLUTION. TO REDUCE ERRORS SHORTEN CHANNEL ELEMENT = 3

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
 FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
 TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS	
				RATIO 1	
					1.00
HYDROGRAPH AT	TL1	4.65	1	FLOW	320.
				TIME	13.50
			2	FLOW	963.
				TIME	13.33
			3	FLOW	1458.
				TIME	13.33
			4	FLOW	2003.
				TIME	13.33
			5	FLOW	2506.
				TIME	13.33
			6	FLOW	3035.
				TIME	13.33
HYDROGRAPH AT	TL2	1.04	1	FLOW	83.
				TIME	13.17
			2	FLOW	249.
				TIME	13.17
			3	FLOW	375.
				TIME	13.00
			4	FLOW	515.
				TIME	13.00
			5	FLOW	651.
				TIME	13.00
			6	FLOW	786.
				TIME	13.00
2 COMBINED AT	KDRAW	5.69	1	FLOW	396.
				TIME	13.33
			2	FLOW	1198.
				TIME	13.33
			3	FLOW	1808.
				TIME	13.33
			4	FLOW	2481.
				TIME	13.33
			5	FLOW	3109.
				TIME	13.17
			6	FLOW	3768.
				TIME	13.17
ROUTED TO	RT1	5.69	1	FLOW	396.
				TIME	14.17
			2	FLOW	1188.
				TIME	13.83
			3	FLOW	1807.
				TIME	13.83
			4	FLOW	2470.
				TIME	13.67
			5	FLOW	3102.
				TIME	13.67

			6	FLOW	3752.
				TIME	13.67
HYDROGRAPH AT	TL3	3.11	1	FLOW	302.
				TIME	12.83
			2	FLOW	908.
				TIME	12.83
			3	FLOW	1353.
				TIME	12.83
			4	FLOW	1848.
				TIME	12.83
			5	FLOW	2331.
				TIME	12.83
			6	FLOW	2794.
				TIME	12.83
2 COMBINED AT	K2002	8.80	1	FLOW	514.
				TIME	14.17
			2	FLOW	1527.
				TIME	13.67
			3	FLOW	2403.
				TIME	13.67
			4	FLOW	3352.
				TIME	13.50
			5	FLOW	4201.
				TIME	13.50
			6	FLOW	5165.
				TIME	13.33
HYDROGRAPH AT	TL7	3.39	1	FLOW	319.
				TIME	13.00
			2	FLOW	966.
				TIME	12.83
			3	FLOW	1445.
				TIME	12.83
			4	FLOW	1977.
				TIME	12.83
			5	FLOW	2496.
				TIME	12.83
			6	FLOW	2998.
				TIME	12.83
HYDROGRAPH AT	TL8	.55	1	FLOW	77.
				TIME	12.50
			2	FLOW	221.
				TIME	12.50
			3	FLOW	333.
				TIME	12.33
			4	FLOW	456.
				TIME	12.33
			5	FLOW	568.
				TIME	12.33
			6	FLOW	689.
				TIME	12.33
2 COMBINED AT	829A	3.94	1	FLOW	368.
				TIME	12.83
			2	FLOW	1099.
				TIME	12.83
			3	FLOW	1636.

	TIME	12.83
4	FLOW	2235.
	TIME	12.83
5	FLOW	2839.
	TIME	12.67
6	FLOW	3422.
	TIME	12.67

ROUTED TO	RT2	3.94	1	FLOW	367.
				TIME	13.17
			2	FLOW	1091.
				TIME	13.00
			3	FLOW	1633.
				TIME	13.00
			4	FLOW	2235.
				TIME	13.00
			5	FLOW	2833.
				TIME	12.83
			6	FLOW	3420.
				TIME	12.83

HYDROGRAPH AT	TL9	.93	1	FLOW	107.
				TIME	12.67
			2	FLOW	316.
				TIME	12.67
			3	FLOW	467.
				TIME	12.67
			4	FLOW	636.
				TIME	12.67
			5	FLOW	804.
				TIME	12.67
			6	FLOW	961.
				TIME	12.50

ROUTED TO	RT3	.93	1	FLOW	103.
				TIME	12.83
			2	FLOW	312.
				TIME	12.83
			3	FLOW	460.
				TIME	12.67
			4	FLOW	631.
				TIME	12.67
			5	FLOW	798.
				TIME	12.67
			6	FLOW	961.
				TIME	12.67

HYDROGRAPH AT	TL10	.96	1	FLOW	117.
				TIME	12.67
			2	FLOW	351.
				TIME	12.50
			3	FLOW	526.
				TIME	12.50
			4	FLOW	718.
				TIME	12.50
			5	FLOW	905.
				TIME	12.50
			6	FLOW	1088.
				TIME	12.50

3 COMBINED AT	2002W	5.83	1	FLOW	522.
				TIME	13.00
			2	FLOW	1604.
				TIME	12.83
			3	FLOW	2431.
				TIME	12.83
			4	FLOW	3349.
				TIME	12.83
			5	FLOW	4257.
				TIME	12.83
			6	FLOW	5105.
				TIME	12.83

ROUTED TO	RT4	5.83	1	FLOW	520.
				TIME	13.50
			2	FLOW	1596.
				TIME	13.17
			3	FLOW	2383.
				TIME	13.17
			4	FLOW	3308.
				TIME	13.00
			5	FLOW	4236.
				TIME	13.00
			6	FLOW	5101.
				TIME	13.00

HYDROGRAPH AT	TL12	1.60	1	FLOW	121.
				TIME	13.33
			2	FLOW	364.
				TIME	13.17
			3	FLOW	549.
				TIME	13.17
			4	FLOW	753.
				TIME	13.17
			5	FLOW	945.
				TIME	13.17
			6	FLOW	1141.
				TIME	13.17

ROUTED TO	RT5	1.60	1	FLOW	120.
				TIME	13.67
			2	FLOW	361.
				TIME	13.50
			3	FLOW	541.
				TIME	13.33
			4	FLOW	747.
				TIME	13.33
			5	FLOW	941.
				TIME	13.33
			6	FLOW	1139.
				TIME	13.33

HYDROGRAPH AT	TL13	3.99	1	FLOW	257.
				TIME	13.67
			2	FLOW	772.
				TIME	13.50
			3	FLOW	1171.
				TIME	13.50
			4	FLOW	1608.
				TIME	13.50

5 FLOW 2007.
TIME 13.50
6 FLOW 2435.
TIME 13.50

ROUTED TO RT6 3.99
1 FLOW 256.
TIME 14.17
2 FLOW 771.
TIME 13.83
3 FLOW 1165.
TIME 13.83
4 FLOW 1597.
TIME 13.67
5 FLOW 2005.
TIME 13.67
6 FLOW 2435.
TIME 13.67

HYDROGRAPH AT TL11 4.28
1 FLOW 282.
TIME 13.50
2 FLOW 848.
TIME 13.50
3 FLOW 1284.
TIME 13.50
4 FLOW 1767.
TIME 13.33
5 FLOW 2220.
TIME 13.33
6 FLOW 2694.
TIME 13.33

4 COMBINED AT PXWEST 15.70
1 FLOW 1110.
TIME 13.67
2 FLOW 3325.
TIME 13.33
3 FLOW 5026.
TIME 13.33
4 FLOW 6882.
TIME 13.33
5 FLOW 8636.
TIME 13.17
6 FLOW 10459.
TIME 13.17

HYDROGRAPH AT TL6A 2.53
1 FLOW 204.
TIME 13.17
2 FLOW 609.
TIME 13.00
3 FLOW 920.
TIME 13.00
4 FLOW 1264.
TIME 13.00
5 FLOW 1596.
TIME 13.00
6 FLOW 1926.
TIME 13.00

ROUTED TO RT7 2.53
1 FLOW 204.
TIME 13.67
2 FLOW 609.

				TIME	13.50
			3	FLOW	918.
				TIME	13.33
			4	FLOW	1258.
				TIME	13.33
			5	FLOW	1576.
				TIME	13.33
			6	FLOW	1895.
				TIME	13.33
HYDROGRAPH AT	TL6B	.85	1	FLOW	97.
				TIME	12.67
			2	FLOW	287.
				TIME	12.67
			3	FLOW	424.
				TIME	12.67
			4	FLOW	578.
				TIME	12.67
			5	FLOW	731.
				TIME	12.67
			6	FLOW	873.
				TIME	12.67
2 COMBINED AT	PXNW	3.38	1	FLOW	239.
				TIME	13.67
			2	FLOW	733.
				TIME	13.33
			3	FLOW	1114.
				TIME	13.33
			4	FLOW	1543.
				TIME	13.17
			5	FLOW	1937.
				TIME	13.17
			6	FLOW	2351.
				TIME	13.17
HYDROGRAPH AT	TL4A	4.65	1	FLOW	250.
				TIME	14.17
			2	FLOW	741.
				TIME	14.00
			3	FLOW	1135.
				TIME	13.83
			4	FLOW	1560.
				TIME	13.83
			5	FLOW	1955.
				TIME	13.83
			6	FLOW	2388.
				TIME	13.83
ROUTED TO	RTB	4.65	1	FLOW	250.
				TIME	14.67
			2	FLOW	740.
				TIME	14.17
			3	FLOW	1135.
				TIME	14.17
			4	FLOW	1555.
				TIME	14.17
			5	FLOW	1943.
				TIME	14.17
			6	FLOW	2377.

TIME 14.00

HYDROGRAPH AT TL4B .52

1	FLOW	44.
	TIME	13.17
2	FLOW	133.
	TIME	13.00
3	FLOW	199.
	TIME	13.00
4	FLOW	273.
	TIME	13.00
5	FLOW	343.
	TIME	13.00
6	FLOW	413.
	TIME	13.00

2 COMBINED AT PXNE 5.17

1	FLOW	269.
	TIME	14.50
2	FLOW	793.
	TIME	14.17
3	FLOW	1218.
	TIME	14.17
4	FLOW	1664.
	TIME	14.00
5	FLOW	2092.
	TIME	14.00
6	FLOW	2563.
	TIME	14.00

HYDROGRAPH AT TL5 1.88

1	FLOW	200.
	TIME	12.83
2	FLOW	600.
	TIME	12.67
3	FLOW	897.
	TIME	12.67
4	FLOW	1226.
	TIME	12.67
5	FLOW	1552.
	TIME	12.67
6	FLOW	1863.
	TIME	12.67

5 COMBINED AT PLAYAX 34.93

1	FLOW	2031.
	TIME	14.00
2	FLOW	6331.
	TIME	13.50
3	FLOW	9743.
	TIME	13.50
4	FLOW	13577.
	TIME	13.33
5	FLOW	17015.
	TIME	13.33
6	FLOW	20725.
	TIME	13.17

HYDROGRAPH AT TL14 12.70

1	FLOW	793.
	TIME	13.67
2	FLOW	2375.
	TIME	13.50
3	FLOW	3617.
	TIME	13.50

4	FLOW	4973.
	TIME	13.50
5	FLOW	6226.
	TIME	13.50
6	FLOW	7565.
	TIME	13.50

ROUTED TO	RT10	12.70	1	FLOW	789.
				TIME	14.17
			2	FLOW	2372.
				TIME	13.83
			3	FLOW	3601.
				TIME	13.83
			4	FLOW	4931.
				TIME	13.83
			5	FLOW	6188.
				TIME	13.67
			6	FLOW	7533.
				TIME	13.67

HYDROGRAPH AT	TL16	2.86	1	FLOW	224.
				TIME	13.17
			2	FLOW	675.
				TIME	13.17
			3	FLOW	1012.
				TIME	13.17
			4	FLOW	1387.
				TIME	13.17
			5	FLOW	1747.
				TIME	13.00
			6	FLOW	2113.
				TIME	13.00

3 COMBINED AT	TLIN	50.49	1	FLOW	2961.
				TIME	14.00
			2	FLOW	9043.
				TIME	13.50
			3	FLOW	13965.
				TIME	13.50
			4	FLOW	19242.
				TIME	13.50
			5	FLOW	24142.
				TIME	13.33
			6	FLOW	29480.
				TIME	13.33

ROUTED TO	TLPLAY	50.49	1	FLOW	119.
				TIME	27.00
			2	FLOW	155.
				TIME	27.17
			3	FLOW	169.
				TIME	27.33
			4	FLOW	923.
				TIME	25.17
			5	FLOW	2833.
				TIME	20.00
			6	FLOW	5259.
				TIME	17.33

** PEAK STAGES IN FEET **

1	STAGE	2734.11
	TIME	27.00
2	STAGE	2740.35
	TIME	27.17
3	STAGE	2743.26
	TIME	27.33
4	STAGE	2745.68
	TIME	25.17
5	STAGE	2746.60
	TIME	20.00
6	STAGE	2747.48
	TIME	17.33

ROUTED TO	ALKRD	50.49	1	FLOW	119.
				TIME	27.17
			2	FLOW	155.
				TIME	27.50
			3	FLOW	169.
				TIME	27.50
			4	FLOW	923.
				TIME	25.33
			5	FLOW	2832.
				TIME	20.00
			6	FLOW	5257.
				TIME	17.50

ROUTED TO	RT11	50.49	1	FLOW	119.
				TIME	27.50
			2	FLOW	155.
				TIME	27.83
			3	FLOW	169.
				TIME	27.83
			4	FLOW	922.
				TIME	25.50
			5	FLOW	2832.
				TIME	20.17
			6	FLOW	5252.
				TIME	17.67

HYDROGRAPH AT	TL18	.62	1	FLOW	66.
				TIME	12.83
			2	FLOW	200.
				TIME	12.67
			3	FLOW	299.
				TIME	12.67
			4	FLOW	408.
				TIME	12.67
			5	FLOW	516.
				TIME	12.67
			6	FLOW	619.
				TIME	12.67

HYDROGRAPH AT	TL17	2.42	1	FLOW	261.
				TIME	12.67
			2	FLOW	788.
				TIME	12.67
			3	FLOW	1175.
				TIME	12.67
			4	FLOW	1604.
				TIME	12.67

5	FLOW	2030.
	TIME	12.67
6	FLOW	2433.
	TIME	12.67

3 COMBINED AT ALKALI 53.53

1	FLOW	326.
	TIME	12.67
2	FLOW	988.
	TIME	12.67
3	FLOW	1474.
	TIME	12.67
4	FLOW	2013.
	TIME	12.67
5	FLOW	2960.
	TIME	20.17
6	FLOW	5472.
	TIME	17.50

ROUTED TO ALKLAK 53.53

1	FLOW	0.
	TIME	.17
2	FLOW	0.
	TIME	.17
3	FLOW	0.
	TIME	.17
4	FLOW	595.
	TIME	28.50
5	FLOW	2778.
	TIME	21.50
6	FLOW	5095.
	TIME	18.83

** PEAK STAGES IN FEET **

1	STAGE	2715.60
	TIME	49.83
2	STAGE	2718.05
	TIME	49.83
3	STAGE	2719.44
	TIME	49.83
4	STAGE	2720.18
	TIME	28.50
5	STAGE	2720.82
	TIME	21.50
6	STAGE	2721.50
	TIME	18.83

HYDROGRAPH AT TL20E 1.53

1	FLOW	72.
	TIME	14.67
2	FLOW	210.
	TIME	14.33
3	FLOW	325.
	TIME	14.33
4	FLOW	443.
	TIME	14.33
5	FLOW	556.
	TIME	14.33
6	FLOW	682.
	TIME	14.33

2 COMBINED AT SP1IN 55.06

1	FLOW	72.
	TIME	14.67

2	FLOW	210.
	TIME	14.33
3	FLOW	325.
	TIME	14.33
4	FLOW	598.
	TIME	28.50
5	FLOW	2856.
	TIME	21.50
6	FLOW	5256.
	TIME	18.67

ROUTED TO SPILL1 55.06

1	FLOW	0.
	TIME	.17
2	FLOW	0.
	TIME	.17
3	FLOW	0.
	TIME	.17
4	FLOW	296.
	TIME	33.17
5	FLOW	2774.
	TIME	22.33
6	FLOW	5127.
	TIME	19.33

** PEAK STAGES IN FEET **

1	STAGE	2711.75
	TIME	32.83
2	STAGE	2714.56
	TIME	33.67
3	STAGE	2715.63
	TIME	32.17
4	STAGE	2720.11
	TIME	33.17
5	STAGE	2720.99
	TIME	22.33
6	STAGE	2721.83
	TIME	19.33

HYDROGRAPH AT TL20F .66

1	FLOW	58.
	TIME	13.00
2	FLOW	174.
	TIME	13.00
3	FLOW	260.
	TIME	13.00
4	FLOW	356.
	TIME	13.00
5	FLOW	451.
	TIME	12.83
6	FLOW	544.
	TIME	12.83

2 COMBINED AT SP21N 55.72

1	FLOW	58.
	TIME	13.00
2	FLOW	174.
	TIME	13.00
3	FLOW	260.
	TIME	13.00
4	FLOW	356.
	TIME	13.00
5	FLOW	2798.

TIME 22.33
 6 FLOW 5166.
 TIME 19.33

ROUTED TO SPILL2 55.72

1 FLOW 0.
 TIME .17
 2 FLOW 0.
 TIME .17
 3 FLOW 0.
 TIME .17
 4 FLOW 185.
 TIME 38.17
 5 FLOW 2711.
 TIME 23.17
 6 FLOW 5056.
 TIME 20.00

** PEAK STAGES IN FEET **

1 STAGE 2700.11
 TIME 27.17
 2 STAGE 2702.29
 TIME 27.33
 3 STAGE 2703.94
 TIME 27.67
 4 STAGE 2710.19
 TIME 38.17
 5 STAGE 2712.71
 TIME 23.17
 6 STAGE 2715.00
 TIME 20.00

HYDROGRAPH AT TL19 4.73

1 FLOW 202.
 TIME 15.17
 2 FLOW 577.
 TIME 14.83
 3 FLOW 892.
 TIME 14.83
 4 FLOW 1209.
 TIME 14.67
 5 FLOW 1525.
 TIME 14.67
 6 FLOW 1881.
 TIME 14.67

ROUTED TO RT13 4.73

1 FLOW 202.
 TIME 15.33
 2 FLOW 576.
 TIME 14.83
 3 FLOW 891.
 TIME 14.83
 4 FLOW 1207.
 TIME 14.83
 5 FLOW 1522.
 TIME 14.67
 6 FLOW 1877.
 TIME 14.67

HYDROGRAPH AT TL20A 1.17

1 FLOW 103.
 TIME 13.00
 2 FLOW 308.

	TIME	13.00
3	FLOW	459.
	TIME	13.00
4	FLOW	628.
	TIME	13.00
5	FLOW	792.
	TIME	12.83
6	FLOW	957.
	TIME	12.83

2 COMBINED AT TL11N 5.90

1	FLOW	239.
	TIME	15.17
2	FLOW	661.
	TIME	14.83
3	FLOW	1020.
	TIME	14.67
4	FLOW	1355.
	TIME	14.67
5	FLOW	1723.
	TIME	14.50
6	FLOW	2137.
	TIME	14.50

ROUTED TO TL20-1 5.90

1	FLOW	0.
	TIME	.17
2	FLOW	0.
	TIME	.17
3	FLOW	0.
	TIME	.17
4	FLOW	0.
	TIME	.17
5	FLOW	0.
	TIME	.17
6	FLOW	0.
	TIME	.17

** PEAK STAGES IN FEET **

1	STAGE	2756.94
	TIME	34.83
2	STAGE	2760.02
	TIME	34.83
3	STAGE	2760.90
	TIME	34.33
4	STAGE	2761.78
	TIME	34.67
5	STAGE	2762.78
	TIME	35.67
6	STAGE	2763.81
	TIME	35.67

HYDROGRAPH AT TL20B .40

1	FLOW	37.
	TIME	13.00
2	FLOW	112.
	TIME	12.83
3	FLOW	168.
	TIME	12.83
4	FLOW	230.
	TIME	12.83
5	FLOW	291.
	TIME	12.83

6 FLOW 350.
TIME 12.83

2 COMBINED AT TL21N 6.30

1 FLOW 37.
TIME 13.00
2 FLOW 112.
TIME 12.83
3 FLOW 168.
TIME 12.83
4 FLOW 230.
TIME 12.83
5 FLOW 291.
TIME 12.83
6 FLOW 350.
TIME 12.83

ROUTED TO TL20-2 6.30

1 FLOW 0.
TIME .17
2 FLOW 0.
TIME .17
3 FLOW 0.
TIME .17
4 FLOW 0.
TIME .17
5 FLOW 0.
TIME .17
6 FLOW 0.
TIME .17

** PEAK STAGES IN FEET **

1 STAGE 2750.82
TIME 26.33
2 STAGE 2752.15
TIME 26.50
3 STAGE 2753.15
TIME 27.00
4 STAGE 2754.14
TIME 27.00
5 STAGE 2755.10
TIME 26.33
6 STAGE 2755.52
TIME 27.17

ROUTED TO RT15 6.30

1 FLOW 0.
TIME .17
2 FLOW 0.
TIME .17
3 FLOW 0.
TIME .17
4 FLOW 0.
TIME .17
5 FLOW 0.
TIME .17
6 FLOW 0.
TIME .17

HYDROGRAPH AT TL20C 3.48

1 FLOW 324.
TIME 13.00
2 FLOW 975.
TIME 12.83

3	FLOW	1462.
	TIME	12.83
4	FLOW	2002.
	TIME	12.83
5	FLOW	2530.
	TIME	12.83
6	FLOW	3042.
	TIME	12.83

2 COMBINED AT TL3IN 9.78

1	FLOW	324.
	TIME	13.00
2	FLOW	975.
	TIME	12.83
3	FLOW	1462.
	TIME	12.83
4	FLOW	2002.
	TIME	12.83
5	FLOW	2530.
	TIME	12.83
6	FLOW	3042.
	TIME	12.83

ROUTED TO TL20-3 9.78

1	FLOW	0.
	TIME	.17
2	FLOW	0.
	TIME	.17
3	FLOW	0.
	TIME	.17
4	FLOW	0.
	TIME	.17
5	FLOW	0.
	TIME	.17
6	FLOW	0.
	TIME	.17

** PEAK STAGES IN FEET **

1	STAGE	2740.34
	TIME	26.00
2	STAGE	2740.87
	TIME	26.67
3	STAGE	2741.28
	TIME	27.00
4	STAGE	2741.68
	TIME	26.50
5	STAGE	2742.14
	TIME	26.50
6	STAGE	2742.62
	TIME	27.00

ROUTED TO RT16 9.78

1	FLOW	0.
	TIME	.17
2	FLOW	0.
	TIME	.17
3	FLOW	0.
	TIME	.17
4	FLOW	0.
	TIME	.17
5	FLOW	0.
	TIME	.17
6	FLOW	0.

TIME .17

HYDROGRAPH AT TL20D 2.08

1	FLOW	98.
	TIME	14.67
2	FLOW	286.
	TIME	14.33
3	FLOW	441.
	TIME	14.33
4	FLOW	602.
	TIME	14.33
5	FLOW	756.
	TIME	14.33
6	FLOW	928.
	TIME	14.33

2 COMBINED AT TL4IN 11.86

1	FLOW	98.
	TIME	14.67
2	FLOW	286.
	TIME	14.33
3	FLOW	441.
	TIME	14.33
4	FLOW	602.
	TIME	14.33
5	FLOW	756.
	TIME	14.33
6	FLOW	928.
	TIME	14.33

ROUTED TO TL20-4 11.86

1	FLOW	0.
	TIME	.17
2	FLOW	0.
	TIME	.17
3	FLOW	0.
	TIME	.17
4	FLOW	0.
	TIME	.17
5	FLOW	0.
	TIME	.17
6	FLOW	0.
	TIME	.17

**** PEAK STAGES IN FEET ****

1	STAGE	2702.15
	TIME	32.33
2	STAGE	2705.27
	TIME	33.17
3	STAGE	2706.47
	TIME	32.83
4	STAGE	2707.67
	TIME	32.67
5	STAGE	2709.02
	TIME	33.00
6	STAGE	2710.20
	TIME	33.33

HYDROGRAPH AT TL20G .41

1	FLOW	30.
	TIME	13.33
2	FLOW	90.
	TIME	13.17
3	FLOW	137.

	TIME	13.17
4	FLOW	188.
	TIME	13.17
5	FLOW	236.
	TIME	13.17
6	FLOW	286.
	TIME	13.17

3 COMBINED AT 4OUT 67.99

1	FLOW	30.
	TIME	13.33
2	FLOW	90.
	TIME	13.17
3	FLOW	137.
	TIME	13.17
4	FLOW	188.
	TIME	13.17
5	FLOW	2725.
	TIME	23.17
6	FLOW	5079.
	TIME	20.00

ROUTED TO RT14 67.99

1	FLOW	30.
	TIME	14.17
2	FLOW	90.
	TIME	13.83
3	FLOW	136.
	TIME	13.67
4	FLOW	187.
	TIME	13.67
5	FLOW	2724.
	TIME	23.33
6	FLOW	5077.
	TIME	20.17

HYDROGRAPH AT TL20H 2.67

1	FLOW	147.
	TIME	14.00
2	FLOW	438.
	TIME	13.83
3	FLOW	671.
	TIME	13.83
4	FLOW	921.
	TIME	13.83
5	FLOW	1151.
	TIME	13.83
6	FLOW	1405.
	TIME	13.83

2 COMBINED AT HW137X 70.66

1	FLOW	177.
	TIME	14.00
2	FLOW	528.
	TIME	13.83
3	FLOW	806.
	TIME	13.83
4	FLOW	1102.
	TIME	13.83
5	FLOW	2821.
	TIME	23.33
6	FLOW	5248.
	TIME	20.17

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

§

APPENDIX I

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*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
*   FEBRUARY 1981                 *
*   REVISED 02 AUG 88             *
*
* RUN DATE 09/13/1990 TIME 12:58:10 *
*
*****
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*****
*
* U.S. ARMY CORPS OF ENGINEERS *
* THE HYDROLOGIC ENGINEERING CENTER *
*   609 SECOND STREET           *
*   DAVIS, CALIFORNIA 95616     *
*
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X  X  XXXXXXXX  XXXXX           X
X  X  X        X   X           XX
X  X  X        X                X
XXXXXXX XXXX  X             XXXXX X
X  X  X        X                X
X  X  X        X   X           X
X  X  XXXXXXXX  XXXXX           XXX

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:::
::: Full Microcomputer Implementation :::
:::               by                :::
:::      Haestad Methods, Inc.       :::
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37 Brookside Road * Waterbury, Connecticut 06708 * (203) 755-1666

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

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE. THE DEFINITION OF -AMSK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION

NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY, DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION

KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

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

*DIAGRAM

```

1 ID MARTIN COUNTY FLOOD CONTROL STUDY JOB NO. 06901-001-036
2 ID HDR ENGINEERING, INC. AUSTIN, TEXAS
3 ID
4 ID THREE LEAGUE GIN AREA MODEL
5 ID
6 ID COMPUTING 2-YR, 5-YR, 10-YR, 25-YR, 50-YR, AND 100-YR FLOOD EVENTS FOR
7 ID WATSHED UPSTREAM OF THREE LEAGUE GIN AREA.
8 ID
9 ID PLAN 1: 2-YEAR EVENT
10 ID PLAN 2: 5-YEAR EVENT
11 ID PLAN 3: 10-YEAR EVENT
12 ID PLAN 4: 25-YEAR EVENT
13 ID PLAN 5: 50-YEAR EVENT
14 ID PLAN 6: 100-YEAR EVENT
15 ID
16 ID
17 IT 10 300
18 IO 5 0
19 JP 6

20 KK TLGIN
21 KM RUNOFF HYDROGRAPH FOR WATSHED UPSTREAM OF THREE LEAGUE GIN
22 PH 50 7.44 0.42 0.8 1.4 1.6 1.7 2.1 2.4 2.8
23 BA 5.00
24 LS 0 72
25 UD 2.54
26 KP 2
27 PH 20 78.9 0.51 1.0 1.9 2.2 2.3 2.8 3.3 3.9
28 KP 3
29 PH 10 78.9 0.58 1.2 2.2 2.6 2.8 3.4 3.9 4.6
30 KP 4
31 PH 4 78.9 0.67 1.4 2.6 3.1 3.3 3.8 4.7 5.3
32 KP 5
33 PH 2 78.9 0.75 1.5 3.0 3.4 3.7 4.4 5.3 6.1
34 KP 6
35 PH 1 78.9 0.82 1.7 3.3 3.8 4.2 5.1 5.9 6.9
36 ZZ
    
```


SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT

LINE (V) ROUTING (--->) DIVERSION OR PUMP FLOW

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

20 TLGIN

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

 *
 * FLOOD HYDROGRAPH PACKAGE (HEC-1) *
 * FEBRUARY 1981 *
 * REVISED 02 AUG 88 *
 *
 * RUN DATE 09/13/1990 TIME 12:58:10 *
 *

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

MARTIN COUNTY FLOOD CONTROL STUDY JOB NO. 06901-001-036
 HDR ENGINEERING, INC. AUSTIN, TEXAS

THREE LEAGUE GIN AREA MODEL

COMPUTING 2-YR, 5-YR, 10-YR, 25-YR, 50-YR, AND 100-YR FLOOD EVENTS FOR
 WATERSHED UPSTREAM OF THREE LEAGUE GIN AREA.

- PLAN 1: 2-YEAR EVENT
- PLAN 2: 5-YEAR EVENT
- PLAN 3: 10-YEAR EVENT
- PLAN 4: 25-YEAR EVENT
- PLAN 5: 50-YEAR EVENT
- PLAN 6: 100-YEAR EVENT

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

IT HYDROGRAPH TIME DATA
 NMIN 10 MINUTES IN COMPUTATION INTERVAL
 IDATE 1 0 STARTING DATE
 ITIME 0000 STARTING TIME
 NQ 300 NUMBER OF HYDROGRAPH ORDINATES
 NDDATE 3 0 ENDING DATE
 NDTIME 0150 ENDING TIME
 ICENT 19 CENTURY MARK

COMPUTATION INTERVAL .17 HOURS
 TOTAL TIME BASE 49.83 HOURS

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

JP MULTI-PLAN OPTION
 NPLAN 6 NUMBER OF PLANS

JR MULTI-RATIO OPTION
 RATIOS OF RUNOFF
 1.00

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
 FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
 TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS	
				RATIO	1
HYDROGRAPH AT	TLGIN	5.00	1	FLOW	260.
				TIME	15.17
			2	FLOW	581.
				TIME	15.00
			3	FLOW	899.
				TIME	15.00
			4	FLOW	1214.
				TIME	14.83
			5	FLOW	1534.
				TIME	14.83
			6	FLOW	1894.
				TIME	14.83

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

```

*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
* FEBRUARY 1981 *
* REVISED 02 AUG 88 *
*
* RUN DATE 09/13/1990 TIME 12:47:51 *
*
*****

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

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X X XXXXXXX XXXX X
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X X X X X
X X X X X
X X XXXXXXX XXXX XXX

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 KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

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

*DIAGRAM

1	ID	MARTIN COUNTY FLOOD CONTROL STUDY	JOB NO. 06901-001-036								
2	ID	HDR ENGINEERING, INC.	AUSTIN, TEXAS								
3	ID										
4	ID	VALLEY VIEW ROAD AREA									
5	ID										
6	ID	COMPUTING 2-YR, 5-YR, 10-YR, 25-YR, 50-YR, AND 100-YR FLOOD EVENTS									
7	ID	FOR VALLEY VIEW ROAD AREA USING PLAN OPTION IN HEC-1.									
8	ID										
9	ID	PLAN 1: 2-YEAR EVENT									
10	ID	PLAN 2: 5-YEAR EVENT									
11	ID	PLAN 3: 10-YEAR EVENT									
12	ID	PLAN 4: 25-YEAR EVENT									
13	ID	PLAN 5: 50-YEAR EVENT									
14	ID	PLAN 6: 100-YEAR EVENT									
15	ID										
16	ID										
17	IT	5		300							
18	IO	5	0								
19	JP	6									
20	KK	VV1									
21	KM	RUNOFF HYDROGRAPH FOR VV1 SUBBASIN									
22	KP	1									
23	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
24	BA	0.51									
25	LS	0	72								
26	UD	0.37									
27	KP	2									
28	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
29	KP	3									
30	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
31	KP	4									
32	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
33	KP	5									
34	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
35	KP	6									
36	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
37	KK	RT01									
38	KM	ROUTE VV1 RUNOFF HYDROGRAPH TO VV2 OUTLET									
39	RK	5280	.0110	0.030		TRAP	5	1			
40	KK	VV2									
41	KM	RUNOFF HYDROGRAPH FOR VV2 SUBBASIN									
42	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
43	BA	0.79									
44	LS	0	72								
45	UD	0.54									
46	KP	2									
47	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
48	KP	3									
49	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
50	KP	4									
51	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3

LINE	ID	1	2	3	4	5	6	7	8	9	10
52	KP	5									
53	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
54	KP	6									
55	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
56	KK VV2OUT										
57	KM COMBINE RT01 WITH VV2 TO GIVE TOTAL HYDROGRAPH AT VV2 OUTLET										
58	HC	2									
59	KK RT02										
60	KM ROUTE VV2OUT TO VV3OUT										
61	RK	5280	.0080	0.030		TRAP	5	1			
62	KK VV3										
63	KM RUNOFF HYDROGRAPH FOR VV3 SUBBASIN										
64	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
65	BA	1.06									
66	LS	0	72								
67	UD	1.04									
68	KP	2									
69	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
70	KP	3									
71	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
72	KP	4									
73	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
74	KP	5									
75	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
76	KP	6									
77	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
78	KK VV3OUT										
79	KM COMBINE RT02 WITH VV3 TO GIVE TOTAL HYDROGRAPH AT VV3 OUTLET										
80	HC	2									
81	KK RT03										
82	KM ROUTE VV3OUT TO VV4OUT										
83	RK	5280	.0070	0.030		TRAP	5	1			
84	KK VV4										
85	KM RUNOFF HYDROGRAPH FOR VV4 SUBBASIN										
86	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
87	BA	1.06									
88	LS	0	72								
89	UD	1.39									
90	KP	2									
91	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
92	KP	3									
93	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
94	KP	4									
95	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
96	KP	5									
97	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
98	KP	6									
99	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9

LINE	ID	1	2	3	4	5	6	7	8	9	10
100	KK	VV4OUT									
101	KM	COMBINE RT03 WITH VV4 TO GIVE TOTAL HYDROGRAPH AT VV4OUT									
102	HC	2									
103	KK	RT04									
104	KM	ROUTE VV4OUT TO VV5OUT									
105	RK	5280	.0050	0.030		TRAP	5	1			
106	KK	VV5									
107	KM	RUNOFF HYDROGRAPH FOR VV5 SUBBASIN									
108	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
109	BA	1.08									
110	LS	0	72								
111	UD	1.67									
112	KP	2									
113	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
114	KP	3									
115	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
116	KP	4									
117	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
118	KP	5									
119	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
120	KP	6									
121	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9
122	KK	VV5OUT									
123	KM	COMBINE RT04 WITH VV5 TO GIVE TOTAL HYDROGRAPH AT VV5 OUTLET									
124	HC	2									
125	KK	RT05									
126	KM	ROUTE VV5OUT TO VV6OUT									
127	RK	5280	.0060	0.030		TRAP	5	1			
128	KK	VV6									
129	KM	RUNOFF HYDROGRAPH FOR VV6 SUBBASIN									
130	PH	50	32.4	0.42	0.8	1.4	1.6	1.7	2.1	2.4	2.8
131	BA	0.83									
132	LS	0	72								
133	UD	1.25									
134	KP	2									
135	PH	20	32.4	0.51	1.0	1.9	2.2	2.3	2.8	3.3	3.9
136	KP	3									
137	PH	10	32.4	0.58	1.2	2.2	2.6	2.8	3.4	3.9	4.6
138	KP	4									
139	PH	4	32.4	0.67	1.4	2.6	3.1	3.3	3.8	4.7	5.3
140	KP	5									
141	PH	2	32.4	0.75	1.5	3.0	3.4	3.7	4.4	5.3	6.1
142	KP	6									
143	PH	1	32.4	0.82	1.7	3.3	3.8	4.2	5.1	5.9	6.9

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

144 KK VV6OUT
145 KM COMBINE RT05 WITH VV6 TO GIVE TOTAL HYDROGRAPH AT VV6 OUTLET
146 HC 2
147 ZZ

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT
 LINE (V) ROUTING (---->) DIVERSION OR PUMP FLOW
 NO. (.) CONNECTOR (<----) RETURN OF DIVERTED OR PUMPED FLOW

20	VV1	
	V	
	V	
37	RT01	
	.	
	.	
40	.	VV2
	.	.
	.	.
56	VV2OUT.....	
	V	
	V	
59	RT02	
	.	
	.	
62	.	VV3
	.	.
	.	.
78	VV3OUT.....	
	V	
	V	
81	RT03	
	.	
	.	
84	.	VV4
	.	.
	.	.
100	VV4OUT.....	
	V	
	V	
103	RT04	
	.	
	.	
106	.	VV5
	.	.
	.	.
122	VV5OUT.....	
	V	
	V	
125	RT05	
	.	
	.	
128	.	VV6
	.	.
	.	.
144	VV6OUT.....	

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
*   FEBRUARY 1981                   *
*   REVISED 02 AUG 88               *
*
* RUN DATE 09/13/1990 TIME 12:47:51 *
*
*****

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

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MARTIN COUNTY FLOOD CONTROL STUDY JOB NO. 06901-001-036
HDR ENGINEERING, INC. AUSTIN, TEXAS

VALLEY VIEW ROAD AREA

COMPUTING 2-YR, 5-YR, 10-YR, 25-YR, 50-YR, AND 100-YR FLOOD EVENTS
FOR VALLEY VIEW ROAD AREA USING PLAN OPTION IN HEC-1.

- PLAN 1: 2-YEAR EVENT
- PLAN 2: 5-YEAR EVENT
- PLAN 3: 10-YEAR EVENT
- PLAN 4: 25-YEAR EVENT
- PLAN 5: 50-YEAR EVENT
- PLAN 6: 100-YEAR EVENT

18 IO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

IT HYDROGRAPH TIME DATA

NMIN	5	MINUTES IN COMPUTATION INTERVAL
IDATE	1	0 STARTING DATE
ITIME	0000	STARTING TIME
NQ	300	NUMBER OF HYDROGRAPH ORDINATES
NDDATE	2	0 ENDING DATE
NDTIME	0055	ENDING TIME
ICENT	19	CENTURY MARK

COMPUTATION INTERVAL .08 HOURS
TOTAL TIME BASE 24.92 HOURS

ENGLISH UNITS

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

JP MULTI-PLAN OPTION
 NPLAN 6 NUMBER OF PLANS

JR MULTI-RATIO OPTION
 RATIOS OF RUNOFF
 1.00

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
 FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
 TIME TO PEAK IN HOURS

RATIOS APPLIED TO FLOWS

OPERATION	STATION	AREA	PLAN	RATIO 1
				1.00
HYDROGRAPH AT	VV1	.51	1	FLOW 84.
				TIME 12.50
			2	FLOW 240.
				TIME 12.50
			3	FLOW 356.
				TIME 12.50
			4	FLOW 482.
				TIME 12.50
			5	FLOW 602.
				TIME 12.50
			6	FLOW 727.
				TIME 12.42
ROUTED TO	RT01	.51	1	FLOW 84.
				TIME 12.67
			2	FLOW 238.
				TIME 12.58
			3	FLOW 356.
				TIME 12.58
			4	FLOW 482.
				TIME 12.58
			5	FLOW 602.
				TIME 12.58
			6	FLOW 725.
				TIME 12.50
HYDROGRAPH AT	VV2	.79	1	FLOW 106.
				TIME 12.75
			2	FLOW 307.
				TIME 12.67
			3	FLOW 456.
				TIME 12.67
			4	FLOW 620.
				TIME 12.67
			5	FLOW 780.
				TIME 12.67
			6	FLOW 935.
				TIME 12.67
2 COMBINED AT	VV2OUT	1.30	1	FLOW 189.
				TIME 12.75
			2	FLOW 541.
				TIME 12.67
			3	FLOW 803.
				TIME 12.58
			4	FLOW 1092.
				TIME 12.58
			5	FLOW 1372.
				TIME 12.58

6 FLOW 1650.
TIME 12.58

ROUTED TO RT02 1.30 1 FLOW 189.
TIME 12.83
2 FLOW 539.
TIME 12.75
3 FLOW 798.
TIME 12.67
4 FLOW 1092.
TIME 12.67
5 FLOW 1370.
TIME 12.67
6 FLOW 1645.
TIME 12.67

HYDROGRAPH AT VV3 1.06 1 FLOW 93.
TIME 13.33
2 FLOW 272.
TIME 13.25
3 FLOW 407.
TIME 13.25
4 FLOW 556.
TIME 13.17
5 FLOW 699.
TIME 13.17
6 FLOW 843.
TIME 13.17

2 COMBINED AT VV3OUT 2.36 1 FLOW 261.
TIME 12.92
2 FLOW 743.
TIME 12.83
3 FLOW 1099.
TIME 12.75
4 FLOW 1497.
TIME 12.75
5 FLOW 1886.
TIME 12.75
6 FLOW 2263.
TIME 12.75

ROUTED TO RT03 2.36 1 FLOW 260.
TIME 13.08
2 FLOW 741.
TIME 12.92
3 FLOW 1098.
TIME 12.83
4 FLOW 1496.
TIME 12.83
5 FLOW 1883.
TIME 12.83
6 FLOW 2256.
TIME 12.83

HYDROGRAPH AT VV4 1.06 1 FLOW 75.
TIME 13.75
2 FLOW 220.
TIME 13.58
3 FLOW 333.

	TIME	13.58
4	FLOW	455.
	TIME	13.58
5	FLOW	568.
	TIME	13.58
6	FLOW	689.
	TIME	13.58

2 COMBINED AT	VV4OUT	3.42	1	FLOW	313.
				TIME	13.17
			2	FLOW	889.
				TIME	13.00
			3	FLOW	1317.
				TIME	12.92
			4	FLOW	1788.
				TIME	12.92
			5	FLOW	2252.
				TIME	12.92
			6	FLOW	2701.
				TIME	12.92

ROUTED TO	RT04	3.42	1	FLOW	312.
				TIME	13.25
			2	FLOW	887.
				TIME	13.08
			3	FLOW	1314.
				TIME	13.08
			4	FLOW	1788.
				TIME	13.00
			5	FLOW	2250.
				TIME	13.00
			6	FLOW	2698.
				TIME	12.92

HYDROGRAPH AT	VV5	1.08	1	FLOW	67.
				TIME	14.08
			2	FLOW	195.
				TIME	13.92
			3	FLOW	296.
				TIME	13.92
			4	FLOW	405.
				TIME	13.92
			5	FLOW	505.
				TIME	13.83
			6	FLOW	616.
				TIME	13.83

2 COMBINED AT	VV5OUT	4.50	1	FLOW	360.
				TIME	13.33
			2	FLOW	1016.
				TIME	13.17
			3	FLOW	1504.
				TIME	13.08
			4	FLOW	2043.
				TIME	13.08
			5	FLOW	2568.
				TIME	13.08
			6	FLOW	3086.
				TIME	13.00

ROUTED TO	RT05	4.50	1	FLOW	359.
				TIME	13.50
			2	FLOW	1015.
				TIME	13.25
			3	FLOW	1503.
				TIME	13.17
			4	FLOW	2042.
				TIME	13.17
			5	FLOW	2563.
				TIME	13.17
			6	FLOW	3085.
				TIME	13.08

HYDROGRAPH AT	VV6	.83	1	FLOW	64.
				TIME	13.58
			2	FLOW	186.
				TIME	13.42
			3	FLOW	281.
				TIME	13.42
			4	FLOW	384.
				TIME	13.42
			5	FLOW	481.
				TIME	13.42
			6	FLOW	582.
				TIME	13.42

2 COMBINED AT	VV6OUT	5.33	1	FLOW	423.
				TIME	13.50
			2	FLOW	1196.
				TIME	13.33
			3	FLOW	1773.
				TIME	13.25
			4	FLOW	2405.
				TIME	13.25
			5	FLOW	3021.
				TIME	13.17
			6	FLOW	3630.
				TIME	13.17

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