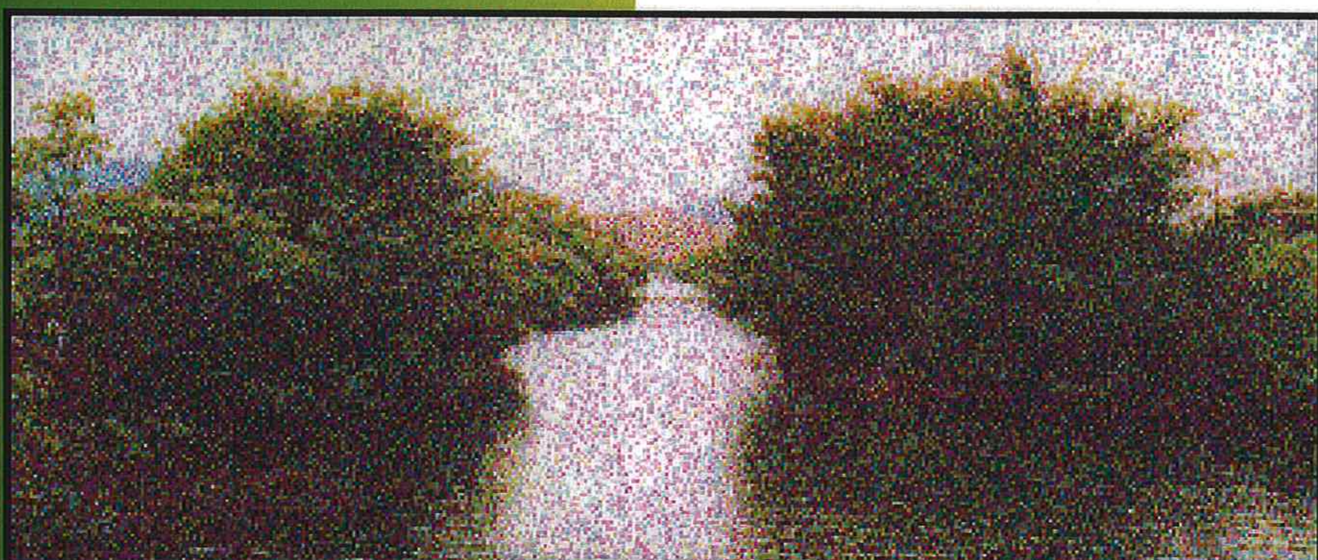
Division of Engineering
Department of Public Works
City and County of Honolulu



KAELEPULU STREAM DRAINAGE STUDY

Prepared by :

ParEn, Inc.

dba Park Engineering

October 22, 1993

Division of Engineering
Department of Public Works
City and County of Honolulu

Kaelepulu Stream Drainage Study

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Executive Summary

EXECUTIVE SUMMARY

This study has been prepared to address the drainage concerns of Kaelepulu Stream drainage basin. Sediment deposition and dense vegetation have reduced the stormwater conveying properties of Kaelepulu and Kawainui Streams, and increased the potential for flooding. Nearby residence have voiced their concerns, which has prompted the City and County of Honolulu, Department of Public Works to investigate alternatives to minimize and possibly alleviate flooding.

The City and County of Honolulu initiated the Kaelepulu / Kawainui Streams Maintenance Dredging Project in June of 1990. ParEn, Inc. was contracted to conduct a drainage study on Kaelepulu Stream. This study includes a hydrologic and hydraulic analysis to evaluate the impact of a 100-year 24-hour storm and determine the level of flood protection Kaelepulu Stream presently offers. The study then evaluates the additional flood protection provided by removal of the estimated 4 to 6-feet of accumulated silt and dense growth of mangrove. The study concludes with the examination of bridge stability under stream flow attack.

This executive summary includes a brief discussion of the project site, the impact of a 100-year 24-hour storm, the existing level of flood protection and the additional flood protection offered by the proposed removal of sediment and mangrove. Finally, scour at bridges and the study recommendations will also be discussed.

Project Site Description

The Kaelepulu Stream watershed is located on the windward side of the Island of Oahu, Koolaupoko District, approximately 10 miles northeast of Honolulu. The watershed drains a majority of the Kailua area, which includes Coconut Grove, Enchanted Lake, Keolu Hills, Kaopa Subdivisions, and Mid-Pacific Country Club. This drainage area extends from Mount Olomana, the furthest point in the watershed, to Kailua Bay where runoff is ultimately discharged.

Topographic characteristics of this watershed varies from coastal lowlands near Kailua Bay to moderately steep mountain slopes of Mount Olomana. Majority of the area in the coastal lowlands lies in residential or urban land use. Other land use within the watershed includes agriculture, commercial, parks (schools and golf course), and preservation (Enchanted Lake, Kaopa detention basin). The vegetative cover ranges from average growth in the developed areas to dense growth in undeveloped preservation lands.

Kaelepulu Stream is approximately 1.2 miles long from its mouth at Kailua Bay, to Enchanted Lake or Kaelepulu Pond. Located approximately 0.6 miles upstream from the mouth is the confluence with the Kawainui Stream. Stream channel hydraulics are largely dominated by tidal effects. The potential for flooding is greater when a significant storm event occurs during periods of high tide.

Many flow obstructions may be found within these two streams. Kaelepulu and Keolu Drive bridges, grouted rubble revetments, wooden docks or launching ramps, dense growth of "Buffalo" grass and Mangrove trees, accumulated silt and debris, and the sand berm at the mouth are some of the flow obstructions that exist along one or both streams. To varying degrees, the effect of these obstructions is to increase the channel roughness, thereby reducing the carrying capacity of the channel.

Impact of a 100-Year 24 Hour Storm

Based on the present condition of Kaelepulu Stream, hydraulic computations indicate that flooding will occur along the low lying area of Block 9 - Kaelepulu Subdivision. Located downstream of Kawainui Stream, approximately ten (10) residential lots along Wanaao Road will be affected. At this location, a peak flood elevation of approximately 3.8-feet mean sea level (MSL) is expected to occur during a 100-year 24-hour storm.

Extending further upstream along Kaelepulu Stream, floodwaters will overtop the banks in scattered isolated areas. Peak flood elevation and peak discharge at Enchanted Lake will be approximately 6.1-feet MSL and 1,800 cubic feet per second (cfs), respectively. The peak discharge at the mouth of Kaelepulu Stream will approach 2,840 cfs. The results are tabulated below.

Existing Level of Flood Protection

This study established **no flooding of residential lots** as the criteria for the determination of the existing level of flood protection. Based on the available topographic information, flood routing computations indicate that Kaelepulu Stream may contain stormwater runoff generated by a 10-year to 20-year 24-hour storm. The low lying area of Block 9, Kaelepulu Subdivision controlled the peak runoff rate and resulting flood water surface elevation.

Accepting the flooding which is expected to occur along Block 9, Kaelepulu Stream may contain stormwater runoff generated by a 80-year to 90-year 24-hour storm. Although sediment deposition and dense vegetative growth have reduced the conveyance properties of Kaelepulu Stream, the design of the surrounding residential subdivisions has provided an adequate amount of freeboard for the temporary containment of stormwater runoff. Kaelepulu Stream and Enchanted Lake still performs as an effective flood control facility.

Proposed Flood Control Improvement / Additional Flood Protection

Without additional modifications to the original design of Kaelepulu Stream, this report proposes a maintenance dredge to remove the accumulated silt within the stream. Kaelepulu Stream should be dredged to an invert of (-) 8-feet MSL, except under Kaelepulu Bridge were an invert of (-)4-feet is recommended. Maintenance work will also include removal of mangrove trees to aid in the restoration of the streams' original flow capacity.

The 100-year 24-hour flood routing computations indicate that the maintenance dredge will enhance the storage (sediment and stormwater) and conveying properties of Kaelepulu Stream. A comparison of the results have been summarized in the table below.

Flooding is still expected to occur within Block 9 of Kaelepulu Subdivision, although to a lesser extent than existing stream conditions. Thus, the relatively high existing level of flood protection and flooding of Block 9 under dredged conditions may not justify the maintenance dredge project for the removal of silt. A maintenance program of mangrove removal may offer added conveyance properties to Kaelepulu Stream. Mangrove removal will curtail encroachment towards the main channel and prevent the continual build-up of sediment along its root zone.

100-year 24-hour Storm	Existing Stream Condition		Improved Stream Condition	
	Kaopa Detention Basin	Enchanted Lake	Kaopa Detention Basin	Enchanted Lake
Peak Inflow, cfs	2,322	5,055	2,322	5,055
Peak Outflow, cfs	397	1,800	397	2,130
Max. W.S.El., ft.	52.8	6.1	52.8	4.5
W.S.El. at Confluence, ft.		3.9	3.4	
Peak Outflow at Mouth, cfs		2,840	3,700	

Scour at Bridges

It has been shown that the proposed maintenance dredge will improve the conveyance properties of Kaelepulu Stream. This increased capacity, while beneficial in lowering the floodwater elevations and increasing the peak discharge, may result in conditions that could impact scour in the area of Kaelepulu and Keolu Drive Bridges.

Based on the 100-year 24-hour flood, pier scour computations for the existing and improved stream conditions indicate that Kaelepulu Bridge is highly vulnerable to pier scour caused by the skewed angle of floodwater attack and also the shallow spread footing. Bridge construction plans indicate that the original piers are supported by spread footings set at various elevations ranging from (-)5.5-feet MSL to (-)9-feet MSL. Scour holes are estimated to extend below the footing by 4.2-feet to 7.7-feet for the existing stream condition, and by 8.2-feet to 11.7-feet for the improved stream condition.

The anticipated 3-feet to 4-feet of scour at Keolu Drive Bridge piers should not extend below the bottom of the footing.

Recommendations

1. The City and County of Honolulu, Roads Maintenance Division should continue the Kaelepulu Stream mouth opening operation until a permanent stream mouth improvement is implemented.

2. A maintenance program of mangrove removal should be initiated to curtail encroachment towards the main channel, minimize the continual build-up of silt along its root zone, and provide additional carrying capacity to Kaelepulu Stream.

3. A bridge inspection program should be implemented to monitor pier scour depths and the stability of the bridge during periods of heavy rainfall.

4. Temporary scour countermeasures should be provided for the piers of Kaelepulu Bridge. Dumped riprap may be used. Guidelines for sizing and gradation may be found in *Design of Riprap Revetments*.

5. Additional studies should be conducted to evaluate the feasibility of constructing a new Kaelepulu Bridge, minimizing the number of piers and designed to withstand scour for the 100-year 24-hour flood.

Introduction
Section 1

1. INTRODUCTION

1.1 General - Project Background

The Department of Public Works, City and County of Honolulu has the responsibility of maintaining public drainageways throughout Oahu. Periodic maintenance of these drainageways is necessary to provide both public safety and to minimize potential flood hazards. The Department of Public Works initiated the Kaelepulu / Kawainui Streams Maintenance Dredging Project in June of 1990. Proposed maintenance work for this project includes the removal of dense mangrove, vegetation and an estimated 4 to 6 feet of accumulated silt, which has reduced the stormwater conveyance properties of the streams. This drainage study will evaluate existing hydrologic and hydraulic conditions of the Kaelepulu Stream drainage basin and recommend measures to restore the streams to their original flow capacities.

1.2 Drainage Concerns

There are a number of concerns which relate to drainage of the Kaelepulu Stream watershed. Among the more significant is the stormwater carrying capacity of Kaelepulu and Kawainui Stream. Over the past 20-years, vegetation and deposition have reduced the flow capacity of the stream, and increased the potential for flooding. Thus far, flooding has been localized in the Coconut Grove area of Kailua, adjacent to Kawainui Marsh. During the New Year's Eve Storm of 1988, this area experienced heavy damage due to marsh flood waters overtopping the levee along Kawainui Stream.

Another area of concern is the mouth of Kaelepulu Stream which discharges into Kailua Bay. The mouth is frequently closed-off by a beach of sand created with the incoming tides and off-shore currents. During periods of heavy rainfall, the City and County of Honolulu, Road Maintenance Division takes precautionary measures to ensure that the mouth is open and capable of passing stormwater runoff. To date, this program has been effective. However, beach users have voiced their concern over the silt laden flood waters that empty into Kailua Bay. There are also reports of a strong odor that is emitted from Kaelepulu Stream and Enchanted Lake after lowering of the water surface.

The stability of Kaelepulu Bridge is also of concern to the City. Are the bridge abutments and piers stable under flood water attack?

Contents in this report may answer some of these questions and hopefully give some insight to the drainage problems of Kaelepulu Stream.

Purpose and Scope
Section 2

2. PURPOSE AND SCOPE

The purpose of this drainage study is three fold: 1) to review and comment on the design assumptions, procedures, and results of the 1971 "Baseline" Analysis of the Kaelepulu Stream drainage basin, by which Kaelepulu Stream, Enchanted Lake, and Kaopa detention basin were designed and constructed; 2) perform an independent drainage analysis of the Kaelepulu Stream drainage basin based on current design criteria, standards, and accepted practices; and, 3) propose a flood control improvement to minimize flooding within the Kaelepulu Stream watershed.

The scope of this study will include a discussion on the 1971 design data and corresponding flood routing results. The 1971 design parameters for Kaelepulu Stream, Enchanted Lake and Kaopa detention basin will be presented in this report.

This independent drainage investigation will include a hydrologic and hydraulic analysis of the Kaelepulu Stream watershed with emphasis on Kaelepulu Stream, Enchanted Lake and Kaopa detention basin drainage facilities. Hydrologic computations will estimate stormwater runoff rates for the 10-year through 100-year 24-hour storm events at 10-year recurrence intervals. Stream channel hydraulics and "reservoir" routing computations will then be performed to determine the existing level of flood protection and also the limits of flooding for the 100-year 24-hour storm. The results of the current study will then be compared with the 1971 "Baseline" results. A drainage improvement will then be recommended to minimize and possibly alleviate flooding. Finally, a bridge scour analysis will be performed on Kaelepulu Bridge and Keolu Drive Bridge.

Site Description
Section 3

3. SITE DESCRIPTION

3.1 Location

The Kaelepulu Stream watershed is located on the windward side of the Island of Oahu, Koolaupoko District. Located approximately 10 miles northeast of Honolulu, the watershed drains a majority of the Kailua area. See Figure 3-1.

The drainage area of Kaelepulu Stream and Kawainui Stream, encompasses the Cocônut Grove, Enchanted Lake, Keolu Hills, and Kaopa Subdivisions, including Mid-Pacific Country Club. This drainage area extends from Mount Olomana, the furthest point in the watershed, to Kailua Bay where runoff is ultimately discharged. The distance between these two features of the watershed stretch approximately 3-miles, shown in Figure 3-2.

3.2 Topography

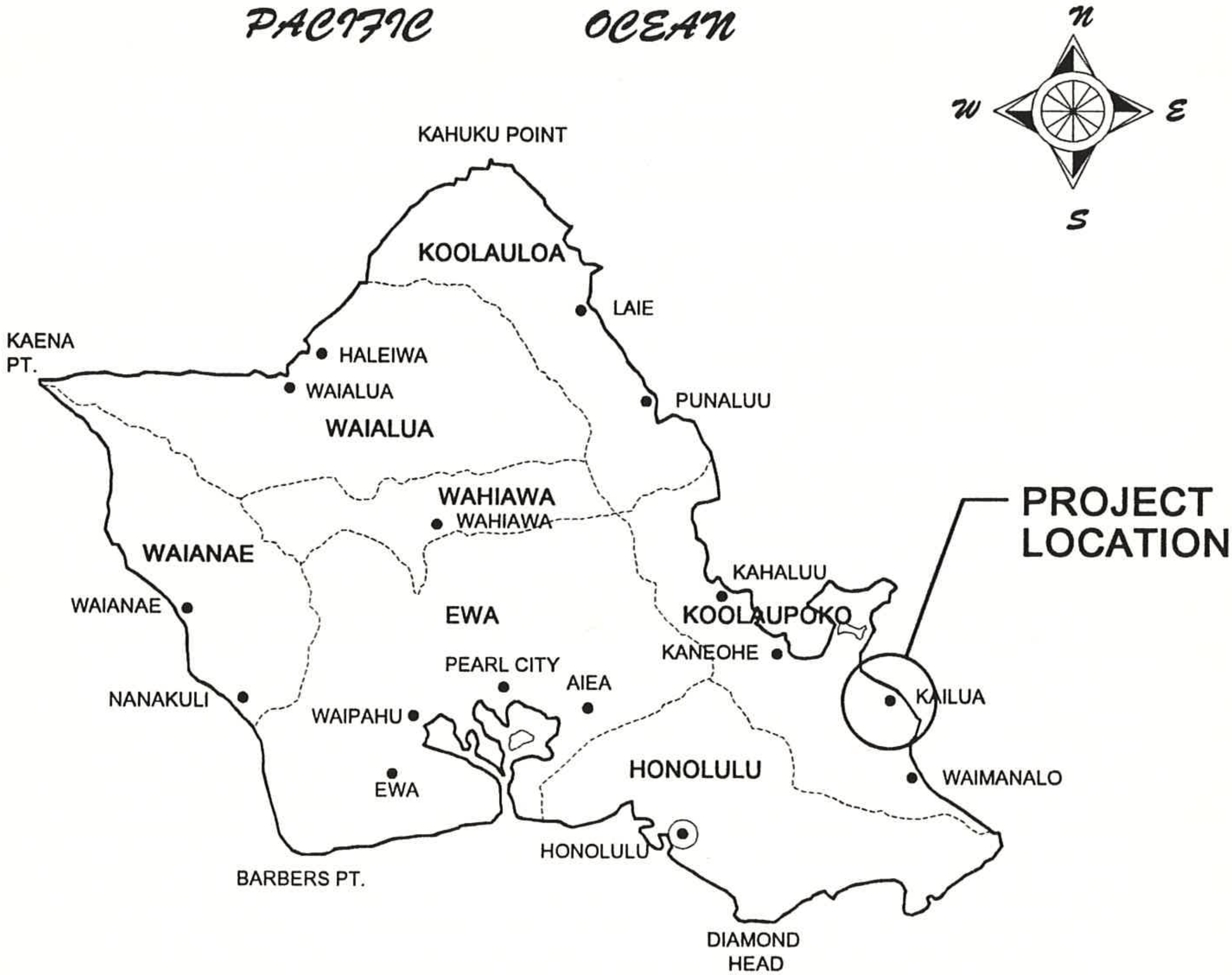
Topographic characteristics of this watershed varies from coastal lowlands near Kailua Bay to moderately steep mountain slopes of Mount Olomana. These features are part of the remnants of the eroded Kailua Volcanic Series, which is a secondary eruption to the Koolau Volcano. (Sterns, 1985) Geologically, the area is relatively young and has not experienced much of the erosive forces that formed the pali, or great cliffs, as seen deep within Maunawili and Waimanalo Valley.

3.3 Soil Type

The geologic formations briefly described above give some indication on the type of soils found within the study area. Soil survey maps prepared by the U.S. Department of Agriculture, Soil Conservation Service (SCS, 1972) indicate that the predominant soil type in the coastal lowland is the Jaucas Series (JaC). This soil is abundantly found in the Coconut Grove subdivision where minimal roadway drainage systems exist. This suggest that the Jaucas Sand possesses good infiltrating properties. The Soil Conservation Service has classified this soil in the hydrologic soil group A.

Progressing further inland to moderately sloping areas, the Alaeloa Series (AeE, ALF), and Papaa Series (PYD, PYE, and PYF) become the dominating soil type. These silty clays and clays may be found in the Enchanted Lake, Keolu Hills and Kaopa subdivisions. Extensive roadway drainage systems exist in these subdivisions and are used to minimize surface runoff and excessive erosion. The hydrologic soil group for these soils range from B to D.

Extending to the mountain ridges and peaks are the Rock Land (rRK) and Stony Steep Land (rSY) soil series. They consist of loose, exposed rocks and boulders that form the steep mountain slopes. Areas with these soil types generally produce high runoff rates - hydrologic soil group D.



ISLAND OF OAHU

NOT TO SCALE

Figure 3-1
Vicinity Map

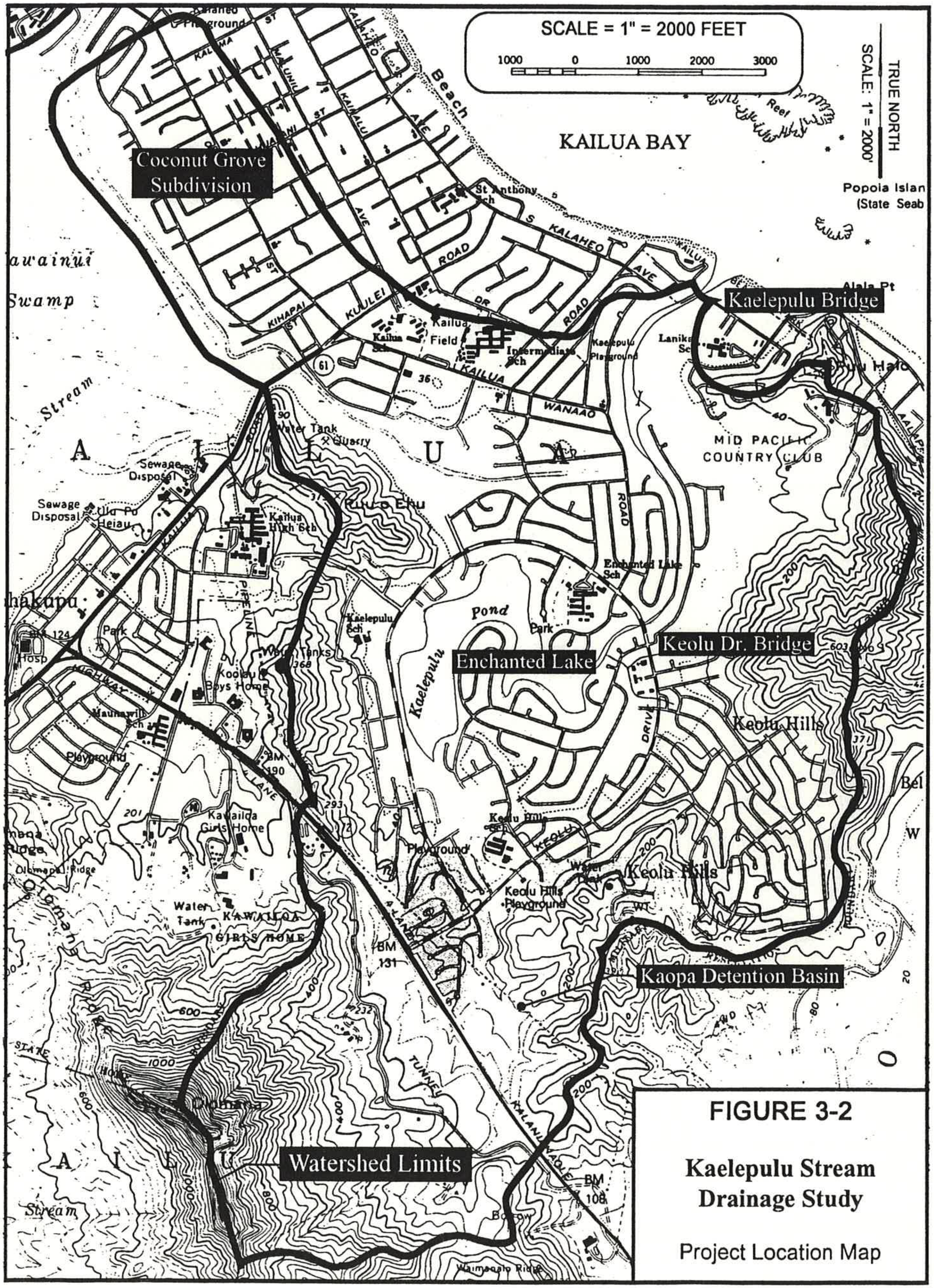


FIGURE 3-2

Kaelepulu Stream Drainage Study

Project Location Map

3.4 Land Use

Majority of the area in the Kaelepulu Stream watershed lies in residential or urban land use. Undeveloped areas designated as residential/urban still remain. However, these areas are limited and rapidly decreasing as development accelerated through the 1980's. Additional development, as a result of land use changes, are very unlikely due to the topography of the remaining undeveloped areas.

Other land use within the watershed includes agriculture, commercial, parks (schools and golf course), and preservation (Enchanted Lake, Kaopa detention basin). The total area tributary to the mouth of Kaelepulu Stream is estimated to be 4.30 square miles or equivalent to 2,754 acres. The vegetative cover ranges from average growth in the developed areas to dense growth in undeveloped preservation lands.

3.5 Climate

The prevailing northeasterly trade winds dictate the climate throughout the year. Precipitation is generated by orographic effects, when warm moisture-rich air from the Pacific Ocean is forced to uplift due to the Koolau mountain range. Rain clouds are created with the cooling of the air mass. The mean annual rainfall ranges from 40-inches at the coastline to 60-inches at Olomana Peak.

Trade winds and the large surrounding body of water produce relatively uniform annual temperatures in this windward region. The mean annual temperature is estimated to be approximately 74 degrees Fahrenheit.

3.6 Existing Stream Characteristics

3.6.1 General

Kaelepulu Stream is approximately 1.2 miles long from its mouth, at Kailua Bay, to Enchanted Lake or Kaelepulu Pond. Located approximately 0.6 miles upstream from the mouth is the confluence with the Kawainui Stream, a drainage channel that extends a distance of approximately 2.2 miles in the northwesterly direction. A typical width of the Kaelepulu Stream within the 0.6 mile reach is 200-feet. Upstream of the confluence, the top width reduces to approximately 100-feet. Kawainui Stream generally has a top width of 100-feet. Both streams have varying bottom widths and side slopes.

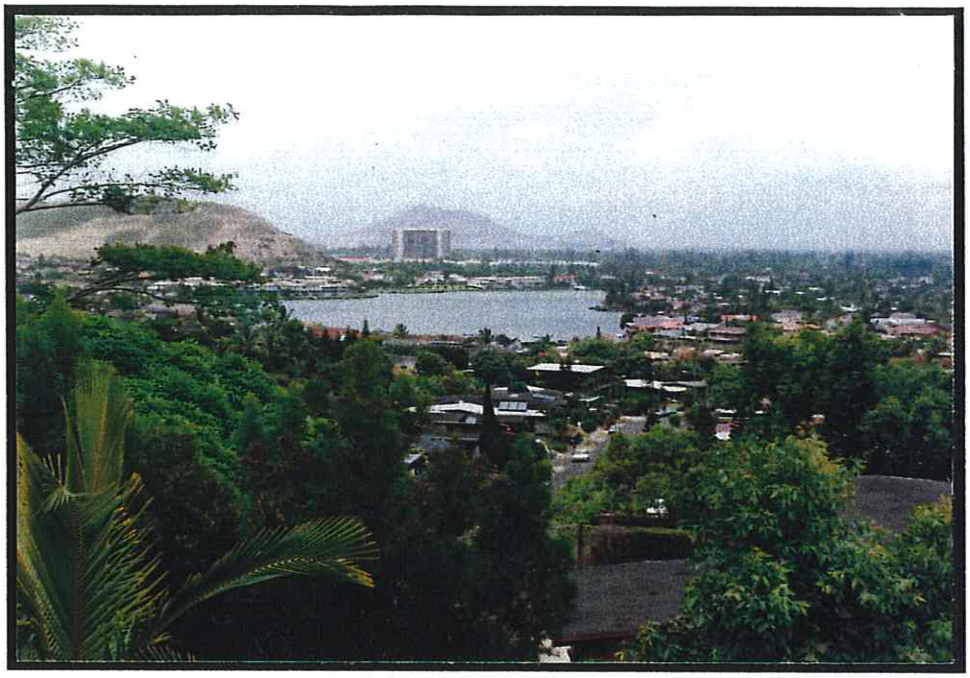
As the location suggests, stream channel hydraulics are largely dominated by tidal effects. The incoming and outgoing tides may be observed within the entire reach of Kaelepulu Stream, indicated by the rising and falling of the water level in Enchanted Lake. The potential for flooding is greater when a significant storm event occurs during periods of high tide. A higher base elevation will cause backwater effects and reduce the carrying capacity and storage capacity of the stream channel drainage network.

Photograph No. 1 : Sand Berm at Kailua Beach

Photograph No. 2 : Kaelepulu Bridge Piers

Photograph No. 3 : Kaelepulu Stream

Photograph No. 4 : Keolu Drive Bridge



Photograph No. 5 : Enchanted Lake Area

Photograph No. 6 : Kaopa Dentention Basin

There are many flow obstructions found within these two streams. Some flow obstructions are man-made, others created by nature, and there are those being a combination of both. The Kaelepulu and Keolu Drive bridges are two of the many man-made obstructions that exist along the Kaelepulu Stream. Similarly, three (3) roadway crossings exists along the Kawainui Stream. Numerous property owners have constructed grouted rubble revetments and wooden docks or launching ramps along Kaelepulu Stream.

Flow obstructions created by nature include dense growth of "Buffalo" grass and Mangrove trees. The effect of increased vegetative growth within the channel is to increase the channel roughness, thereby reducing the carrying capacity of the channel. Flooding of Coconut Grove subdivision, during the New Year's Eve Storm of 1988, was partially due to this condition.

Probably the most significant of the natural flow obstruction is the closing of the mouth of Kaelepulu Stream. The effect once again is a higher base elevation, thus reducing the capacity of the drainage system. At the request of the City, the U.S. Army Corps of Engineers (COE) conducted a reconnaissance study for flood control improvements to Kaelepulu Stream. (U.S. Army COE, 1992) In their summary report, a channel fluidization technique was proposed as an alternative to clearing the stream mouth. Their economic evaluation resulted in a benefit to cost ratio less than one. As a result, the U.S. Army COE concluded that "there is no federal interest in pursuing the study" and planning studies under Section 205 will not continue into the feasibility phase.

Among the flow obstruction created by mans activities and aided by nature is the not-so-noticeable buildup of silt and other debris found within the streams. As various stages of development exposes the ground surface to erosion, runoff gradually transports sediment into the streams. Generally, the flow velocity of coastal streams are not capable of transporting larger particles; deposition results.

3.6.2 Geomorphology

The stability of a stream is governed by its geomorphic factors. The geomorphology of Kaelepulu Stream may easily be described using Figure 3-3, adopted from Hydrologic Engineering Circular No. 20 of the U.S. Department of Transportation, Federal Highway Administration. (FHWA, 1991)

Kaelepulu Stream is considered a medium-size stream downstream of the confluence and a small-size stream upstream of the confluence. Although it experiences a constant flow of water from the wetter regions further into the basin, the stream mouth regulates the outflow into Kailua Bay. Set in the region of the alluvial fan, it is typical of streams in a flat, low-lying area. Kaelepulu and Kawainui Streams both have a significant floodplain area, are not incised, have hardly any natural levees, and their stream beds are composed primarily of fine silt, clays and sand. Bank cover ranges from low ground cover and coconut trees to dense Mangrove bushes. Kaelepulu Stream appears to be stable as there is limited braiding or anabranching. The streams' bends are very mild.

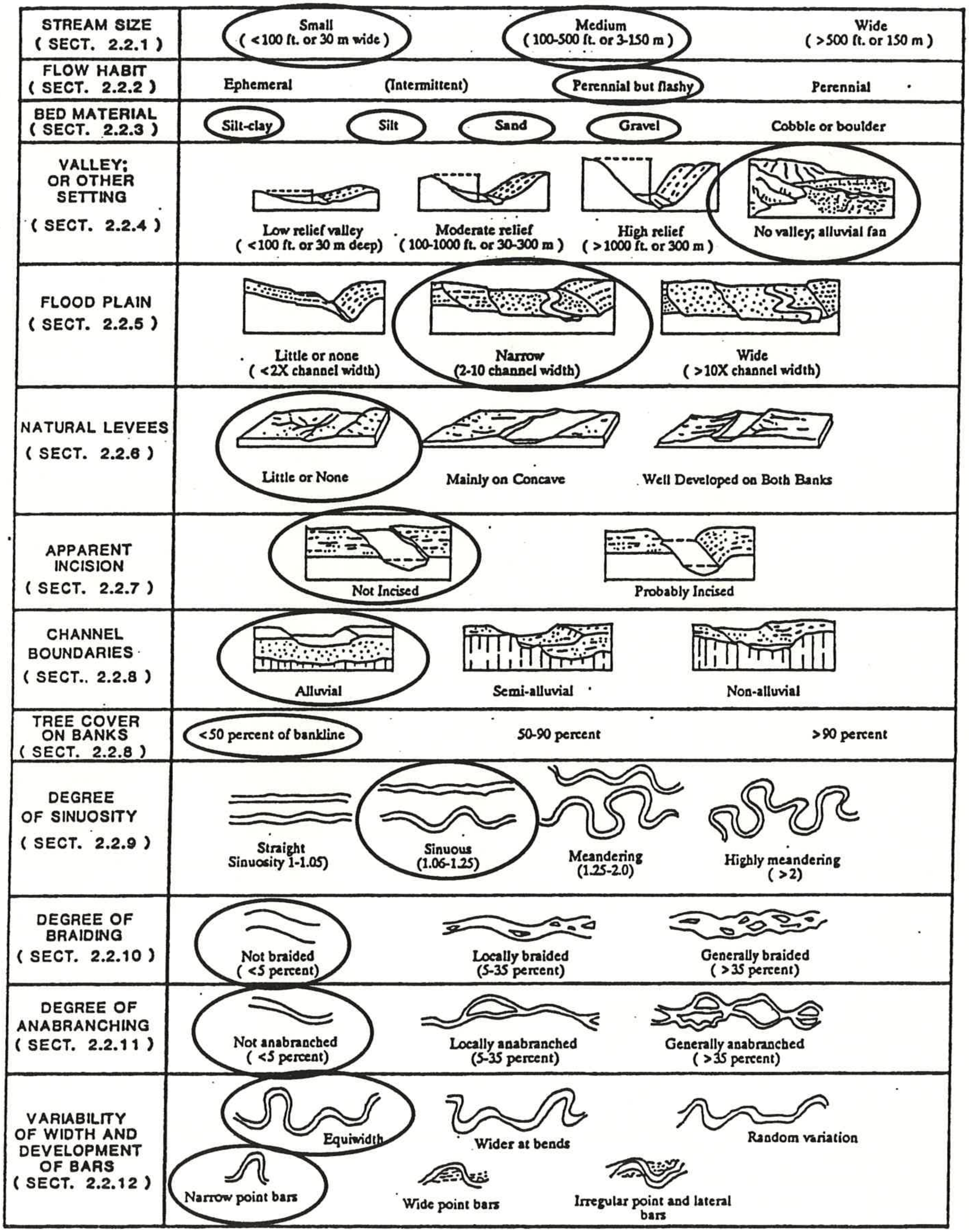


FIGURE 3-6

Kaelepulu Stream Geomorphology

adopted from HEC #20 (FHWA, 1991)

Hydrology
Section 4

4. HYDROLOGY

4.1 General

Many variables are involved in the determination of the peak discharge. Given the topographic, climatic, and land use conditions of a watershed, numerous hydrologic methods are available to estimate the peak stormwater runoff rate. Given flood records obtained from a stream gaging station, statistical methods may be utilized to determine a frequency and/or magnitude of a particular flood event. This method is desirable when a sufficient number of data are available. Often times, however, adequate amount of data are not available. The engineer must then rely on alternate hydrologic methods.

The following sections will focus on the hydrologic analysis for the Kaelepulu Stream watershed. Section 4.2 - 1971 "Baseline" Analysis discusses the assumptions, procedures, and results obtained in the 1971 analysis. Section 4.3 - Existing Conditions examines the hydrologic conditions as they exist today. Peak runoff rates will be computed using: 1) SCS Curve Number (CN) Method, developed by the U.S. Department of Agriculture, Soil Conservation Service; and compared with 2) HEC-1, developed by the U.S. Army Corps of Engineers, Hydrologic Engineering Center; and, 3) Plate 6 of the City and County of Honolulu, Department of Public Works, Storm Drainage Standards, May 1988. The results will be evaluated at the conclusion of the hydrology section.

4.2 1971 - "Baseline" Analysis

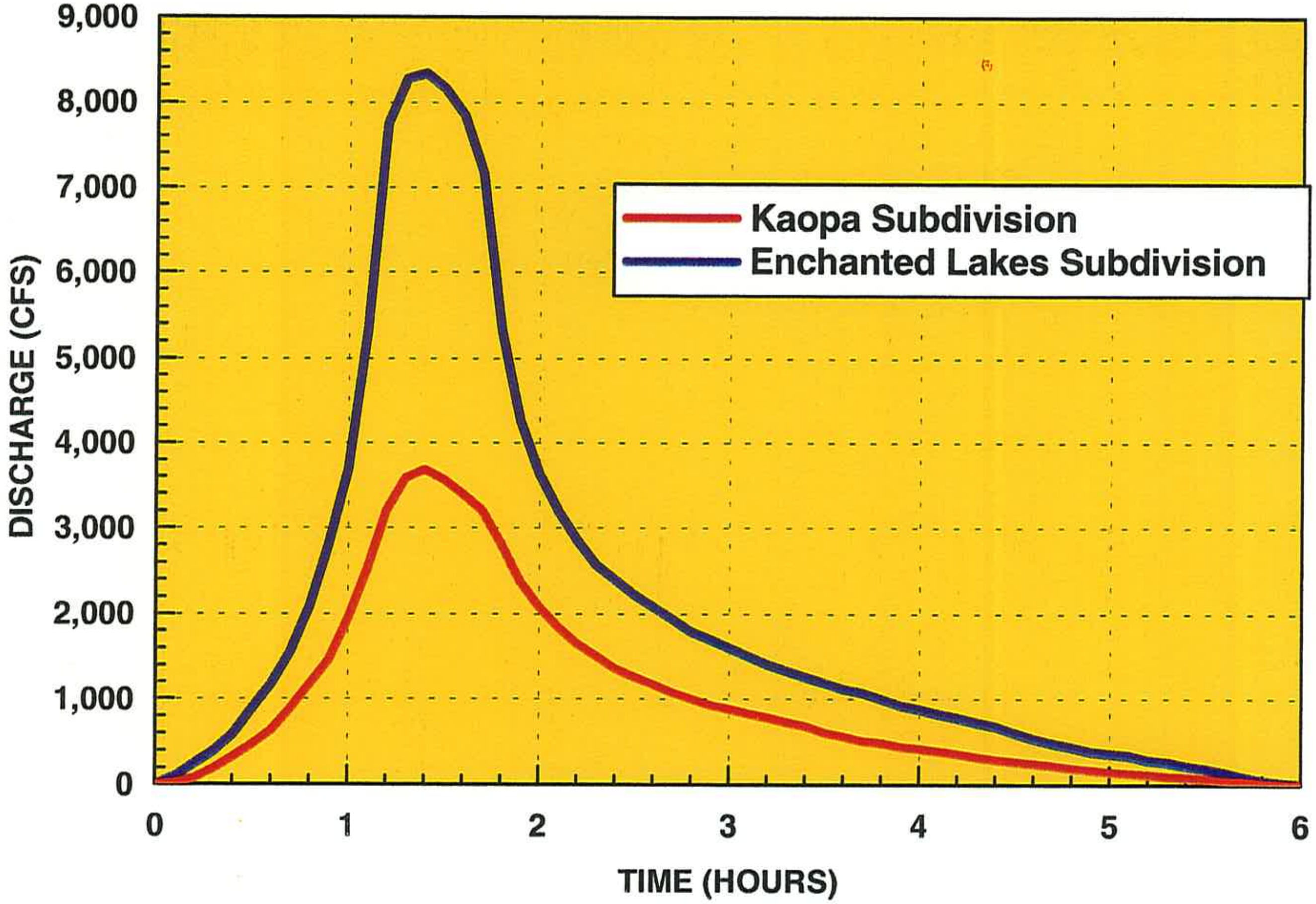
Several documents pertaining to the analysis and design of Kaelepulu Stream and Enchanted Lake were obtained from the files of the City and County of Honolulu, Department of Public Works, Division of Engineering. The 1971 runoff drainage map (Exhibit 1 - Drainage Basin, Enchanted Lake Estates) indicate that the watershed was divided into three (3) sub-basins, labeled drainage Basin "A", "B" and "C". Inflow hydrographs were developed for Basins "A" and "B", shown in Figure 4-1. Copies of the original documents may be found in Appendix A. The area and estimated peak discharge for each basin is tabulated below in Table 4-1.

Drainage Basin	Area acs..	Peak Discharge cfs
A	552	3,665
B	1,255	8,335
C	460	3,055*
TOTAL	2,267	15,055

TABLE 4-1 - 1971 DRAINAGE AREA AND PEAK DISCHARGE
* estimated peak discharge based on basin "A" and "B" cfs per acre

FIGURE 4-1
1971 Inflow Hydrographs
Kaopa Detention Basin & Enchanted Lake

* Original inflow Hydrograph (adopted from Y. Arakaki's Drainage Study of Enchanted Lakes Subdivision



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Drainage basins shown on the 1971 runoff drainage map indicate that minimal runoff contributions were considered from the Coconut Grove subdivision. A peak discharge of 300 cfs was estimated for the inflow from Kawainui Stream into Kaelepulu Stream. The 1971 analysis reported peak flows for Basin "A" and "B" to be much higher than the current peak flows computed using the SCS CN Method (Section 4.3.1) or Plate 6 of the City and County of Honolulu (Section 4.3.3).

Computations for peak discharge may have been performed with the aid of Plate 6, City and County of Honolulu, Storm Drainage Standards, March 1969. It appears that the cumulative peak discharge was determined for the cumulative area of Basins "A" and "B". The sum of the drainage area of Basins "A" and "B" gives 1,807 acres. From Plate 6 of the 1969 Storm Drainage Standards, the peak discharge is estimated to be 12,000 cfs. Computing the discharge per area gives 6.64 cfs/acre. This factor was probably applied to each basin to yield the peak flows shown in Table 4-1.

The methods used to generate a hydrograph for each basin, the time of concentrations and runoff coefficients are unknown. Based on the magnitude of the peak discharge and duration of the hydrograph, a 100-year 6-hour storm was probably considered.

Kaopa detention basin and Enchanted Lake were both designed using the 6-hour hydrographs shown on Figure 4-1. The current practice for the design of a regional detention/retention basin requires the use of a 24-hour design storm, often times for a storm with a 100-year recurrence interval. Generally, the 24-hour storm will produce a greater volume of stormwater runoff, critical to the design and performance of a detention/retention basin. For this reason, a flood routing analysis was conducted to determine the effects of a 100-year 24-hour storm. See Sections 5.2 and 5.3 for a comparison of the flood routing results.

4.3 Hydrologic Investigation and Analysis - Existing Conditions (1993)

It is important to keep in mind the assumptions and limitations of the following hydrologic methods used to compute peak discharge. Aside from those inherent in the development of the equations, a few will be mentioned herein. Computations are being performed to a hydrologically homogenous watershed. In other words, a single storm event which distributes a uniform rainfall over the entire watershed; a watershed which is, on the average, uniform in land use, soil type and ground cover.

4.3.1 SCS Curve Number Method

Stormwater runoff rates were computed using the method developed by the U.S. Department of Agriculture, Soil Conservation Service. Guidelines and general procedures were taken from ***Urban Hydrology for Small Watersheds***, Training Release No. 55 (SCS, 1986) and ***A Guide to Hydrologic Analysis Using SCS Methods*** (McCuen, 1982). Quick TR-55, a computer program developed by

Plate 6 DESIGN CURVES FOR PEAK DISCHARGE VS. DRAINAGE AREA (more than 100 acres)

- CURVES ARE FOR STREAM CHANNELS AND DRAINAGE STRUCTURES.
- THESE CURVES ARE NOT APPLICABLE TO KALIHI STREAM WATERSHED.

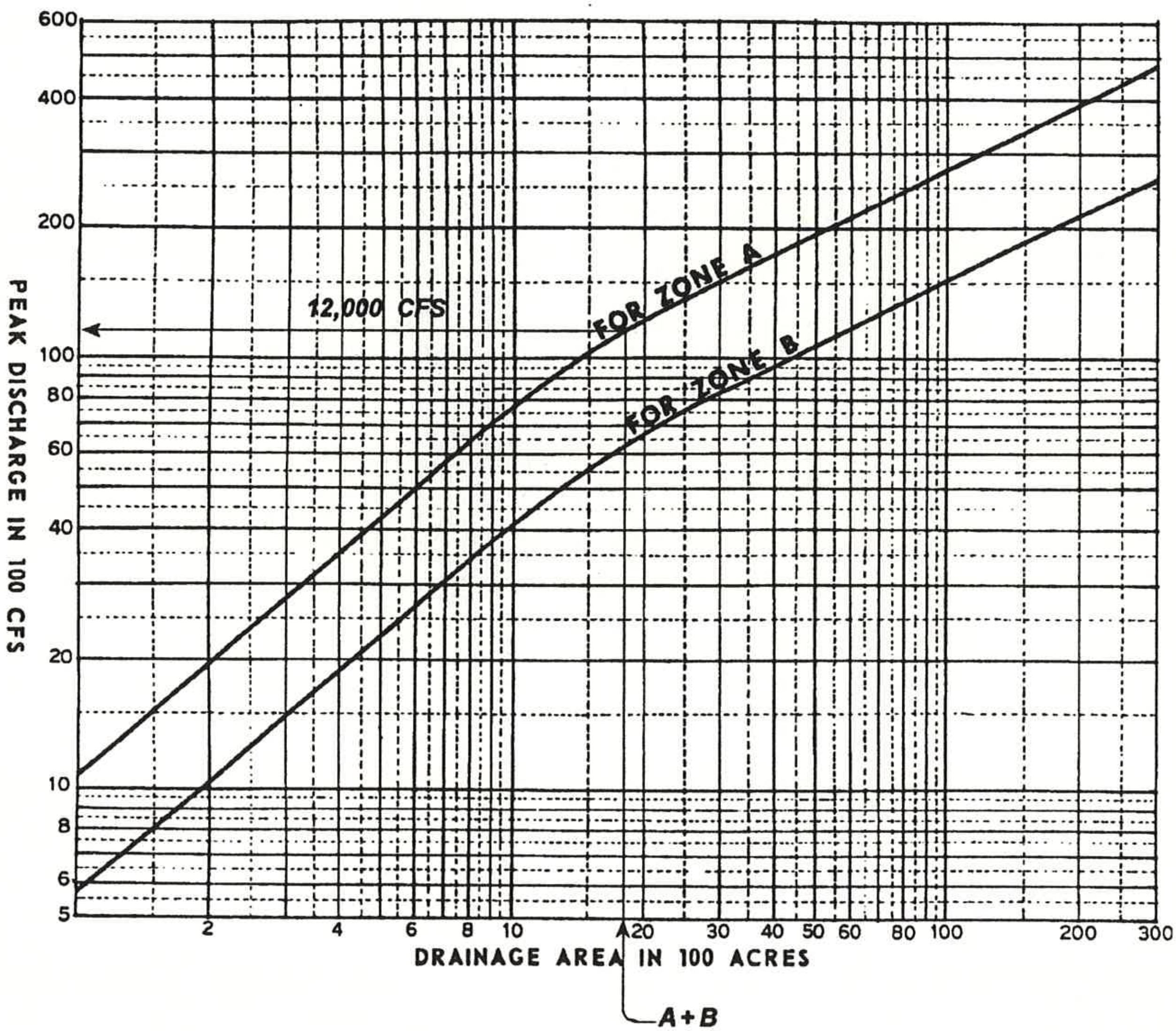


Figure 4-2

Prepared by: ParEn, Inc dba Park Engineering	Kaelepulu Stream Drainage Study May 1993	Division of Engineering Department of Public Works City and County of Honolulu

Haested Methods, was utilized to facilitate hydrograph computations for each sub-basin, shown in Exhibit 2. Calculations may be found in Appendix B.

4.3.1.1 Curve Number (CN) Determination

An input variable for the determination of peak stormwater runoff rates is the runoff curve number. This hydrologic variable describes the land use conditions, the soil types, and the ground cover of a drainage area. The City and County of Honolulu, Development Plan (DP) maps were used to determine the future land use conditions and also the possible type of ground cover. The curve numbers used in the analysis accounted for areas presently undeveloped, but designated as residential. Soil types found within the watershed were obtained from the Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii (SCS, 1972). Based on these variables, a weighted curve number was calculated for each sub-basin. They are presented in Table 4-2.

Drainage Basin	Area acs.	Weighted CN	Time of Concentration hours
1	74	77	0.44
2	613	80	0.87
3	442	80	0.50
4	1,123	84	0.69
5	502	68	0.54

TABLE 4-2 - SUMMARY OF DRAINAGE BASIN DATA - SCS CN Method

4.3.1.2 Rainfall Intensity (I)

Rainfall intensities were obtained from the ***Rainfall Frequency Study for Oahu*** (Giambelluca, T.W., et. al., 1984). Dependent upon the location of each drainage basin, rainfall depths of 9-inches, 12 to 13-inches, and 12 to 15-inches were used for the 10-year, 50-year, and 100-year 24-hour storms. A return period interpolation diagram (Figure 20, Giambelluca, T.W., et. al., 1984) was used to determine rainfall depths for storm between the 50-year and 100-year. The Type-I Rainfall Distribution was applied to the depth to determine the rainfall pattern, as recommended by the Soil Conservation Service.

4.3.1.3 Time of Concentration (T_c)

In determining the peak discharge using a hydrologic model, one of the most sensitive of the input variables is the time of concentration. The procedures outlined in TR-55 were applied to compute the time of concentration for each subarea. Overland flow, shallow concentrated flow, and open channel flow were all considered in estimating the time of concentration. A sensitivity analysis was performed to determine the effects of varying the time of concentration on the peak discharge. Procedures and guidelines from TR-55 together with engineering judgement resulted in the values also presented in Table 4-2.

Travel times through each sub-basin were accounted for during the routing analysis of the drainage system. See Section 5.3 - Flood Routing Analysis - Existing Conditions. The travel time for Basin No. 5, was neglected due to the improved concrete lined channel extending into Enchanted Lake. Generally, short improved channels do not have an attenuating or dampening effect on the peak discharge.

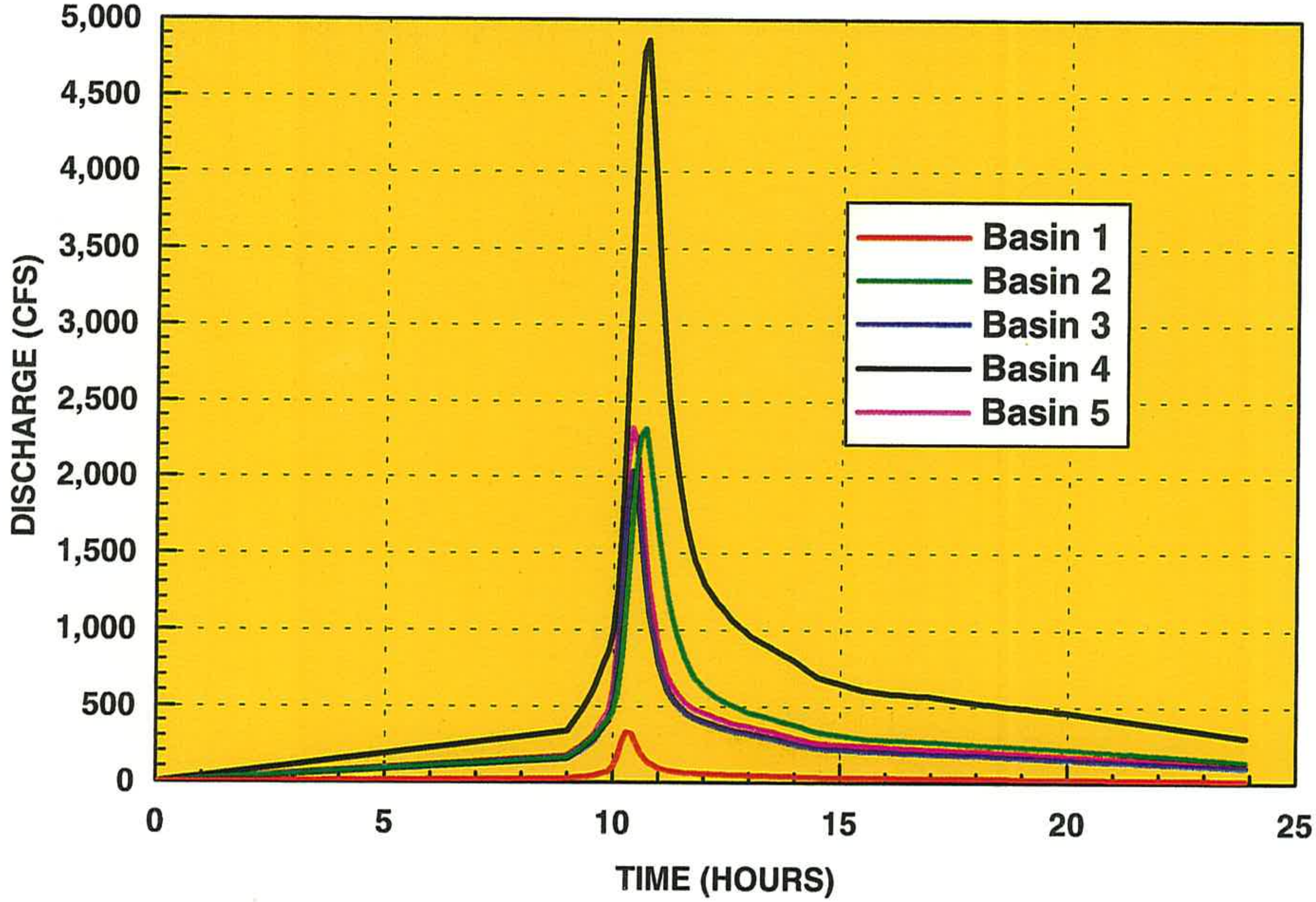
4.3.1.4 SCS Peak Stormwater Runoff Rates

Results of the SCS computations are tabulated below in Table 4-3. The 100-year 24-hour runoff hydrographs are shown in Figure 4-3.

Drainage Basin	Area acs.	Peak Discharge cfs		
		10-year	50-year	100-year
1	74	210	310	330
2	613	1,360	2,110	2,320
3	442	1,190	1,840	2,030
4	1,123	2,890	4,250	4,870
5	502	1,150	1,920	2,320
TOTAL	2,754	6,800	10,430	11,870

TABLE 4-3 - SUMMARY OF SCS PEAK DISCHARGE

FIGURE 4-3
SCS 100-Year Inflow Hydrographs



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4.3.2 HEC-1

Stormwater runoff rates were also computed using HEC-1, a flood hydrograph model developed by the U.S. Army Corps of Engineers. Computations were facilitated with the aid of the computer program developed by Haestad Methods. Watershed data already obtained in the SCS CN computations were adapted to the HEC-1 computations. The difference in the data input is the time of concentration. An empirical relationship adjusts the time of concentration by a factor of 0.6 to obtain the lag time. The lag time is defined as the time between the center of mass of excess rainfall and the peak of the unit hydrograph. (U.S. Army COE, 1990) Data summary and results are presented in Table 4-4 and 4-5. HEC-1 calculations are shown in Appendix C.

Drainage Basin	Area sq. mi.	Weighted CN	Lag Time hours
1	0.116	77	0.264
2	0.957	80	0.522
3	0.691	80	0.300
4	1.755	84	0.414
5	0.784	68	0.324

TABLE 4-4 - SUMMARY OF DRAINAGE BASIN DATA - HEC-1

Drainage Basin	Area sq. mi.	Peak Discharge cfs		
		10-year	50-year	100-year
1	0.116	150	250	270
2	0.957	1,000	1,630	1,780
3	0.691	1,190	1,670	1,810
4	1.755	2,890	3,970	4,300
5	0.784	1,070	1,620	1,790

TABLE 4-5 - SUMMARY OF HEC-1 PEAK DISCHARGE

4.3.3 Plate 6 - City and County of Honolulu, D. P.W, Storm Drainage Standards, May 1988

Finally, peak stormwater runoff rates were computed using Plate 6 of the current City and County of Honolulu, Department of Public Works, storm drainage standards. Depending on the number of drainage basins selected within a watershed and their areas, numerous results may be obtained for the peak discharge. In view of the 1971 analysis, the following peak discharges were computed using the total area. From Plate 6, the peak discharge for an area of 2,754 acres is 14,400 cfs. Computing the discharge per acre gives 5.23 cfs/ac. Multiplying this factor to the areas of each basin yields the peak discharges shown Table 4-6.

Drainage Basin	Area acs.	Peak Discharge cfs
1	74	390
2	613	3,200
3	442	2,310
4	1,123	5,870
5	502	2,630
TOTAL	**2,754**	**14,400**

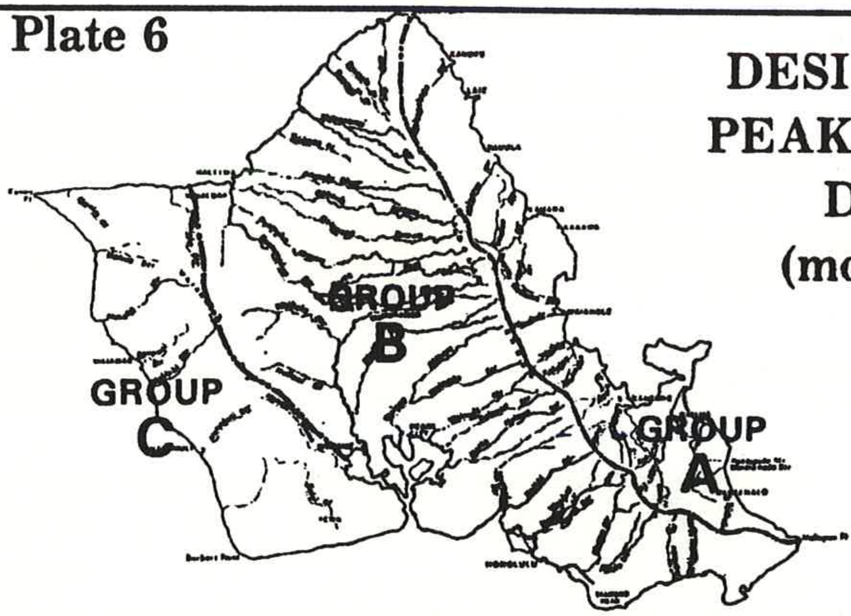
TABLE 4-6 - SUMMARY OF C & C OF HONOLULU PEAK DISCHARGE

4.4 Hydrologic Evaluation

Results of the 100-year peak discharge for each method are shown in Table 4-7. As the table indicates, a range of values were computed. Plate 6 of the City and County of Honolulu estimated the highest peak discharge for each drainage basin. HEC-1 estimated the lowest peak discharge.

Results of the SCS CN Method were selected for use in the hydraulic analysis portion of this study. Hydrographs generated by the SCS CN Method were used for flood routing of the Kaelepulu Stream drainage system, covered in Section 5.3 and Section 6. It was felt that the SCS Method provided a hydrologic model well suited for this study watershed. Results from Plate 6 are more applicable to the design of drainage facilities and does not model existing hydrologic conditions. Review of its development indicate that Plate 6 is statistically based with adjustments to account for factors affecting runoff, i.e. future development of the watershed. A factor of safety may also be applied into the nomograph.

Plate 6



DESIGN CURVES FOR PEAK DISCHARGE VS. DRAINAGE AREA (more than 100 acres)

- CURVES ARE FOR STREAM CHANNELS AND DRAINAGE STRUCTURES.

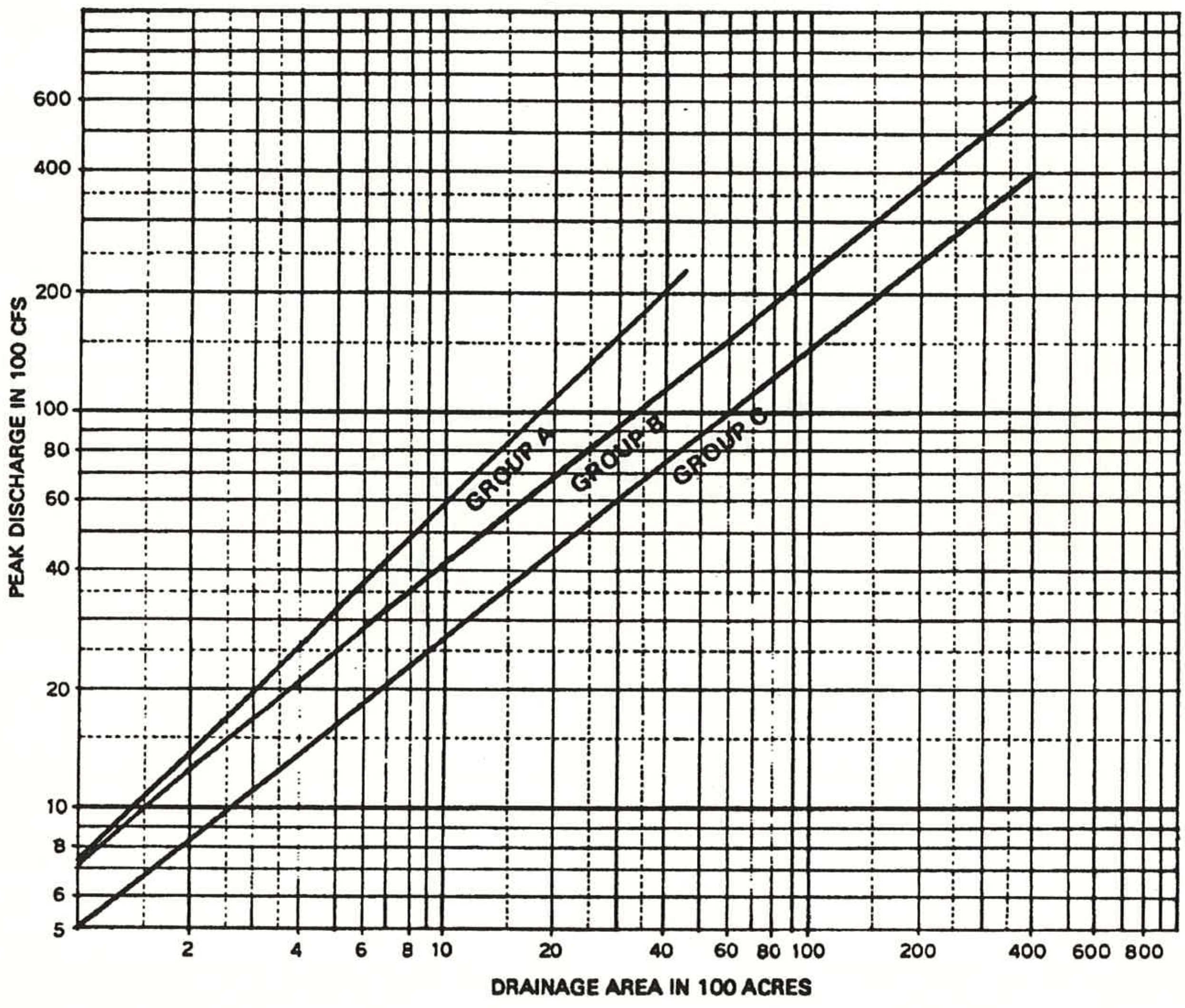


Plate 6 - C & C of Honolulu, May 1988 ***Figure 4-4***

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Drainage Basin	Area acs.	Peak Discharge by Method cfs		
		HEC-1	SCS CN	C & C
1	74	270	330	390
2	613	1,780	2,320	3,200
3	442	1,810	2,030	2,310
4	1,123	4,300	4,870	5,870
5	502	1,790	2,320	2,630
TOTAL	**2,754**	**9,950**	**11,870**	**14,400**

TABLE 4-7 - COMPARISON OF 100-YEAR PEAK DISCHARGE

In the ***Kaelepulu Stream Flood Control Study***, (U.S. Army COE, 1992) the U.S. Army Corps of Engineers used the geometric mean flood, determined by past multiple regression studies, and the Log-Pearson Type III equation to calculate discharge frequency curves. There is good agreement between the U.S. Army COE peak discharges, presented in Table 4-8 below, and the peak discharges computed by the SCS CN Method presented herein.

Concentration Point	Drainage Area sq. mi.	Peak Discharge cfs		
		10-year	50-year	100-year
Kaelepulu Stream mouth	4.97	5,800	10,800	13,500
Kawainui Stream confluence	1.21	1,150	2,150	2,700

TABLE 4-8 - PEAK DISCHARGES - U.S. ARMY COE

A comparison of the SCS peak discharge to those computed by the U.S. Army COE reveals that the SCS CN Method estimated a higher peak discharge for the more frequent storm (10-year) and a lower peak discharge for the less frequent storm (100-year). Closer observation indicate that the study conducted by the U.S. Army COE used a larger drainage area, 4.97 sq. mi. vs 4.30 sq. mi. As a result, the SCS Method has a higher discharge per unit area.

Hydraulics

Section 5

5. HYDRAULICS

5.1 General

Similar to hydrologic models, numerous variables are involved in a numerical hydraulic model. Developing a model which adequately describes the hydrologic conditions of a watershed, a hydrograph may be generated and used in the design and/or analysis of a drainage system. Given the vertical and horizontal constraints, the size, shape, flow and storage capacity of a stream channel network all contribute in providing a level of flood protection. The following sections will determine the level of flood protection and also the effects of a 100-year storm event. Figure 5-1 provides a schematic representation of the Kaelepulu Stream watershed.

Section 5.1.1 - "Reservoir" Routing, and Section 5.1.2 - Stream Channel Hydraulics discusses the methods, procedures, assumptions and limitations used in performing the flood routing hydraulic analysis of the existing Kaelepulu Stream drainage system.

5.1.1 "Reservoir" Routing

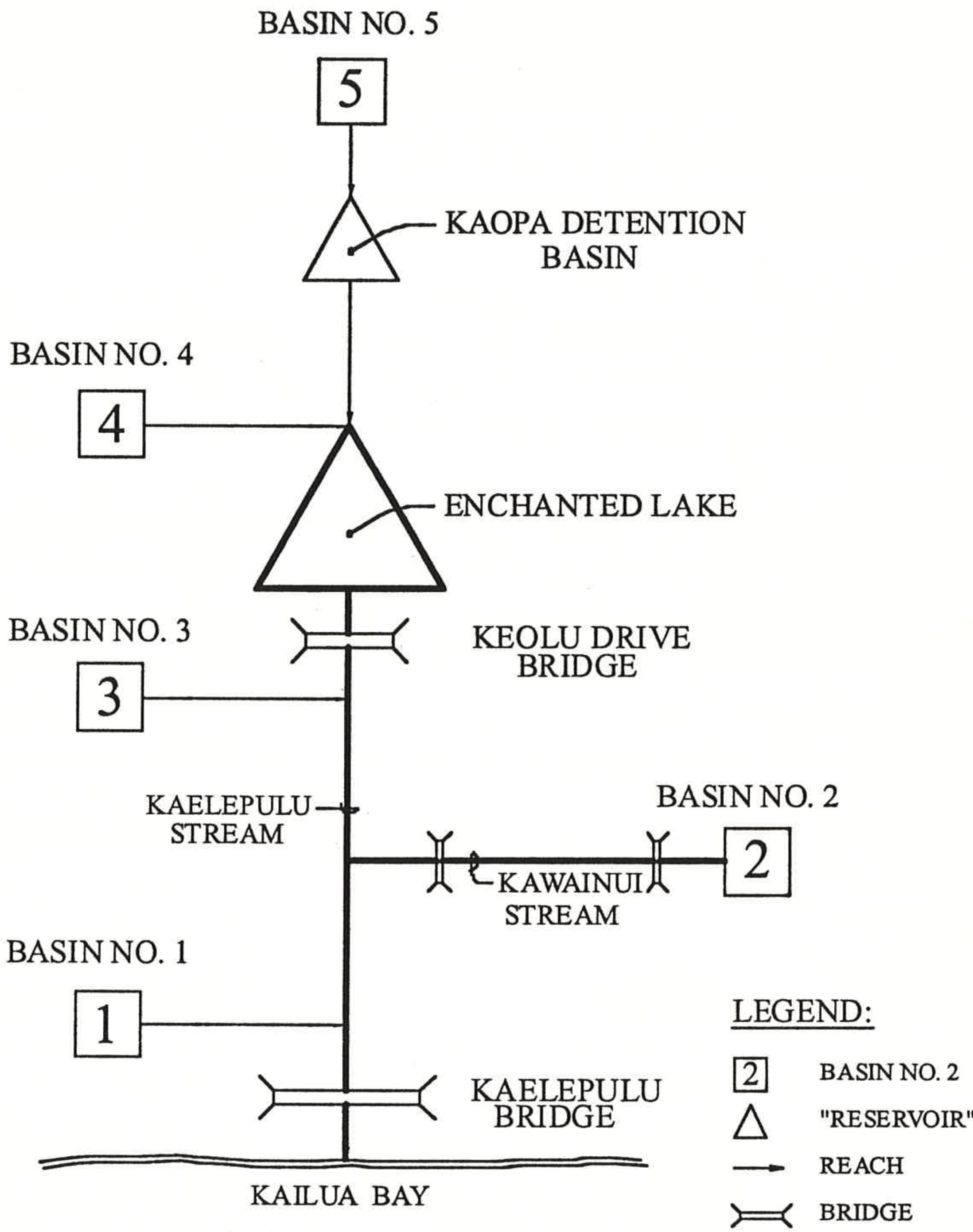
"Reservoir" routing computations were performed on Kaopa detention basin and Enchanted Lake (or Kaelepulu Pond) using the Level-Pool Reservoir Routing method and procedures, also known as the Puls Method. This method assumes a horizontal water surface throughout the passage of the flood wave. (Chow, 1964; Maidment, 1993) A form of the basic continuity equation is solved in a time-stepped procedure using input variables of stage, storage volume, and discharge.

Routing computations were greatly facilitated with the use of POND-2, a detention pond routing computer program developed by Haestad Methods. However, several assumptions were required to perform the "reservoir" routing analysis. They are given as follows:

1. The detention/retention basins do not contain stormwater runoff from previous storm events. In the case of Enchanted Lake, the high tide starting water surface elevation is 1.76-feet mean sea level (MSL), which represents 2.8-feet mean lower low water, generally shown on tidal charts.

2. Tailwater effects from Kailua Bay, and friction losses from Kaelepulu Bridge, Kaelepulu Stream and Keolu Drive Bridge governs the outflow from Enchanted Lake, and not entrance controls at the outlet of Enchanted Lake. i.e. a weir and orifice type of structure.

3. The Stage vs Storage relationship of Enchanted Lake was determined using a "reservoir" area of 100 acres. Due to the lack of topographic data, it was assumed that flooding will be contained within the 100 acre area. Land maps indicate that the area of Enchanted Lake is greater than 100 acres.



Schematic Flow Diagram

Figure 5-1

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A limitation of the routing method is that computations do not account for downstream tailwater effects. The influence of downstream inflow hydrographs cannot be modeled simultaneously with the reservoir routing computations. A complex numerical model is required to solve a two dimensional unsteady flow problem which analyzes and simulates downstream sub-basin effects. However, by incorporating the use of HEC-2, backwater effects were integrated into the reservoir routing analysis. Several iterations were necessary to obtain the final Stage vs. Discharge relationship for Enchanted Lake.

Flood routing procedures for Kaopa detention basin are straight forward and will not be discussed herein. Flood routing procedures for Enchanted Lake are outlined below. Results of the reservoir routing analysis are presented in Section 5.3.

Step 1: Add the outflow hydrograph of Kaopa detention basin to the inflow hydrograph of Basin No. 4.

Step 2: Determine the Stage vs Storage relationship of Enchanted Lake.

Step 3: Determine the Stage vs Discharge relationship based on incremental outflow rates from Enchanted Lake and also inflows from Basin Nos. 1, 2, and 3. Peak flow rates from the three basin were used for the initial computation. Here, HEC-2 was required for the stream channel hydraulic computations.

Step 4: Perform the reservoir routing computations.

Step 5: Determine the time at which the routed peak outflow occurs from Enchanted Lake. Then, from the hydrographs of Basin Nos. 1, 2, and 3, determine the new inflow into Kaelepulu Stream.

Step 6: Repeat Steps 3 - 5, until the time, peak outflow, or water surface elevation of Enchanted Lake converges.

5.1.2 Stream Channel Hydraulics

Information extracted from the hydrologic analysis of the drainage basin provide the necessary data to calculate the hydraulic capacity of Kaelepulu Stream, and to determine corresponding water surface elevations at various locations along the stream. The complexity of the basin system requires the inputs from various sub-basins to be discretized as steady state, point source inputs along Kaelepulu Stream.

Hydraulic computations were performed utilizing HEC-2, the program developed by the U. S. Army Corp of Engineers, Hydrologic Engineering Center for the computation of water surface profiles. The program employs a step backwater analysis as its theoretical basis.

Stream stations start at (-)8+00 at Kailua Bay and extend upstream to station 69+50 at Enchanted Lake. The confluence is approximately located at station 31+00. Two bridges cross Kaelepulu Stream. Kaelepulu Bridge, which is located between station (-)0+26 and 0+08, is approximately 210 feet long and has nine piers supporting it. The second bridge at Keolu Drive is about 100 feet long and has only one center pier. Keolu Drive Bridge is located between station 61+10 to 61+91.

Stream stations were typically set at 50 feet intervals except in areas adjacent to bridges that require greater resolution.

Several assumptions were made to perform the calculations:

1. Manning's n values for the existing channel were set at 0.05 for the overbanks and 0.04 for the main channel.

2. Manning's n values for the improved channel were reduced to 0.04 for the overbanks and 0.03 for the main channel.

3. The sand berm at the mouth of Kailua Bay was assumed to be removed and clear to a depth of (-) 4-feet MSL to allow stream flow into the Bay for both existing and improved channel analyses.

4. High flow velocities will remove bed material under Kaelepulu Bridge to an estimated invert of (-) 2-feet MSL (minimum). Due to the relative close spacing of the bridge piers, overlapping and interacting pier scour holes will clear the entire channel under the bridge. Remnant scour holes may be seen on the topographic survey map.

5. Tailwater conditions for the analysis were determined to be 1.76 feet above MSL which represents 2.8-feet mean lower low water. (U.S. Department of Commerce, NOAA, National Oceanic Service, 1992)

By design, Kaelepulu Stream has a flat bottom that was originally set to an elevation of (-) 8-feet MSL. Flow occurs only when the hydraulic head upstream increases and a gradient develops. Under such conditions, subcritical flow occurs and tailwater conditions will govern.

5.2 1971 "Baseline" Routing Computations

Documents of the 1971 routing computations were obtained from the City's files. They include reservoir routing of Kaopa detention basin and Enchanted Lake. Sections 5.2.1 and 5.2.2 discusses the data and results of the flood routing analysis for Kaopa detention basin and Enchanted Lake, respectively. Note, Kaelepulu Stream, Enchanted Lake, Kaopa detention basin were being designed at the time of the 1971 study. The intent was to minimize the lake and stream size, and maximize the "buildable" area for residential development.

5.2.1 Kaopa Detention Basin

The flood routing relationships for Kaopa detention basin are shown below in Figures 5-2 and 5-3. The Stage vs Discharge relationship is based on two (2) -36" reinforced concrete pipes (RCP) at elevation 40-feet MSL, and a 80-feet weir at elevation 50-feet MSL. Entrance control condition was considered in developing the outflow relationship for the 2 - 36" RCP low flow structure. The 1971 study assumed that tailwater effects will not govern outflow from this structure. This is probably a valid assumption, due to the steep improved open channel that exists downstream of the outlet works. Calculations for outflow from the emergency spillway utilized the weir equation with corrections for end contractions.

Results of the 1971 study indicated that Kaopa detention basin and its outlet works will decrease the peak discharge from 3,665 cfs to 2,560 cfs, a reduction of approximately 1,100 cfs. See Figure 5-3. Furthermore, the maximum water surface elevation that will be attained in the detention basin was reported to be 54.2-feet MSL. Construction plans of the basin were not available to determine the free-board height. However, routing data from the 1971 analysis indicates that the elevation prior to overtopping is 56-feet MSL. This results in a freeboard of approximately 1.8-feet.

This study also performed reservoir routing for Kaopa detention basin to investigate the validity of the 1971 results. Based on the 1971 data, POND-2 generated similar results. See Appendix D. Computations indicate that the peak discharge will be reduced by 1,030 cfs at a maximum water surface elevation of 54.4-feet MSL.

5.2.2 Enchanted Lake Retention Basin

The routed outflow hydrograph from Kaopa detention basin was then added to the inflow hydrograph from Basin "B", shown in Figure 5-4. Based on the composite inflow hydrograph, the 1971 reservoir routing analysis of Enchanted Lake reported a peak outflow rate of approximately 6,770 cfs, a reduction of approximately 2,920 cfs. See Figure 5-6. The maximum water surface elevation in Enchanted Lake was estimated to be 5.7-feet MSL. The 1971 study also determined that Enchanted Lake should have a minimum area of 100 acres to provide flood protection for the 100-year storm.

POND-2 routing computations, using the 1971 data, also generated similar results. However, several assumptions and procedures of the 1971 flood routing analysis are questionable. Due to the complexity of the Kaelepulu Stream drainage network, several assumptions were required. The occurrence of the peak discharge during high tide, stream mouth and bridge constrictions, and downstream sub-basin influences should all be considered in the flood routing analysis. It appears that the 1971 analysis addressed these variables by assuming a starting water surface elevation at the confluence to be 3-feet MSL. Then, backwater computations were performed to develop the Stage vs Discharge vs Storage relationship of Enchanted Lake, shown in Figure 5-5.

FIGURE 5-2

Kaopa Detention Basin Stage vs. Discharge vs. Storage

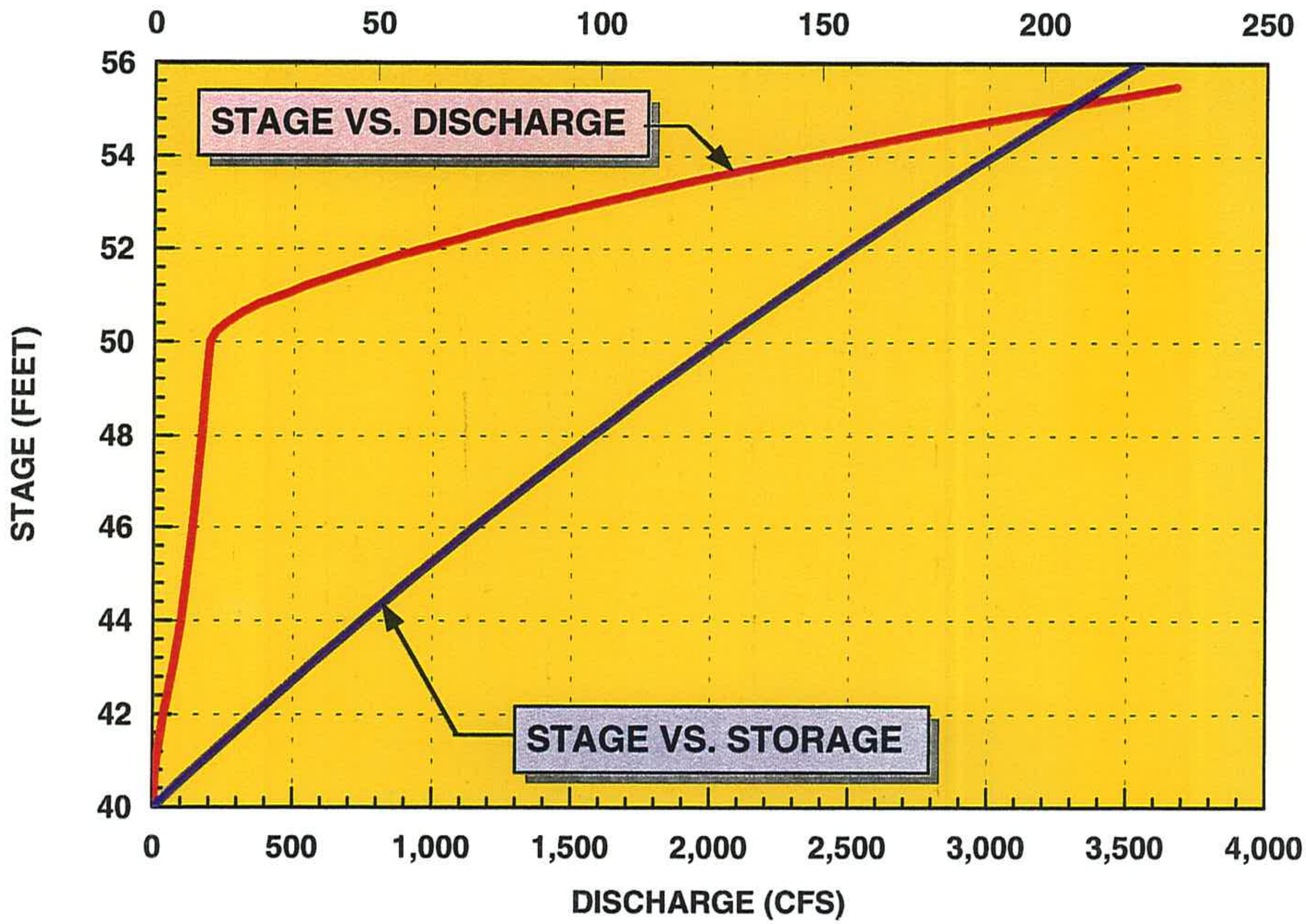

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FIGURE 5-3
Kaopa Detention Basin Flood Routing Results

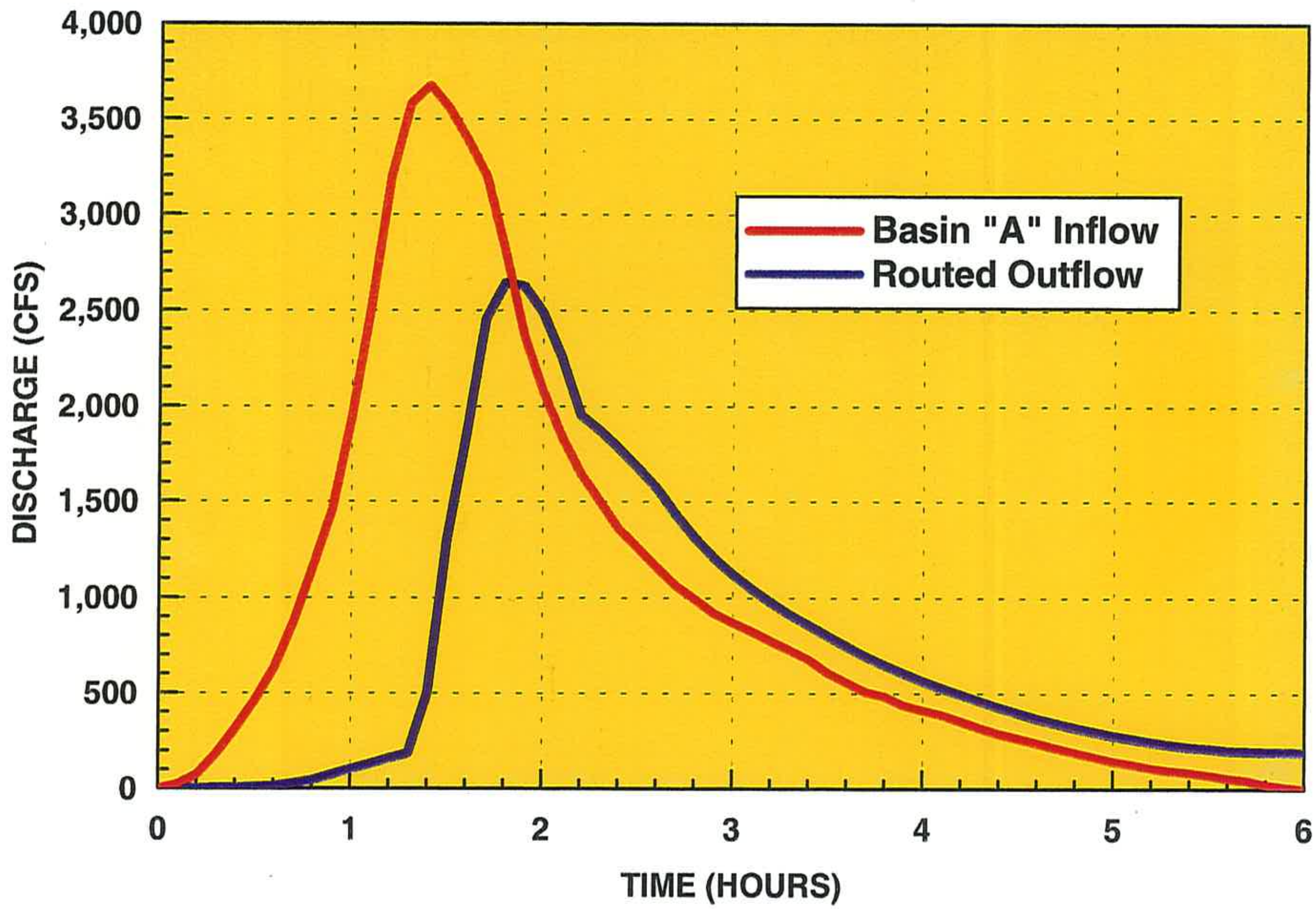

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FIGURE 5-4
Inflow Hydrograph for Enchanted Lake

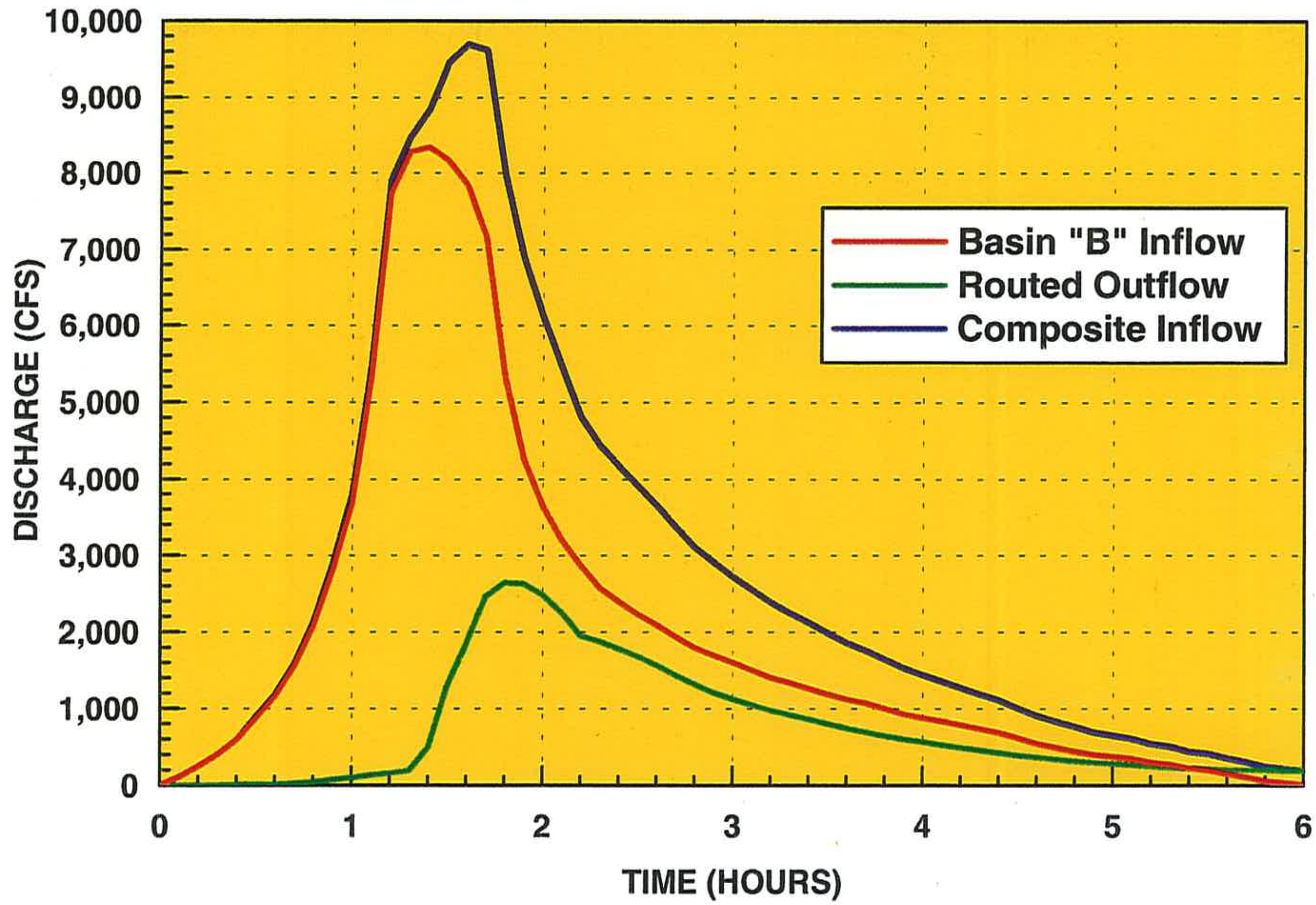

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FIGURE 5-5
Enchanted Lake Stage vs. Discharge vs. Storage

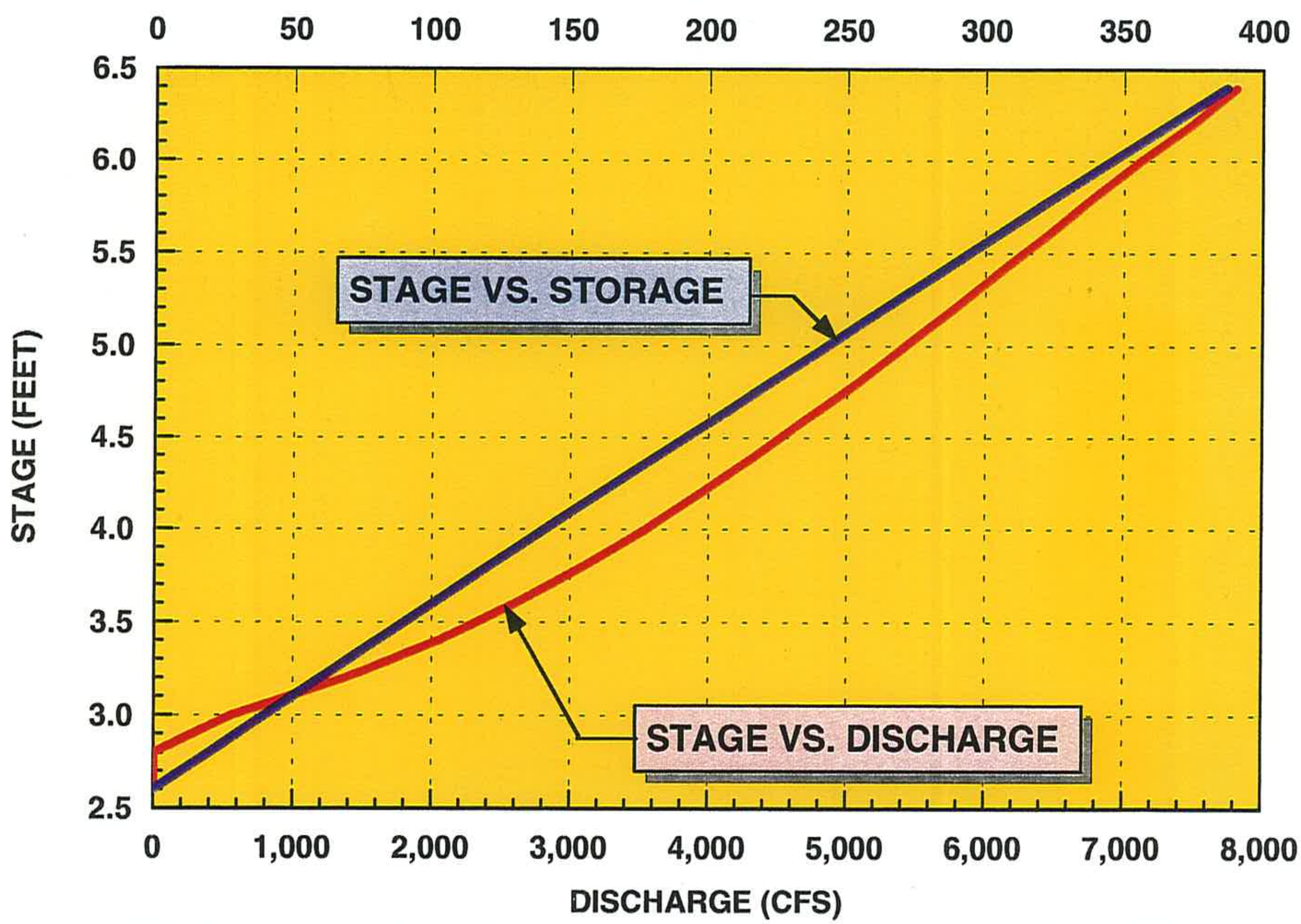

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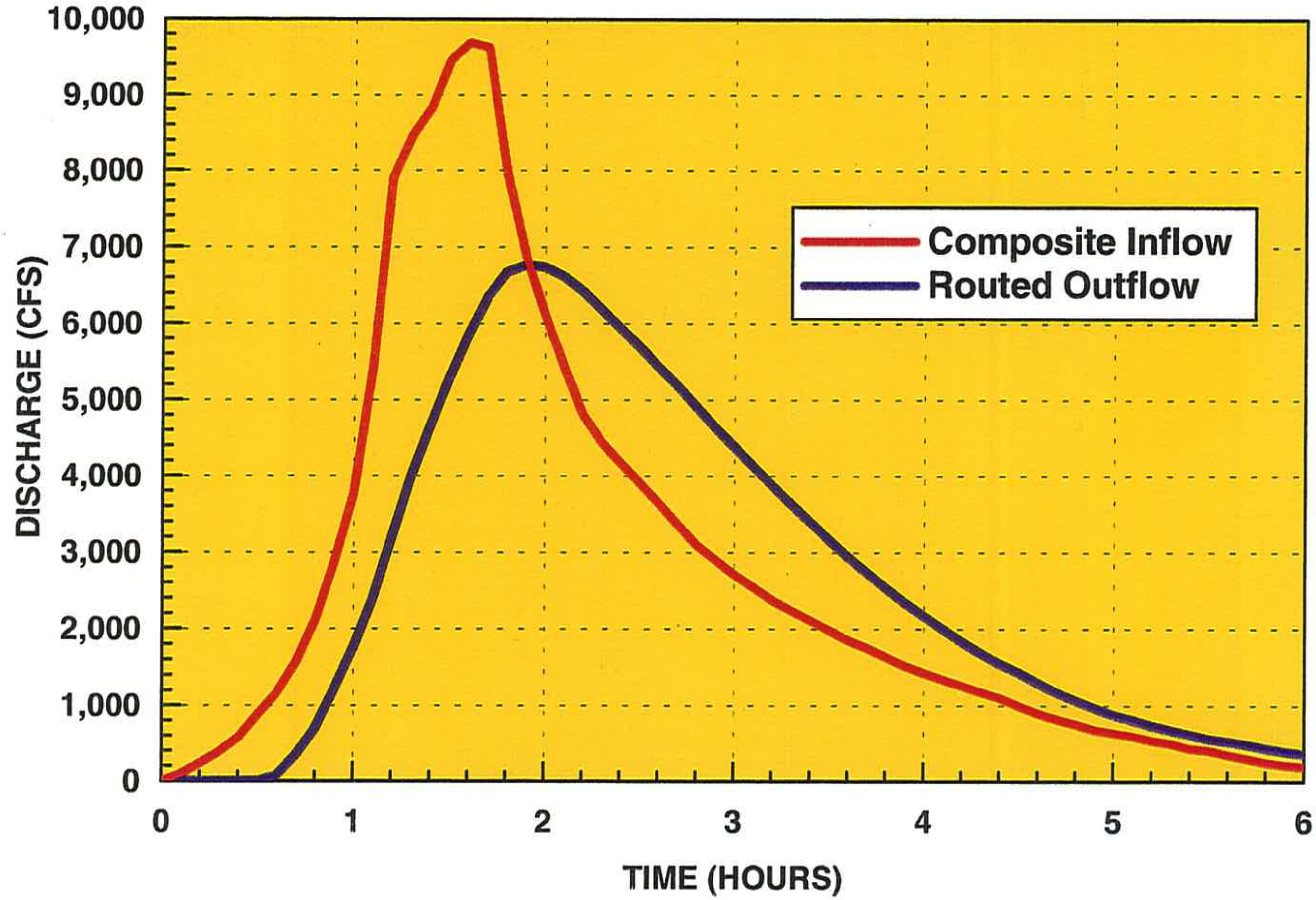
FIGURE 5-6
Enchanted Lake Flood Routing Results



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The application of POND-2 and HEC-2 aided in minimizing engineering judgement and permitted numerous variables to be incorporated into the analysis of Kaelepulu Stream. Tailwater effects at high tide, bridge constrictions, stormwater inflow from downstream sub-basins, and to some extent, stream mouth constriction were all considered in the current study. See Section 5.3.2.

5.3 Flood Routing Analysis - Existing Conditions (1993)

5.3.1 Kaopa Detention Basin

The current study investigated the performance of Kaopa detention basin for a 100-year 24 hour storm event. As mentioned in Section 4.2 - 1971 "Baseline" Analysis, a 24-hour storm will generate a larger volume of runoff, as compared to a 6-hour storm having an equivalent recurrence interval. Results of the 24-hour routing computations indicate that Kaopa detention basin will serve as an effective stormwater control facility. The peak discharge from Basin No. 5 has been decreased from 2,322 cfs to 397 cfs, a reduction of 1,925 cfs at a maximum water surface elevation of 52.8-feet MSL. Figure 5-7 presents the results as inflow and routed outflow hydrographs.

5.3.2 Enchanted Lake Retention Basin

Similar to the 1971 flood routing procedures for Enchanted Lake, the routed outflow hydrograph from Kaopa detention basin was added to the inflow hydrograph from Basin No. 4. The iterative procedure discussed in Section 5.1.1 was required to develop the Stage vs Discharge relationship for Enchanted Lake.

Stage as a function of discharge at the outlet of Enchanted lake was computed for outflows ranging from zero to 4,400 cfs. In order to obtain the water surface elevation information, inputs from adjacent sub-basins were assigned at the appropriate station so the downstream effects could be incorporated into the hydraulic analysis. A plot of outflow from Enchanted Lake versus stage is presented as Figure 5-9.

Based on the assumptions and procedures outlined in Section 5.1.1 - "Reservoir" Routing and Section 5.1.2 - Stream Channel Hydraulics, the results of the 100-year 24-hour flood routing computations indicate that the maximum water surface elevation at Enchanted Lake will be approximately 6.1-feet MSL. The peak outflow rate was estimated to be approximately 1,800 cfs, a reduction of 3,255 cfs. Combining the discharges from Basin Nos. 1, 2, and 3, it is estimated that the peak discharge at the stream mouth approaches 2,840 cfs. HEC-2 computed the stream channel hydraulics which provided the data for the 100-year limits of flooding, plotted on Exhibit 2 - Drainage Map. Furthermore, the hydraulic data, i.e. flow depth and velocity, were used to compute the scour at Kaelepulu and Keolu Drive Bridges, covered in Section 7.3. Flood routing computations for Kaopa detention basin and Enchanted Lake are shown in Appendix E.

FIGURE 5-7
Kaopa Detention Basin Flood Routing Results

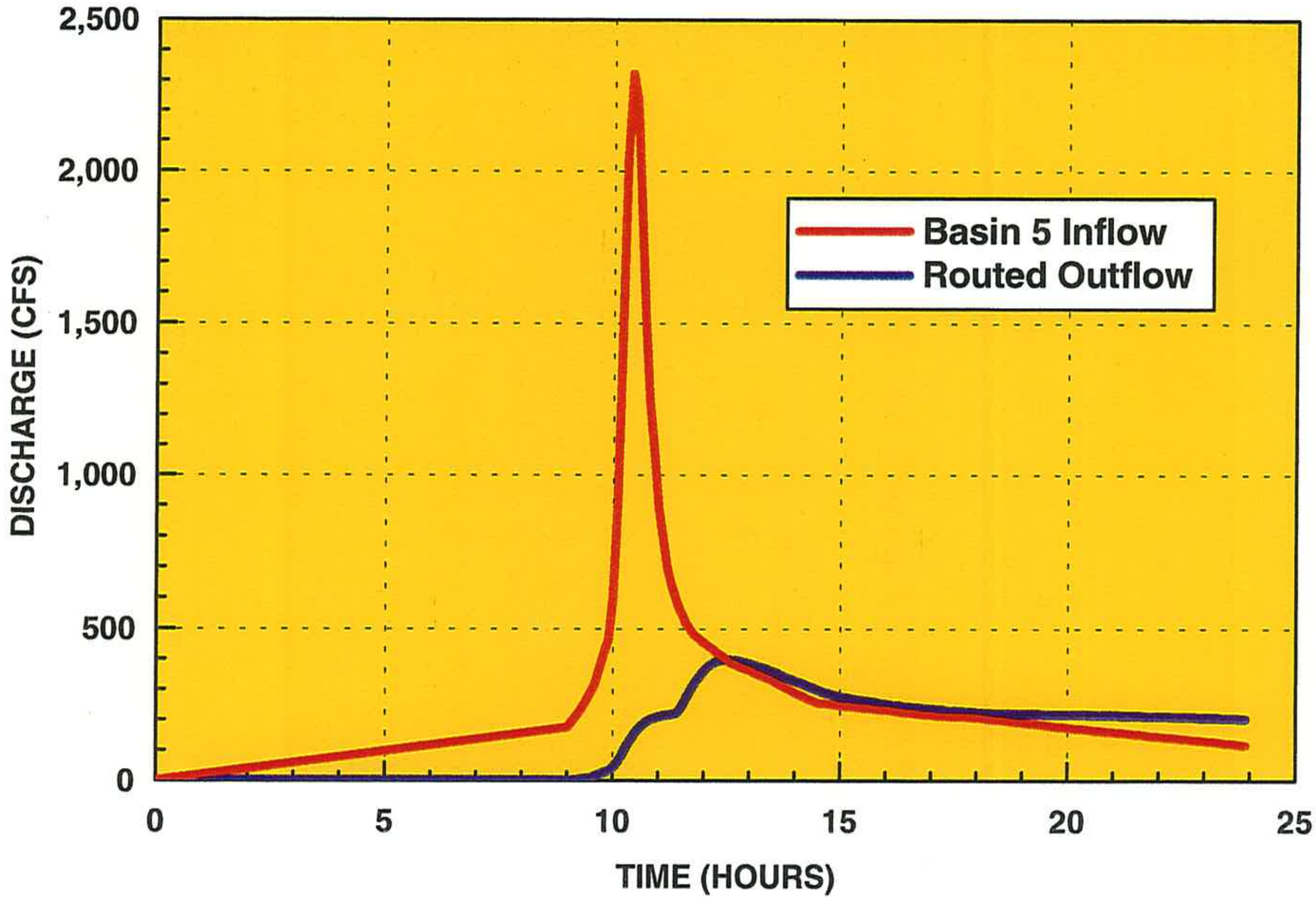

FIGURE 5-8
Inflow Hydrograph for Enchanted Lake

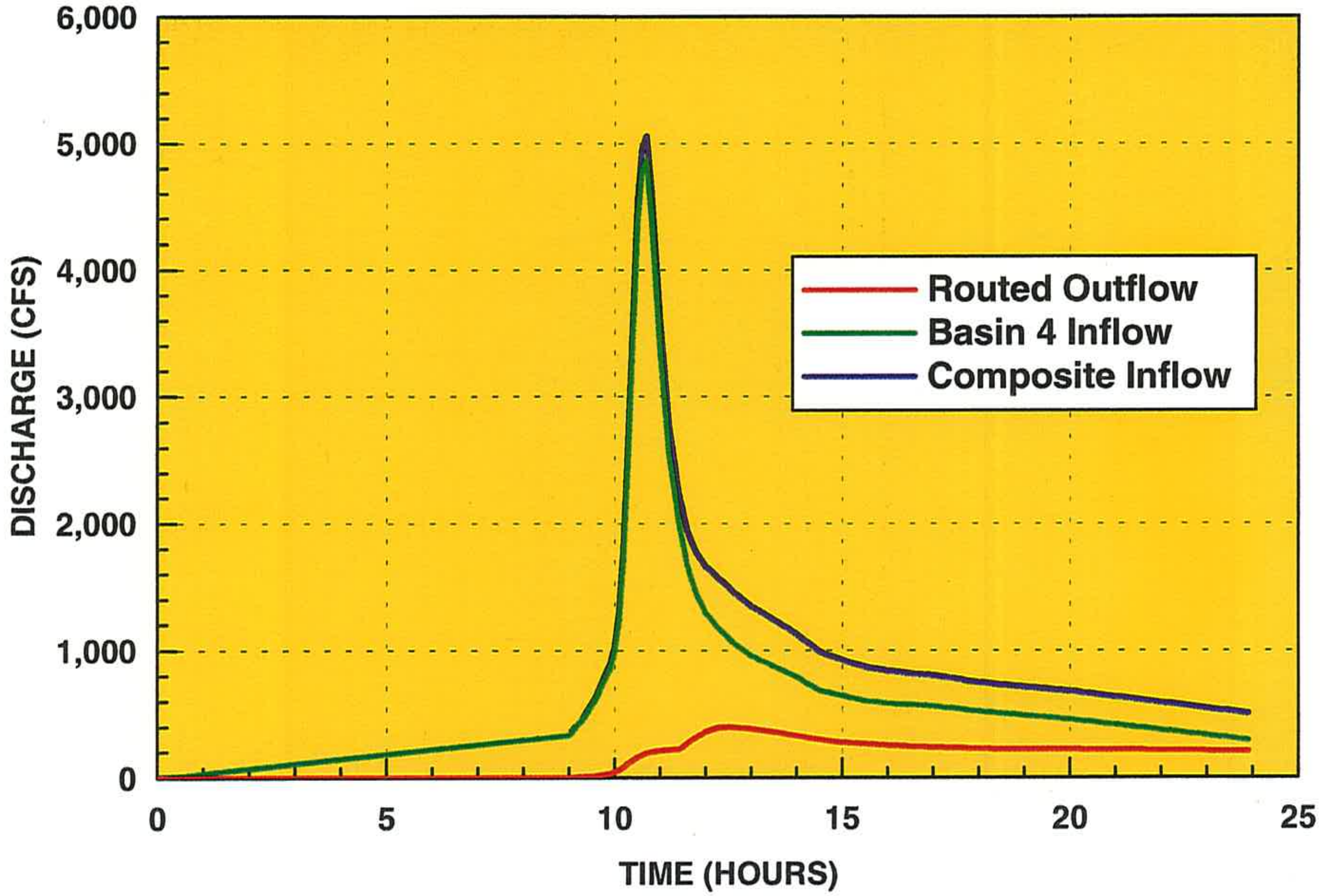

FIGURE 5-9

Enchanted Lake Stage vs. Discharge vs. Storage

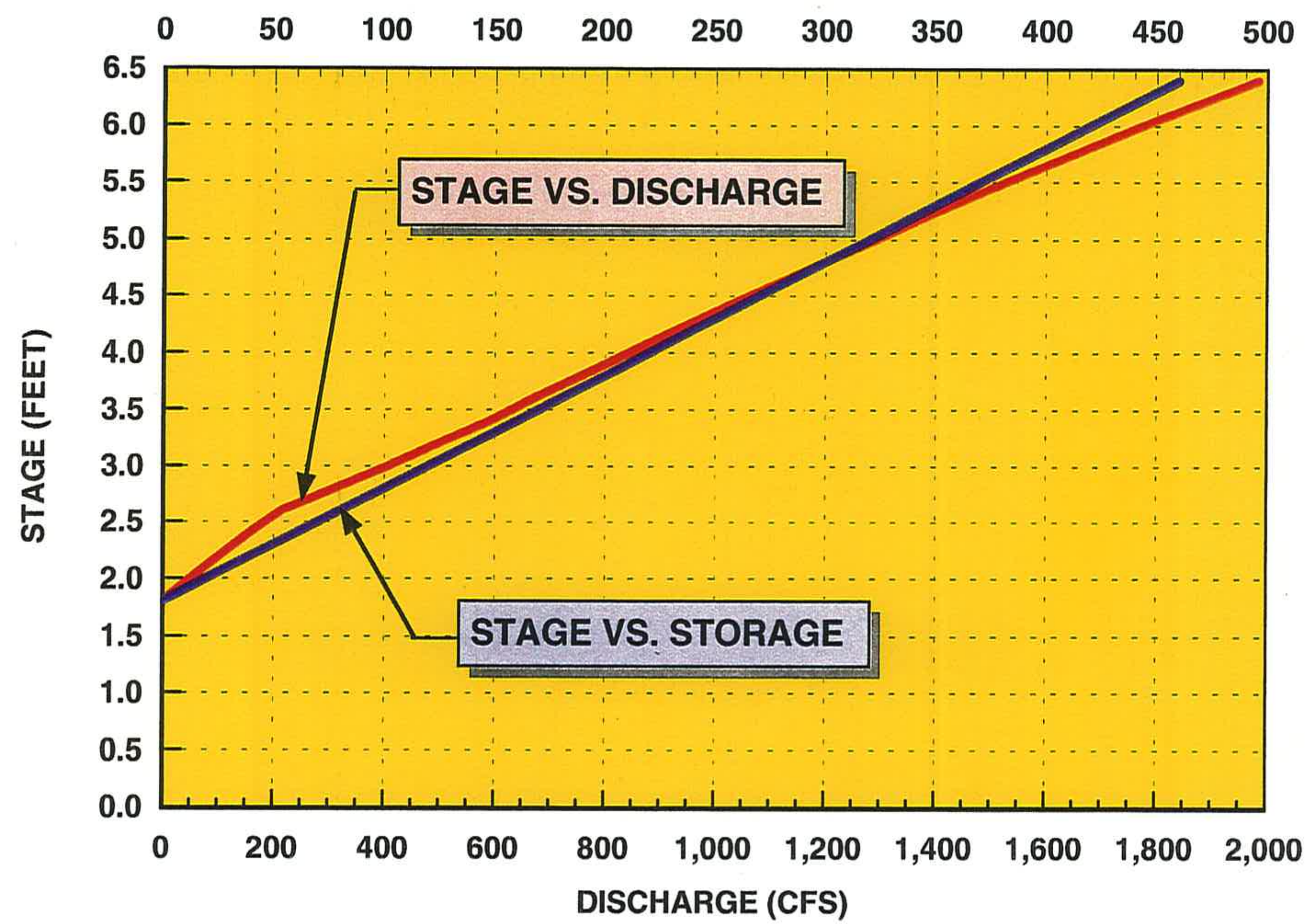

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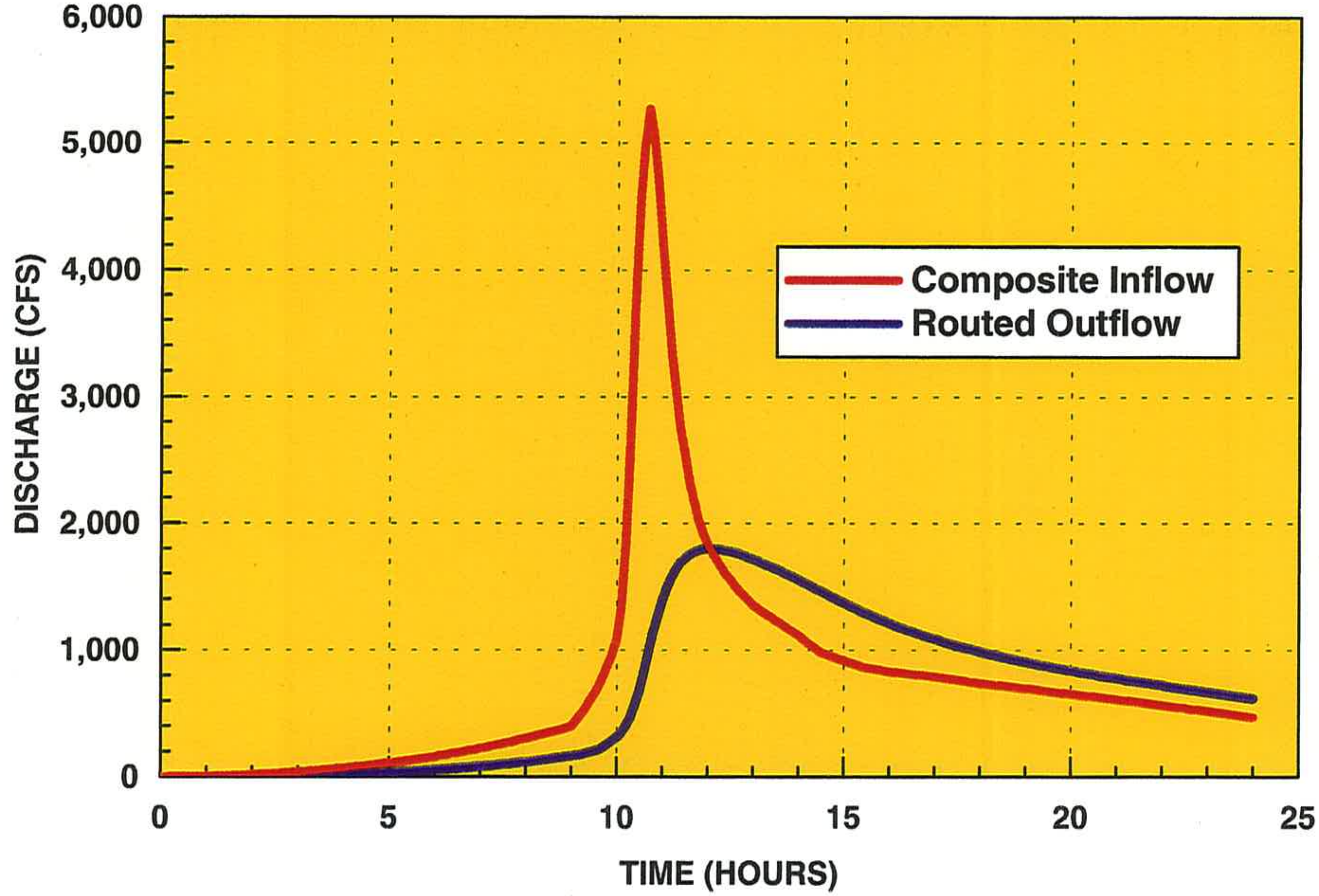
FIGURE 5-10
Enchanted Lake Flood Routing Results



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5.4 Hydraulic Evaluation and Results

5.4.1 100-Year 24-Hour Flood Routing Results

Several interesting results were obtained in the 100-year 24-hour flood routing analysis of Kaelepulu Stream drainage system. The results of the 1971 "Baseline" Analysis and current study, previously reported in Sections 5.2 and 5.3, are tabulated below in Tables 5-1 and 5-2, respectively.

1971 "Baseline" Analysis		
	Kaopa Detention Basin	Enchanted Lake
Peak Inflow, cfs	3,665	9,690
Peak Outflow, cfs	2,560	6,770
Max. W.S.El., ft.	54.2	5.7
W.S.El @ Confluence, ft.		3.0
Peak Outflow at Mouth, cfs		6,770

Table 5-1 - 1971 "Baseline" Analysis, 100-year 24-hour Storm

Existing Conditions - 1993		
	Kaopa Detention Basin	Enchanted Lake
Peak Inflow, cfs	2,322	5,055
Peak Outflow, cfs	397	1,800
Max. W.S.El., ft.	52.8	6.1
W.S.El @ Confluence, ft.		3.9
Peak Outflow at Mouth, cfs		2,840

Table 5-2 - Existing Conditions - 1993, 100-year 24-hour Storm

The analysis of Kaopa detention basin revealed that the performance of the basin improved for the 100-year 24-hour storm event, as compared to the 6-hour storm used for the design of the basin. The increased capacity of this flood control facility may be accounted for by several factors:

1. Current reservoir routing computations used a flatter, less intense inflow hydrograph from Basin No. 5. The 1971 study used an inflow hydrograph (Basin "A") with a peak discharge approximately 1,360 cfs greater than the current study.

2. The low flow outlet structure (2 - 36" RCP) is capable of passing a greater volume of water for the 100-year 24-hour inflow pattern. A substantial volume of stormwater runoff will be passed through the emergency spillway for the 6-hour inflow hydrograph.

3. The maximum storage volume of Kaopa detention basin is attained at a faster rate for the 6-hour inflow hydrograph.

The 1971 study and the current study resulted in a similar level of flooding in Enchanted Lake. However, results of the peak outflow deviates substantially. The 1971 study estimated a peak discharge of 6,770 cfs, as compared to 1,800 cfs computed for existing channel conditions. This difference is due to the increased flow resistance within the stream channel, and also the lack of evaluating the full impact of downstream tailwater effects in the 1971 study.

Stream channel hydraulics computed the 100-year flood water surface elevation at the confluence to be 3.9-feet MSL. The 1971 study assumed a flood water surface elevation of 3.0-feet MSL. This assumption resulted in a steeper energy grade line from Enchanted Lake, thus providing more energy to pass a greater discharge. Interesting to note, the Flood Insurance Rate Map, prepared by the Federal Emergency Management Agency (1987) estimates the flood elevation at the confluence to be 4-feet MSL. The close agreement in water surface elevation provides some supporting evidence for the results of this study. See Exhibit 2.

5.4.2 Existing Level of Flood Protection

This report established **no flooding of residential lots** as the criteria for the determination of the existing level of flood protection. Flood routing analysis for the 10-year 24-hour storm event indicated that Kaelepulu Stream may contain runoff generated from a larger storm event. However, routing computations for the 20-year 24-hour storm indicated that localized flooding will occur along Block 9 of Kaelepulu Subdivision, adjacent to Wanaao Road. Thus, the existing level of flood protection of Kaelepulu Stream was estimated to be approximately a 10 - 20 year 24-hour storm.

Accepting the flooding which is expected to occur in the low-lying areas of Block 9 - Kaelepulu Subdivision, flood routing computations indicate that the Kaelepulu Stream drainage system may contain stormwater runoff generated by a 80 - 90 year 24-hour storm. With the exception of Block 9, it appears that other residential subdivisions adjacent to Kaelepulu Stream were "built-up" high enough to provide flood protection for a significant storm event. The peak water surface elevations at the confluence and Enchanted Lake will be approximately 3.7-feet and 5.8-feet, respectively.

The results and findings of the 1971 "Baseline" Analysis and the current hydrologic and hydraulic analysis may explain why Kaelepulu Stream drainage facilities still provides flood protection for a 80-year to 90-year 24-hour storm event.

The 1971 analysis and design of Kaelepulu Stream and Enchanted Lake used the conveyance approach for stormwater management. The focus of this school is to design drainage facilities to, first, collect the stormwater runoff, then convey the runoff immediately to the discharge point. This approach has been widely used in the past due to the minimal impact on land use required for these drainage facilities.

Peak outflow and maximum flood elevation of Enchanted Lake are good indicators that suggest the use of the conveyance approach. The 1971 analysis reported a peak outflow of 6,770 cfs, much higher than the peak outflow computed in this study, 1,800 cfs. A peak flood elevation of 5.8-feet MSL was reported in the 1971 analysis, while 6.1-feet MSL was computed in this study.

Sediment deposition and dense vegetative growth have reduced the conveyance properties of Kaelepulu Stream. As a result, peak outflow will decrease and maximum flood stage will increase. This increase in flood stage provides additional storage for temporary containment of stormwater runoff. With the exception of Block 9 of Kaelepulu Subdivision, the design of the surrounding residential subdivisions has provided an adequate amount of freeboard to allow Kaelepulu Stream and Enchanted Lake to perform as an effective flood control facility.

The Kaelepulu Stream drainage system is now operating as a storage approach drainage facility for stormwater management. With the Environmental Protection Agency's (EPA) mandate for stormwater quality control under the National Pollutant Discharge Elimination System (NPDES) permit program, the storage approach to stormwater management has now become a feasible and effective alternative for the design of drainage improvements.

The City and County of Honolulu, Road Maintenance Division is concern over the duration between the time the 100-year storm begins and the time the mouth of Kaelepulu Stream should be cleared. Based on a 24-hour storm duration having a Type I rainfall distribution, the composite inflow hydrograph (shown in Figure 5-10) indicate that approximately 6 - 8 hours may lapse until drainage of Kaelepulu Stream will be adversely impacted. During this time, Kaelepulu Stream and Enchanted Lake will contain the flow rates and resulting volume of stormwater runoff with an adequate amount of storage remaining for passage of the peak discharge.

It is important to note that the 6 - 8 hour "lead time" for clearing of the mouth is only applicable for the 24-hour storm duration and Type I rainfall distribution pattern. Intense shorter duration storms, multiple storm events, storm direction, and storm cell location are some of the many factors which may decrease the lead time.

Proposed Flood Control Improvement
Section 6

6. PROPOSED FLOOD CONTROL IMPROVEMENT

6.1 General

Flood routing analysis of the 1971 study concluded that Kaelepulu Stream should be designed to convey 6,770 cfs. Furthermore, the analysis provided data to design a non-silting, non-eroding earth channel as computed using the Kennedy formula, given by the following equation: (Chow, 1959)

$$V_o = CD^x$$

The equation estimates the non-silting, non-eroding velocity for channels found in various types of soils, as reflected by the coefficient C. Flow depth (D) and the amount of suspended solids (x) determines the flow velocity. A typical stream channel section may be obtained for a given flow rate, by iterating between the design of the section and analysis of its flood routing relationship. To a certain degree, the 1971 study conducted such computations.

The final design of Kaelepulu Stream cross sections are shown in Exhibit 3 - Enchanted Lake Estates, Drainage Channels, Plan and Sections. Side slopes ranged from 1H : 1 V to 2 H : 1 V. Top widths ranged from 100-feet to 200-feet. What the sections have in common is the invert elevation, set at (-) 8.0-feet MSL.

6.2 Proposed Flood Control Improvement

Without additional modifications to the original design of Kaelepulu Stream, this report proposes a maintenance dredge to remove the silt and debris which has accumulated over the past 20 years. In addition, dense vegetation, such as mangrove trees, will also be removed to restore the original flow capacity of the Kaelepulu Stream. The following section will determine the additional level of flood protection offered by the proposed maintenance dredge.

Kaelepulu Stream should be dredged to an invert elevation of (-) 8.0-feet MSL, except under Kaelepulu Bridge were an invert of (-) 4-feet is recommended. The structural integrity of the pier foundation may be jeopardized if the stream bed is dredged to a lower elevation. See Section 7 - Scour Analysis for the estimated 100-year scour depths. The stream side slopes should not exceed 2 H : 1V.

6.3 Flood Routing Analysis - Improved Channel Conditions

Results of the 100-year 24-hour flood routing computations indicate that the proposed maintenance dredge will enhance the storage (stormwater and sediment) and conveying properties of Kaelepulu Stream. The peak outflow rate was estimated to be approximately 2,130 cfs, as compared to 1,800 cfs for existing conditions. By increasing the outflow rate, the maximum water surface elevation at Enchanted Lake will be 4.5-feet MSL, a difference of 1.6-feet lower than existing conditions. The flood water surface elevation at the confluence was computed to be 3.4-feet MSL.

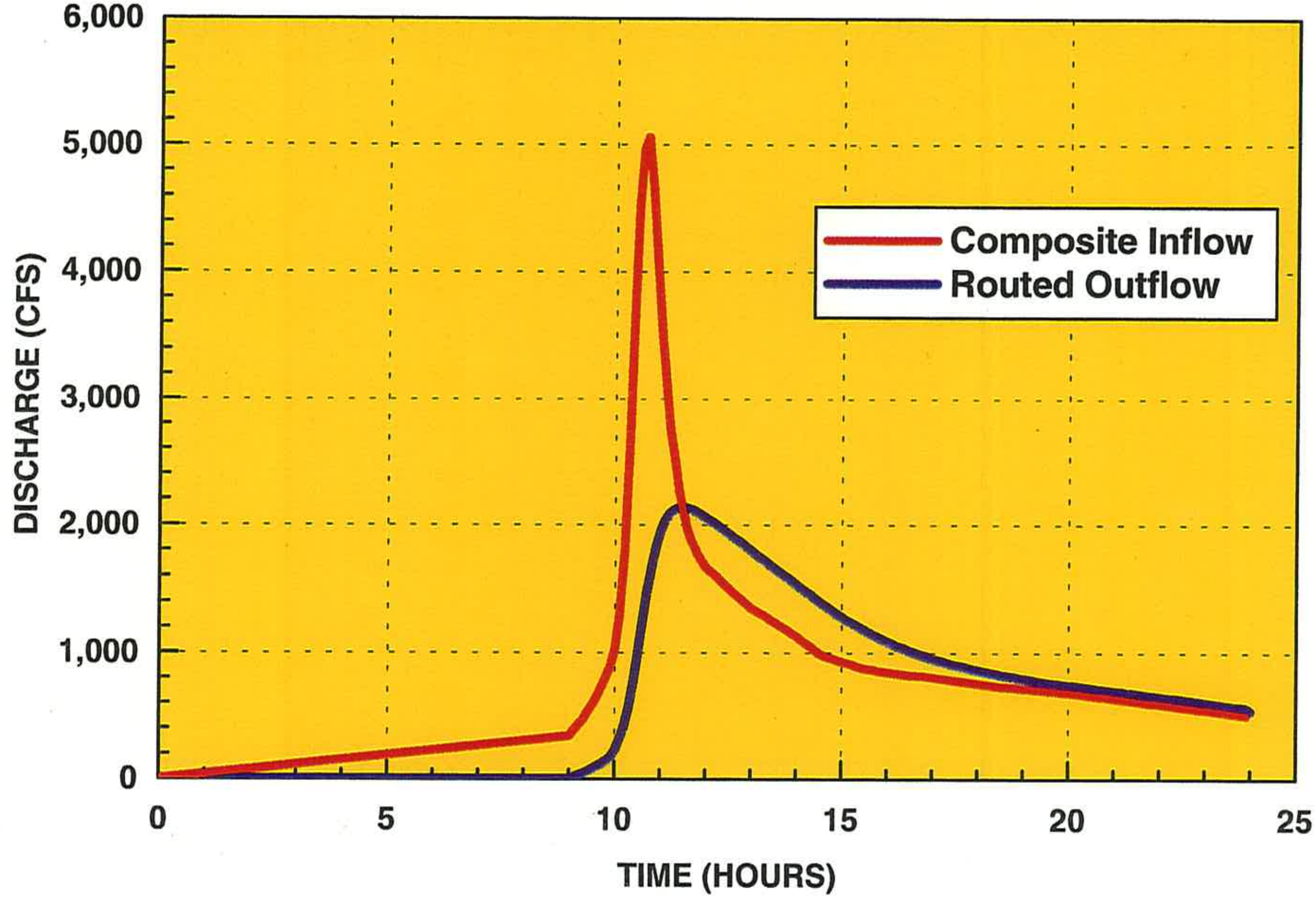
The addition of downstream sub-basin inflows will result in a cumulative discharge rate of approximately 3,700 cfs at the mouth of Kaelepulu Stream. The results are shown in Figure 6-1 and also tabulated in Table 6-1. See Appendix F for computations.

Improved Stream Conditions		
	Kaopa Detention Basin	Enchanted Lake
Peak Inflow, cfs	2,322	5,055
Peak Outflow, cfs	397	2,130
Max. W.S.El., ft.	52.8	4.5
W.S.El @ Confluence, ft.		3.4
Peak Outflow at Mouth, cfs		3,700

Table 6-1 - Improved Stream Conditions, 100-year 24-hour Storm

Under improved stream conditions, flooding is still expected to occur within Block 9 of the Kaelepulu Subdivision, although to a lesser extent than existing stream conditions. Additional freeboard will be provided in other areas. The increase in the streams capacity may not justify dredging to the original design invert. However, a maintenance program of mangrove removal may offer added conveyance properties to Kaelepulu Stream. Mangrove removal will curtail encroachment towards the main channel and minimize the continual build-up of sediment along its root zone. Hydraulic properties, such as flow cross-sectional area and Manning's n will be improved.

FIGURE 6-1
Enchanted Lake Flood Routing Results



Prepared by:
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Kaelepulu Stream
Drainage Study
October 1993

Division of Engineering
Department of Public Works
City and County of Honolulu

Scour Analysis
Section 7

7. SCOUR ANALYSIS

7.1 General

It has been demonstrated in the preceding sections that for the condition of the sand berm cleared at the mouth of Kailua Bay, the improved channel will convey a higher flow than the existing channel. This increased capacity, while beneficial in lowering floodwater depths, may result in conditions that could impact scour in the area of bridges.

The procedures used in estimating scour are provided by the U.S. Department of Transportation, Federal Highways Division (FHWA) in Hydraulic Engineering Circular No. 18, ***Evaluating Scour at Bridges***, dated February 1991. The cumulative effect of a bridge encroachment on stream scour can be approximated by examining each scour component individually. The basic equation for total scour at a bridge crossing is the sum of long term aggradation/degradation, contraction scour and local scour.

7.2 Long Term Bed Elevation Changes and Contraction Scour

In 1971 Kaelepulu Stream's invert was dredged to a depth of (-) 8-feet MSL. Since then, considerable debris and sediments have accumulated in the bottom of the stream. These aggrading tendencies are the result of the flat slope and low velocity experienced in the stream. In fact, with the sand berm normally obstructing the mouth of the stream, the stream behaves as a sedimentation basin.

Contraction scour is deemed to be negligible as Kaelepulu Bridge and Keolu Drive Bridge do not have an appreciable effect on the stream's cross-sectional area. As such, contraction scour is assumed to be zero.

7.3 Scour at Bridges

Local scour in the area of bridge support members can occur at the abutments or at bridge piers. Abutment scour is a function of the abutment shape and the degree to which the abutment encroaches into the streams flow path. For the case of Kaelepulu Bridge, the abutments are sufficiently set back and will not intrude on stream flow. Effectively, the scour due to abutments is zero.

Pier scour is also dependant on the pier shape and geometry. In addition, scour is affected by the pier's angle of attack. Kaelepulu Bridge, which was extended in the early 1960's, has a total of nine piers. The original piers (Type "A") have an angle of attack of 34 degrees while piers supporting the extension (Type "B") are aligned to the direction of flow. Keolu Drive Bridge has a row of center piers which is in-line with stream flow. Pier scour calculations are included in Appendix G for both existing stream and improved channel conditions. Results are presented in Tables 7-1 and 7-2.

Stream Condition	Kaelepulu Bridge		Keolu Drive Bridge
	Type "A"	Type "B"	
Existing	11.2	1.9	3.2
Improved	13.2	2.3	3.8

TABLE 7-1 PIER SCOUR SUMMARY
* scour depth in feet.

Since contraction scour and abutment scour are non-existent and long term bed elevation changes are difficult to quantify, the total scour is assumed to consist only of pier scour. Scour depth is referenced from the stream bottom elevation, therefore, the depth to which scouring occurs for the improved condition is the sum of the scour and the depth of dredging. A summary of scour elevation is shown below.

	Kaelepulu Bridge				Keolu Drive Bridge	
	Type "A"		Type "B"			
	Exist.	Imp.	Exist.	Imp.	Exist.	Imp.
Invert, ft. MSL	-2	-4	-2	-4	-4	-8
Scour Depth, ft.	11.2	13.2	1.9	2.3	3.2	3.8
Scour Elev., ft.	-13.2	-17.2	-3.9	-6.3	-7.2	-11.8

TABLE 7-2 SCOUR ELEVATION SUMMARY

Several items should be emphasized about the results.

1) It is important to note that scouring will occur only during periods of high flow. During periods of low flow, the sand berm at the outlet to Kaelepulu Stream restricts flow and creates an aggrading situation.

2) Scour results for both existing and improved conditions are comparable for Kaelepulu Bridge. In both cases, the degree of scouring for type "A" piers are unacceptable. The primary reason for the excessive scour is the orientation of the pier relative to the direction of flow which increases the effective width of the pier.

Despite the increase in scour at Keolu Drive Bridge for the improved condition, the depth of scour should not extend beneath the bottom of the footing. This situation should not pose a problem, especially since any scour hole created around the pier should fill in naturally in a short period of time.

However, Kaelepulu Bridge is highly vulnerable to pier scour caused by the skewed angle of floodwater attack and also its shallow flooding. Construction plans for the extension of the bridge indicate that the original piers (Type "A") are supported by spread footings set at various depths which range from (-) 5.5-feet MSL to (-) 9.5-feet MSL. Kaelepulu Bridge is a scour-critical bridge under the Federal Highway Administration's guidelines for evaluating scour susceptibility of existing bridges.

The stability of the bridge extension could not be determined due to lack of pier footing information. The construction plans have alternate foundation details which proposes to use 14" x 14" square concrete piles at tip elevations (-) 20-feet MSL or a spread footing at elevation (-) 9-feet MSL. Additional investigation is required to determine the pier footing depth.

Results of the hydraulic computations for the 100-year 24-hour flood, dredged stream channel condition, indicate that the average flow velocity will not exceed 7 feet per second. For existing bridges, dumped riprap may be used for interim scour protection until permanent scour countermeasures are implemented. The riprap size is not expected to be excessively large due to the relatively low flow velocity. Dumped riprap sizing and gradation should be determined using Hydraulic Engineering Circular No. 11, "Design of Riprap Revetments". (FHWA, 1989)

During periods of heavy rainfall and wide spread flooding, similar to the 1987 - 1977 New Year's Storm, bridge inspection is recommended to monitor the stability of the bridge super-structure and supporting pier foundations. Electronic monitoring devices may collect pier scour data and corresponding flow velocities.

Study Results and Findings
Section 8

8. STUDY RESULTS AND FINDINGS

Results and findings of this study are listed below.

1. The 1971 "Baseline" Analysis used a higher intensity, shorter duration storm for the design of the Kaelepulu Stream drainage facilities, inclusive of Enchanted Lake and Kaopa Detention Basin. During the 1970's, the accepted practice for the design of these drainage facilities may have required the use of a 100-year 6-hour storm.

2. The 1971 peak flow rates used for the design of Kaelepulu Stream, Enchanted Lake, and Kaopa detention basin are higher than the SCS peak flow rates generated in this study, peak flow rates reported in the U.S. Army Corps of Engineers' study, and peak discharge computed using Plate 6 of the current City and County of Honolulu, Storm Drainage Standards.

3. Flood routing results of the 1971 study determined that Enchanted Lake should have an area of 100 acres to provide protection for the 100-year 6-hour storm event. Furthermore, Kaelepulu Stream should be designed to convey approximately 6,770 cfs of stormwater runoff. The maximum water surface elevation in Enchanted Lake will be 5.8-feet MSL.

4. The 1971 flood routing results are questionable. The Stage vs Discharge relationship of Enchanted Lake was determined by assuming a "control point" elevation at the confluence to be 3-feet MSL. The full impact of downstream tailwater effects were not considered, as an example, high tide, stream mouth and bridge constrictions, and downstream inflow contributions.

5. The 100-year 24-hour flood routing computations performed in this study estimated the following flow characteristics of Kaopa Detention basin, Enchanted Lake and Kaelepulu Stream, based on existing and improved stream conditions.

	Existing Stream Condition		Improved Stream Condition	
	Kaopa Detention Basin	Enchanted Lake	Kaopa Detention Basin	Enchanted Lake
Peak Inflow, cfs	2,322	5,055	2,322	5,055
Peak Outflow, cfs	397	1,800	397	2,130
Max W.S.El., ft.	52.8	6.1	52.8	4.5
W.S.El. at Confluence, ft.		3.9	3.4	
Peak Outflow at Mouth, cfs		2,840	3,700	

6. Flooding will occur along Block 9 of Kaelepulu Stream Subdivision under both existing and improved stream conditions.

7. Without flooding of any residential lots, the existing Kaelepulu Stream may provide flood protection for a 10-year to 20-year 24-hour storm.

8. Accepting the flooding which is expected to occur within Block 9 of Kaelepulu Subdivision, Kaelepulu Stream may contain stormwater runoff generated by a 80-year to 90-year 24-hour storm.

9. The 80-year to 90-year peak flood elevation and peak discharge from Enchanted Lake will be approximately 5.8-feet MSL and 1,680 cfs, respectively. Peak flood elevation at the confluence and peak discharge at the mouth is estimated to be approximately 3.7-feet MSL and 2,690 cfs, respectively.

10. Although sediment deposition and dense vegetation have reduced the conveyance properties of Kaelepulu Stream, the freeboard provided during the design of the surrounding residential subdivisions has allowed for additional storage of stormwater runoff. As a result, Kaelepulu Stream and Enchanted Lake still may contain the 80-year to 90-year 24-hour flood and perform as an effective flood control facility.

11. Bridge scour analysis indicate that pier scour will be greater for the original piers (Type "A") of Kaelepulu Bridge, due to the skewed angle of flood water attack. Furthermore, pier scour depths will be greater under the dredged stream conditions as compared to scour depths computed for the existing stream, as shown on the following table.

	Kaelepulu Bridge				Keolu Drive Bridge	
	Type "A"		Type "B"			
	Exist.	Imp.	Exist.	Imp.	Exist.	Imp.
Invert, ft. MSL	-2	-4	-2	-4	-4	-8
Scour Depth, ft.	11.2	13.2	1.9	2.3	3.2	3.8
Scour Elev., ft.	-13.2	-17.2	-3.9	-6.3	-7.2	-11.8

12. Kaelepulu Bridge is classified as a scour-critical bridge, vulnerable to pier scour. Pier scour holes may extend below the original pier foundations.

13. The structural integrity of Keolu Drive Bridge should not be jeopardized under the existing stream conditions or the dredged stream conditions. Based on the 100-year flood, scour computations indicate that the scour holes should not extend below the pier footing elevation.

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Section 9

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Kaelepulu Stream Drainage Study

1971 "Baseline" Analysis

Appendix A

Kaopa Subdivision
Inflow Hydrograph

12-May-93

Basin "A"
Area = 552 acs.

min. Time	ac.ft./t Q	cfs Q	min. Time	ac.ft./t Q	cfs Q	min. Time	ac.ft./t Q	cfs Q
0.0	0.0	0.0	2.0	43.0	2081.2	4.0	8.5	411.4
0.1	0.5	24.2	2.1	38.0	1839.2	4.1	8.0	387.2
0.2	1.5	72.6	2.2	34.0	1645.6	4.2	7.3	353.3
0.3	3.8	183.9	2.3	31.0	1500.4	4.3	6.6	319.4
0.4	6.5	314.6	2.4	28.0	1355.2	4.4	6.0	290.4
0.5	9.5	459.8	2.5	26.0	1258.4	4.5	5.5	266.2
0.6	13.0	629.2	2.6	24.0	1161.6	4.6	5.0	242.0
0.7	18.0	871.2	2.7	22.0	1064.8	4.7	4.5	217.8
0.8	24.0	1161.6	2.8	20.5	992.2	4.8	4.0	193.6
0.9	30.0	1452.0	2.9	19.0	919.6	4.9	3.5	169.4
1.0	40.0	1936.0	3.0	18.0	871.2	5.0	3.0	145.2
1.1	52.0	2516.8	3.1	17.0	822.8	5.1	2.7	130.7
1.2	66.0	3194.4	3.2	16.0	774.4	5.2	2.3	111.3
1.3	74.0	3581.6	3.3	15.0	726.0	5.3	2.0	96.8
1.4	76.0	3678.4	3.4	14.0	677.6	5.4	1.8	87.1
1.5	73.5	3557.4	3.5	12.5	605.0	5.5	1.5	72.6
1.6	70.0	3388.0	3.6	11.5	556.6	5.6	1.2	58.1
1.7	66.0	3194.4	3.7	10.5	508.2	5.7	1.0	48.4
1.8	58.0	2807.2	3.8	10.0	484.0	5.8	0.5	24.2
1.9	49.0	2371.6	3.9	9.0	435.6	5.9	0.2	9.7
						6.0	0.0	0.0

t = 15 min.

Original Inflow Hydrograph (Adopted form Y. Arakaki's Drainage Study of Enchanted Lakes Subdivision)

Enchanted Lakes Subdivision

12-May-93

Inflow Hydrograph

Basin "B"

Area = 1255 acs.

min. Time	ac.ft./t Q	cfs Q	min. Time	ac.ft./t Q	cfs Q	min. Time	ac.ft./t Q	cfs Q
0.0	0.0	0.0	2.0	75.0	3630.0	4.0	18.0	871.2
0.1	2.0	96.8	2.1	66.0	3194.4	4.1	17.0	822.8
0.2	5.0	242.0	2.2	59.0	2855.6	4.2	16.0	774.4
0.3	8.0	387.2	2.3	53.0	2565.2	4.3	15.0	726.0
0.4	12.0	580.8	2.4	49.5	2395.8	4.4	14.0	677.6
0.5	18.0	871.2	2.5	46.0	2226.4	4.5	12.5	605.0
0.6	24.0	1161.6	2.6	43.0	2081.2	4.6	11.0	532.4
0.7	32.0	1548.8	2.7	40.0	1936.0	4.7	10.0	484.0
0.8	43.0	2081.2	2.8	37.0	1790.8	4.8	9.0	435.6
0.9	58.0	2807.2	2.9	35.0	1694.0	4.9	8.0	387.2
1.0	76.0	3678.4	3.0	33.0	1597.2	5.0	7.5	363.0
1.1	110.0	5324.0	3.1	31.0	1500.4	5.1	7.0	338.8
1.2	160.0	7744.0	3.2	29.0	1403.6	5.2	6.0	290.4
1.3	171.0	8276.4	3.3	27.5	1331.0	5.3	5.5	266.2
1.4	172.2	8334.5	3.4	26.0	1258.4	5.4	4.5	217.8
1.5	168.5	8155.4	3.5	24.5	1185.8	5.5	4.0	193.6
1.6	162.0	7840.8	3.6	23.0	1113.2	5.6	3.0	145.2
1.7	148.0	7163.2	3.7	22.0	1064.8	5.7	2.0	96.8
1.8	110.0	5324.0	3.8	20.5	992.2	5.8	1.0	48.4
1.9	88.0	4259.2	3.9	19.0	919.6	5.9	0.5	24.2
						6.0	0.0	0.0

t = 15 min.

Original Inflow Hydrograph (Adopted form Y. Arakaki's Drainage Study of Enchanted Lakes Subdivision)

Mid-Pac Country Club

12-May-93

Inflow Hydrograph

Basin "C"

Area = 460 acs.

min. Time	ac.ft./t Q	cfs Q	min. Time	ac.ft./t Q	cfs Q	min. Time	ac.ft./t Q	cfs Q
0.0		0.0	2.0		1728.4	4.0		341.7
0.1		20.1	2.1		1527.5	4.1		321.6
0.2		60.3	2.2		1366.7	4.2		293.4
0.3		152.7	2.3		1246.1	4.3		265.3
0.4		261.3	2.4		1125.5	4.4		241.2
0.5		381.9	2.5		1045.1	4.5		221.1
0.6		522.6	2.6		964.7	4.6		201.0
0.7		723.5	2.7		884.3	4.7		180.9
0.8		964.7	2.8		824.0	4.8		160.8
0.9		1205.9	2.9		763.7	4.9		140.7
1.0		1607.8	3.0		723.5	5.0		120.6
1.1		2090.2	3.1		683.3	5.1		108.5
1.2		2653.0	3.2		343.1	5.2		92.5
1.3		2974.5	3.3		602.9	5.3		80.4
1.4		3054.9	3.4		562.7	5.4		72.4
1.5		2954.4	3.5		502.5	5.5		60.3
1.6		2813.7	3.6		462.3	5.6		48.2
1.7		2653.0	3.7		422.1	5.7		40.2
1.8		2331.4	3.8		402.0	5.8		20.1
1.9		1969.6	3.9		361.8	5.9		8.0
						6.0		0.0

t = 15 min.

Interpolated Hydrograph

Kaopa Subdivision

12-May-93

Stage vs Storage Relationship

Basin "A"			Basin "B" (1)		
Ft. Stage		Ac.- Ft. Storage	Ft. Stage		Ac.- Ft. Storage
40		0.00	2.6		0.00
41		11.25	2.8		20.02
42		22.80	3.0		40.08
43		34.65	3.2		60.18
44		46.80	3.4		80.32
45		59.25	3.6		100.50
46		72.00	3.8		120.72
47		85.05	4.0		140.98
48		98.40	4.2		161.28
49		112.05	4.4		181.62
50		126.50	4.6		202.00
51		141.35	4.8		222.42
52		156.60	5.0		242.88
53		172.25	5.2		263.38
54		188.30	5.4		283.92
55		204.75	5.6		304.50
56		221.60	5.8		325.12
			6.0		345.78
			6.2		366.48
			6.4		387.22

(1) Initial Area = 100.0 acs.

Obtained from Y. Arakaki's Drainage Study of Enchanted Lakes Subdivision

Kaopa and Enchanted Lakes

Stage vs Discharge Relationship

23-Apr-93

Basin "A"			Basin "A"			Basin "B"		
Ft. Stage	ac.ft./t Q	cfs Q	Ft. Stage	ac.ft./t Q	cfs Q	Ft. Stage	ac.ft./t Q	cfs Q
40.0	0.0	0.0	51.2	11.3	547.0	2.6	0.0	0
41.0	0.2	12.0	51.4	13.3	642.0	2.8	0.0	0
42.0	0.8	37.0	51.6	15.4	743.0	3.0	11.6	560
43.0	1.4	70.0	51.8	17.6	851.0	3.2	28.5	1380
44.0	2.1	100.0	52.0	20.0	968.0	3.4	42.4	2050
45.0	2.5	120.0	52.5	26.3	1274.0	3.6	53.7	2600
46.0	2.9	140.0	53.0	33.2	1609.0	3.8	64.0	3100
47.0	3.2	156.0	53.5	40.7	1972.0	4.0	73.3	3550
48.0	3.5	170.0	54.0	48.8	2362.0	4.2	81.6	3950
49.0	3.8	184.0	54.5	57.4	2777.0	4.4	89.7	4340
50.0	4.1	200.0	55.0	66.4	3215.0	4.6	97.1	4700
50.2	4.5	220.0	55.5	75.9	3675.0	4.8	105.0	5080
50.4	5.3	257.0				5.0	112.0	5420
50.6	6.3	307.0	t = 15 min.			5.2	119.2	5770
50.8	7.7	374.0				5.4	126.0	6100
51.0	9.5	461.0	Note: 2 - 36" RCP @ El. 40.0'			5.6	133.3	6450
			and 80-ft. Weir @ El. 50.0'			5.8	140.1	6780
						6.0	147.1	7120
						6.2	154.8	7490
						6.4	161.4	7810
						t = 15 min.		

Obtained from Y. Arakaki's Drainage Study of Enchanted Lakes Subdivision

APPENDIX A-1
1971 "BASELINE" ANALYSIS
KAOPA SUBDIVISION

FEB [illegible] 1971

EC 71-156

Island Construction Co., Ltd.
1020-F [illegible] Drive
Kailua, Hawaii 96734

Attention: Mr. Henry F. Alves, President

Gentlemen:

Subject: Kaopa Subdivision
Tax Map Key: 4-2-02: 3 &
4-2-04: 1

This is to acknowledge receipt of your letter of February 19, 1971, with the following enclosures:

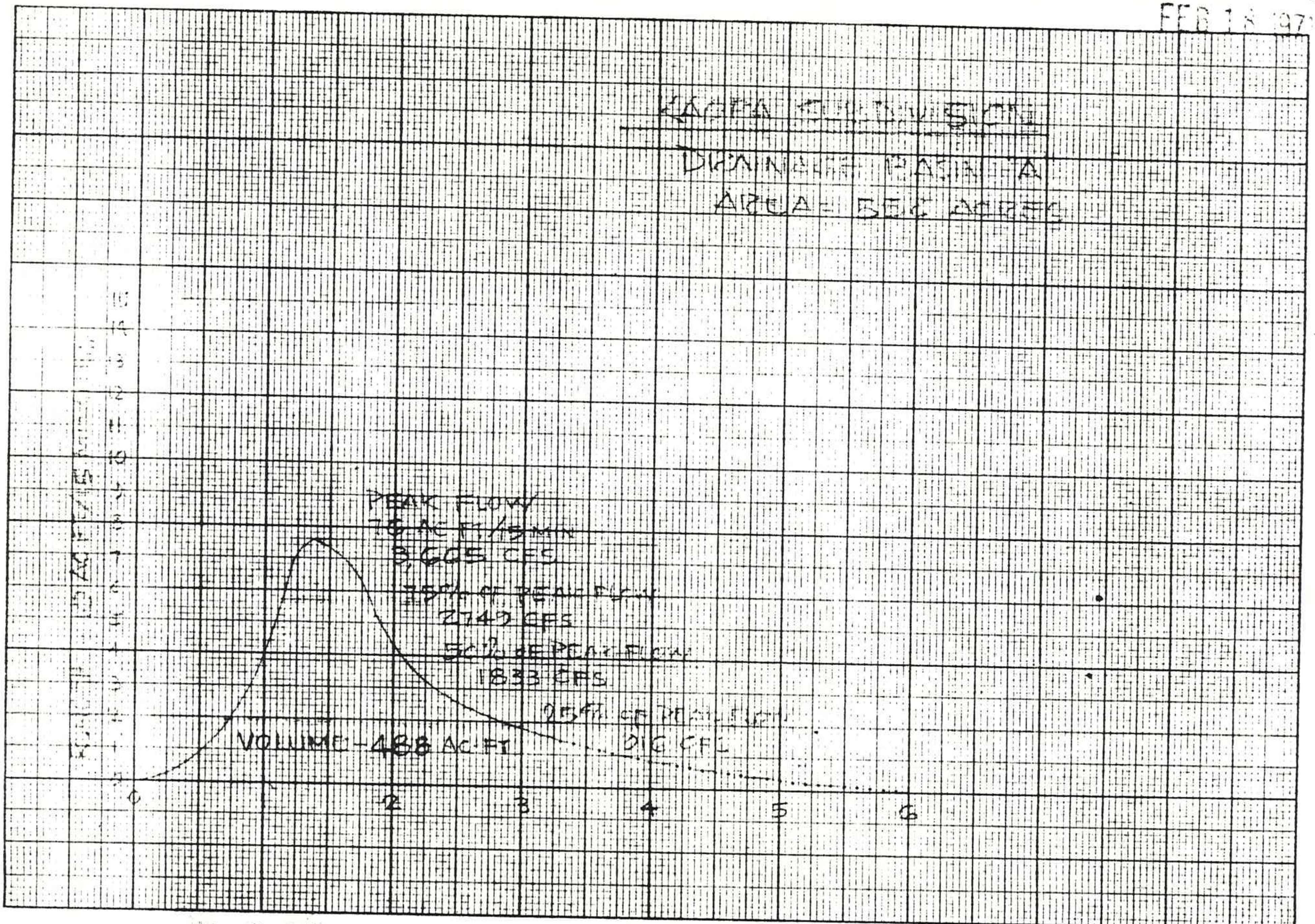
1. Drainage System Master Plan
   (Flood Routing Study For Storage Basin)
2. Hydrological Data and Hydraulics
3. Temporary Drain Channel Plans

Please be informed that we are reviewing your Master Plan of the Drainage System, including the proposed Flood Water Storage Basin.

Because of the time it will take to properly review your proposed plans, we shall comment only on your proposed temporary drain channel with this letter.

We have noted our comments and recommendations on the check print which we return herewith.

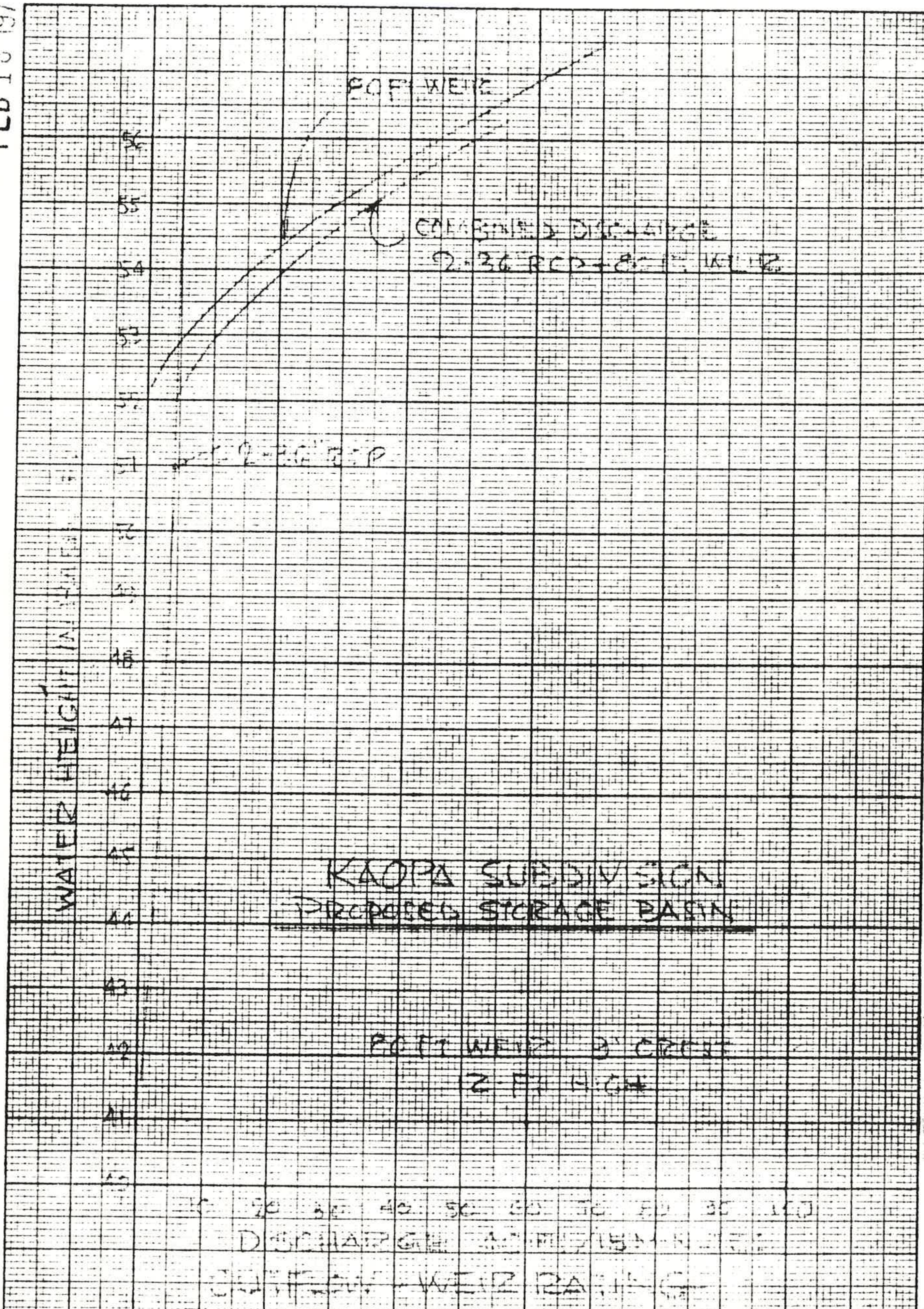
The hydraulic data indicate the velocity for the temporary channel to be 14.35 fps. This velocity is too high for an unlined ditch. However, on the basis that you shall be responsible for any corrective action on the silting and scouring problems, we will approve the construction of this temporary drain channel.



DRAINAGE BASIN A
PEAK FLOW
3,665 CFS
2749 CFS
1833 CFS
VOLUME - 488 AC FT
0
2
3
4
5
6

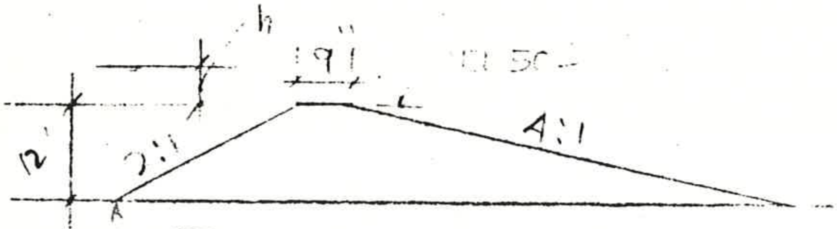
80-FT WEIR EL. = 52.0

FEB 18 1971



KAOPA SUBDIVISION
PROPOSED STORAGE BASIN

FEB 18



PROJECT WEIR

WEIR LENGTH = 80 FT

REFERENCE
"HANDBOOK OF HYDRAULICS"
KING - FOURTH EDITION
TABLE 47, PG 5-12

$Q = CLH^{3/2}$

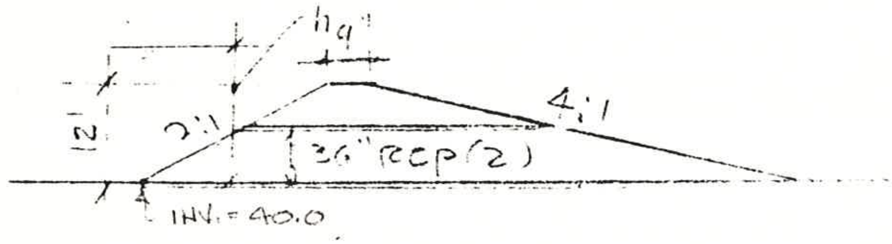
h FT	ELEV	C WEIR COEF	Q CFS/LF	[illegible]	[illegible]	DISCHARGE AC-FT
0.2	50.2	2.75	0.246	80.00	[illegible]	[illegible]
0.4	50.4	2.80	0.700	79.99	[illegible]	[illegible]
0.6	50.6	2.89	1.34	79.99	[illegible]	[illegible]
0.8	50.8	3.04	2.18	[illegible]	[illegible]	[illegible]
1.0	51.0	3.14	3.14	79.98	[illegible]	5.9
1.2	51.2	3.20	4.21	79.97	[illegible]	6.96
1.4	51.4	3.26	5.40	79.97	[illegible]	8.92
1.6	51.6	3.29	6.66	79.96	[illegible]	11.00
1.8	51.8	3.32	8.02	79.96	64_.78	13.25
2.0	52.0	3.31	9.36	79.95	74_.__	15.46
2.5	52.5	3.32	13.12	79.94	1049.81	21.67
3.0	53.0	3.32	17.25	79.93	137_.__	28.49
3.5	53.5	"	21.74	79.91	1737.24	35.89
4.0	54.0	"	26.56	79.90	[illegible]	43.85
4.5	54.5	"	31.69	79.89	[illegible]	52.31
5.0	55.0	"	37.12	79.88	2965.15	61.26
5.5	55.5	"	42.82	79.86	3419.61	70.65

CORRECTION FOR
END CONTRACTIONS

$C_2 = Q\,(\text{CFS/LF})\,(L - \tfrac{2h}{10})$
$= (L - \tfrac{2h}{10})$

KACPA SUBDIVISION
PROPOSED STORAGE BASIN

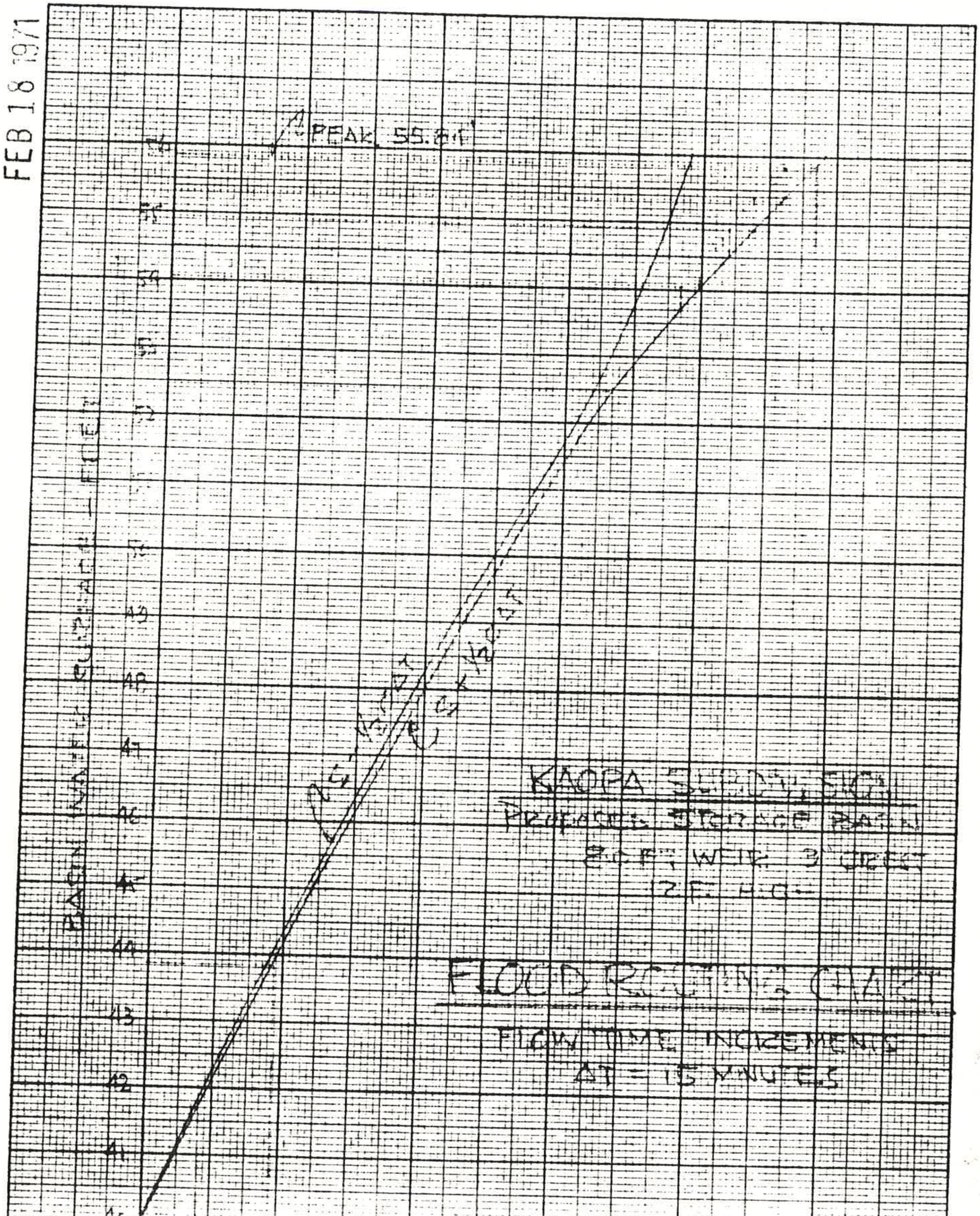
FEB 197



REFERENCE
STORM DRAIN STANDARDS
C & C OF HONOLULU
PLATE 13 PG 34

H FT	ELEV	H/D	Q CFS SINGLE PIPE	Q ACFT/HT SINGLE PIPE	Q CFS DOUBLE PIPE	Q ACFT/HT DOUBLE PIPE
1	41	.33	—			
2	42	.67	18.5	0.38	37	0.16
3	43	1.00	35	0.72	70	1.45
4	44	1.33	50	1.03	100	2.07
5	45	1.67	60	1.24	120	2.48
6	46	2.00	70	1.45	140	2.89
7	47	2.33	78	1.61	156	3.22
8	48	2.67	85	1.76	170	3.51
9	49	3.00	92	1.90	184	3.80
10	50	3.33	100	2.07	200	4.13
11	51	3.67	105	2.17	210	4.34
12	52	4.00	110	2.27	220	4.55
13	53	4.33	115	2.38	230	4.75
14	54	4.67	120	2.48	240	4.96
15	55	5.00	125	2.58	250	5.17

FEB 18 1971



PEAK 55.8'
56
55
54
53
52
49
48
47
46
45
44
43
42
41
40
5
10
15
KAOPA
FLOOD
FLOW TIME INCREMENTS

[illegible]1971

KAOPA SUBDIVISION
PROPOSED STORAGE BASIN

[illegible]0-FT WEIR ([illegible] 12 FT HIGH

1	2	3	4	5	6	7	8	9	10	
BASIN ELEV	STORAGE AREA ACS	STORAGE CAPACITY AC-FT	OUTFLOW [illegible] AC FT ΔT	½ O AT AC-FT ΔT	S−½O ΔT AC-FT ΔT	S+½O ΔT AC-FT ΔT	FLOW TIME HRS	AVE INFLOW DURING ΔT AC-FT ΔT	BASIN STAGE AT END OF ΔT	
4[illegible]	[illegible]	0	0	0			0	0		
4[illegible]	11.2	11.25	.4	.2	11.05	11.25	.25	.5	—	
4[illegible]	11.7	22.80	.76	[illegible]	22.42	23.53	.50	5	40.47	
4[illegible]	12.[illegible]	34.05	1.45	[illegible]	33.92	35.38	.75	14	41.70	.8
44.0	[illegible]	46.80	[illegible]	[illegible]	45.76	47.84	1.00	29	43.83	
45.0	12.6	59.25	2.45	1.2[illegible]	58.01	60.49	1.25	54	47.80	
4[illegible]	[illegible]	72.0[illegible]	[illegible]	[illegible]	70.55	73.45	1.50	74	52.47	
47.0	13.2	85.01	3.22	1.61	83.44	86.66	1.75	69	55.31	39.0
48.0	13.5	98.40	[illegible]	1.76	96.64	100.16	2.00	52	55.84	[illegible]
[illegible]	13.8	112.05	3.80	1.90	110.15	113.95	2.25	37	55.40	40.5
[illegible]	14.2	126.50	4.13	2.07	124.43	128.57	2.50	29	54.90	32.5
[illegible]	14.6	141.15	4.34	2.17	139.18	143.52	2.75	23	54.50	27.8
[illegible]	15.0	156.60	4.55	2.28	154.32	158.88	3.00	17	54.06	21.6
[illegible]	15.4	172.25	10.50	5.25	167.00	177.50	3.25	14	53.70	11.5
[illegible]	15.8	188.[illegible]	21.0	10.50	177.80	198.80	3.50			
[illegible]	16.2	204.75	34.0	17.0	187.75	221.75	3.75			
56.0	16.6	221.60	50.5	25.25	196.35	246.85				

D_{max} = 5325 [illegible]

@ 217 Ac Ft
Elev 55.8
[illegible] of basin

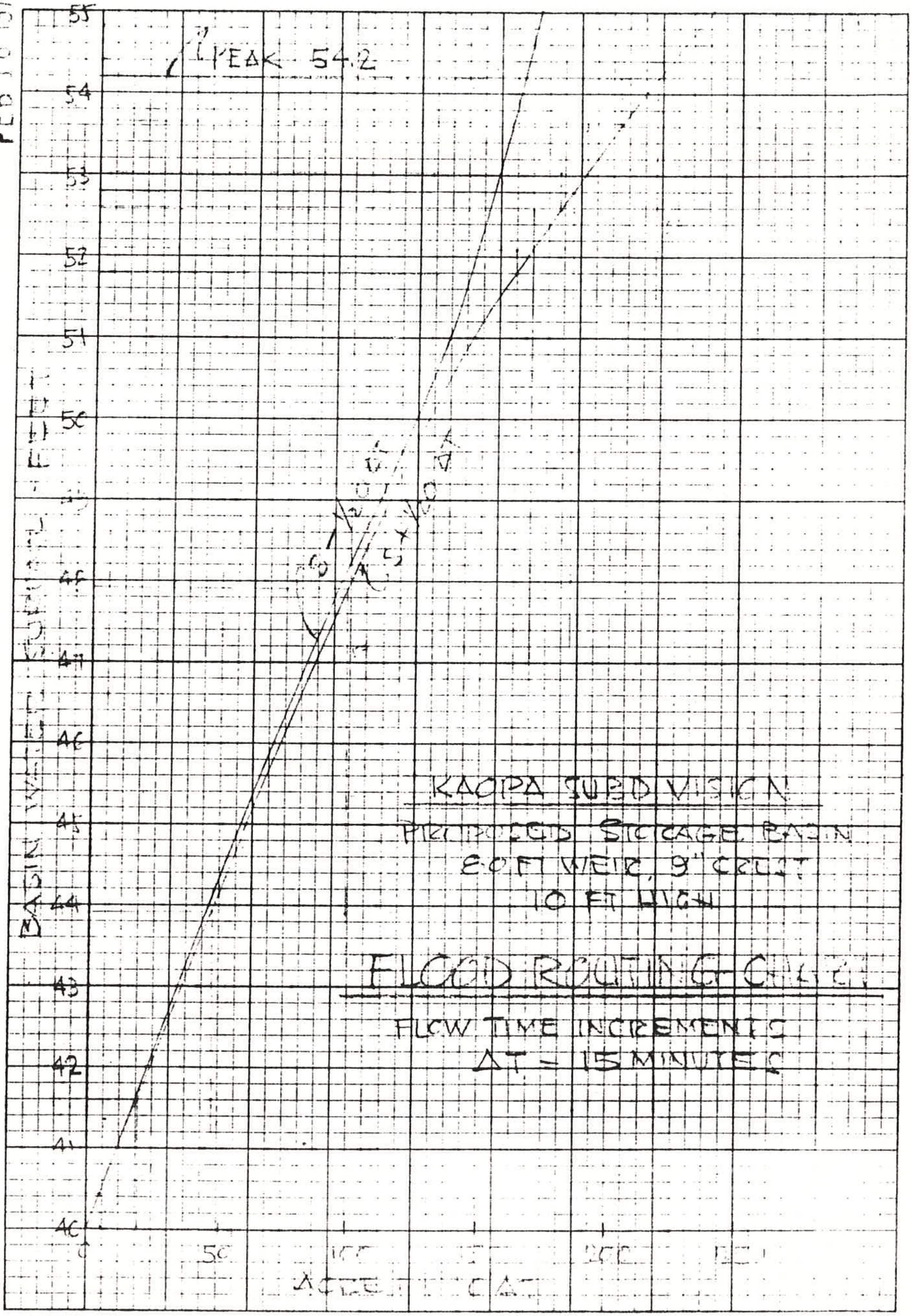
[illegible]-FT WEIR (9' CREST) 12 FT HIGH

KA[illegible]A SUBDIVISION
[illegible] STORAGE BASIN

1	2	3	4	5	6	7	8	9	10
BASIN ELEV	STORAGE AREA ACS	STORAGE CAPACITY AC-FT	OUTFLOW TO AC-FT ΔT	½O ΔT AC-FT ΔT	S−½O ΔT AC-FT ΔT	S+½O ΔT AC-FT ΔT	FLOW TIME HRS	AVE INFLOW DURING ΔT AC-FT ΔT	BASIN STAGE AT END OF ΔT
40	11.1	0	0	0			0	0	
[illegible]	11.4	11.25	.4	.2	11.05	[illegible]	.25	5	—
[illegible]	11.7	22.80	.76	.38	22.42	[illegible]	.50	5	40.41
[illegible]	12.0	34.65	1.45	.73	33.92	[illegible]	.75	14	41.70
[illegible]	12.3	46.80	2.07	1.04	45.76	[illegible]	1.00	[illegible]	[illegible]
45.0	12.6	59.25	2.48	1.24	58.01	60.4[illegible]	1.25	54	[illegible]
46.0	12.9	72.00	2.89	1.45	70.55	73.45	1.50	[illegible]	47.80
47.0	13.2	85.05	3.22	1.61	83.44	86.66	[illegible]	69	52.47
48.0	13.5	98.40	3.51	1.76	96.64	100.16	2.00	52	55.31
49.0	13.8	112.05	3.80	1.90	110.15	113.95	2.25	37	55.84 ←
50.0	14.2	126.50	4.13	2.07	124.43	[illegible]	2.50	29	51.40
[illegible]	14.6	141.35	4.34	2.17	[illegible]	[illegible]	2.75	[illegible]	54.90
[illegible]	15.0	156.60	4.55	2.28	[illegible]	[illegible]	3.00	17	54.50
[illegible]	15.4	172.25	10.50	5.25	[illegible]		[illegible]	[illegible]	54.06
[illegible]	15.8	188.30	21.0	10.50	[illegible]		[illegible]		[illegible]
[illegible]	16.2	204.75	34.0	[illegible]	[illegible]		[illegible]		
[illegible]	16.6	221.60	50.5	[illegible]					

FEB 18 1971

80-FT. WEIR EL.=50.0



[illegible] VA[illegible] [illegible] 10 FT HIGH

[illegible] STORAGE BASIN

[illegible]	2	3	4	5	6	7	8	9	[illegible]
[illegible]	STORAGE AREA ACS	STORAGE CAPACITY AC-FT	OUTFLOW [illegible] AC-FT AT	½ O AT AC-FT AT	[illegible] AC-FT AT	[illegible] AC-FT [illegible]	FLOW TIME [illegible]	AVE INFLOW DURING AT AC-FT AT	BASIN STA[illegible] [illegible]
[illegible]	[illegible]	0	0	0	[illegible]	[illegible]	0	[illegible]	
[illegible]	[illegible]	11.21	.4	.2	[illegible]	[illegible]	[illegible]	[illegible]	
	[illegible]	22.8[illegible]	[illegible]	.3[illegible]			[illegible]	[illegible]	40.1
	[illegible]	34.[illegible]	[illegible]	.7	[illegible]		[illegible]	[illegible]	40.42
		[illegible]	[illegible]	[illegible]	[illegible]				41.[illegible]
		[illegible]	[illegible]	[illegible]					4[illegible]
	10.9	73.00	[illegible]	1.4[illegible]				[illegible]	[illegible]
	13.2	85.05	3.22	1.6[illegible]				[illegible]	52.[illegible]
	13.7	98.40	3.51	.76	96.[illegible]				54.[illegible]
	13.8	112.05	3.[illegible]	1.96	[illegible]			[illegible]	54.20
	14.2	126.50	4.12	2.07	[illegible]			[illegible]	[illegible]
	14.6	141.21	9.6	4.80	[illegible]	14[illegible]	[illegible]	[illegible]	5[illegible]
	15.0	156.60	20.0	10.00	14[illegible]	[illegible]		[illegible]	[illegible]
	15.4	172.[illegible]	[illegible]	16.[illegible]	[illegible]				[illegible]
	15.8	188.30	49.[illegible]	24.[illegible]	[illegible]				57.80
	16.2	204.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			

KAOPA SUBDIVISION
1/22/75

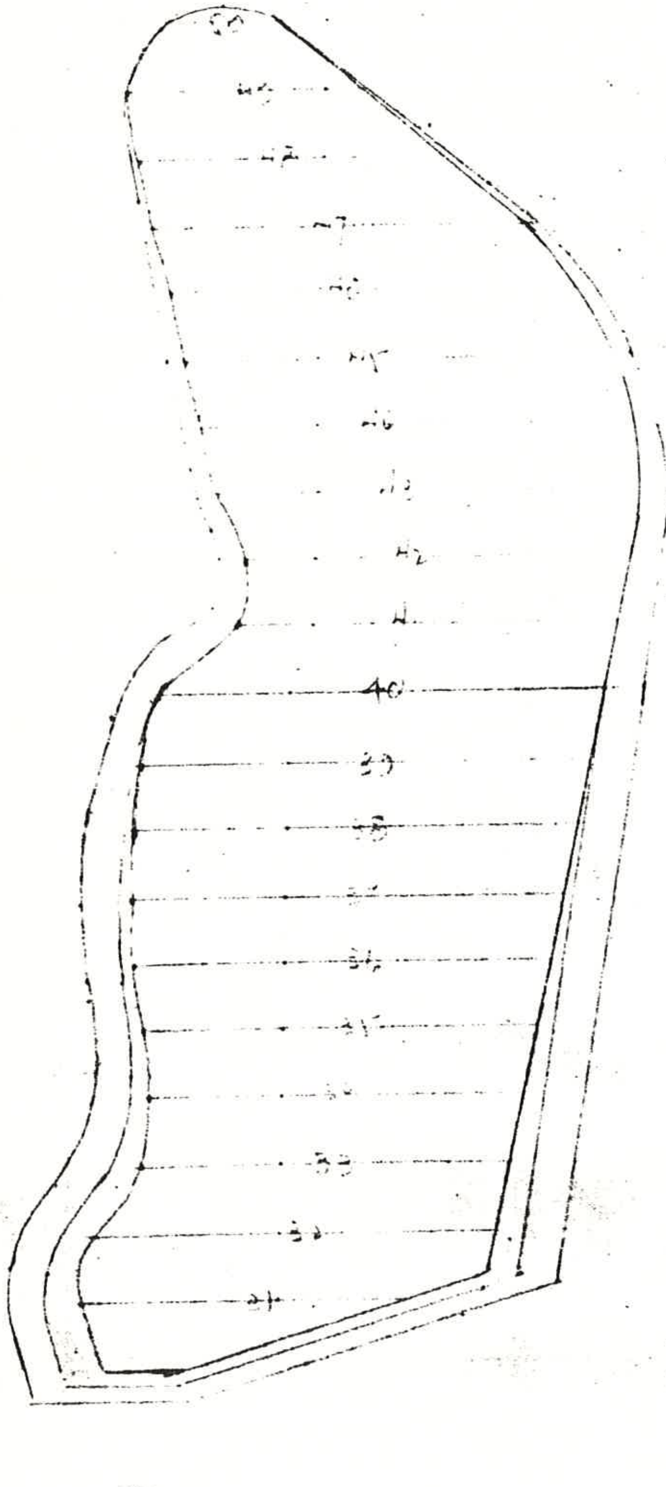
1	2	3	4	5	6	7	8	9	10
LAKE ELLY	STORAGE AREA ACS.	STORAGE CAPACITY AC-FT	OUTFLOW O AC-FT ΔT	½ O ΔT ACFT ΔT	S-½O ΔT AC-FT ΔT	S+½O ΔT ACFT ΔT	FLOW TIME HRS	AVE INFLOW DURING ΔT AC-FT ΔT	LAKE STAGE AT END OF ΔT
30		0	0		0		0	1	
31		.20	0		.20		.25	5	[illegible]
32		1.10	0				.50	14	[illegible]
33		2.70	0				.75	29	41.4
34		5.00					1.00	56	45.0
35		8.00	0				1.25	95	49.0
36		11.70	0				1.50	80	50.2
37		16.45	0				1.75	53	50.0
38		22.40	0				2.00	37	
39		29.15	0				2.25	29	
40		37.00	0				2.50	23	
41		45.65	0						
42		55.20	0						
43		65.65	0						
44		77.00	0						
45		89.25	0	—	81.25	89.25			
46		101.60	[illegible]	3.82	97.78	105.42			
47		114.75	[illegible]	10.53	104.22	125.28			
48		127.50		13.21	114.29	147.61			
49		140.60	[illegible]	20.53	120.07	161.13			
50		153.[illegible]	[illegible]	[illegible]	135.79	190.21			
51		164.5[illegible]							
52		177.10							
53		189.75							
54		202.6[illegible]							
55		216.25							

1/22/81

STORAGE RE[illegible]

— KAPPA [illegible]

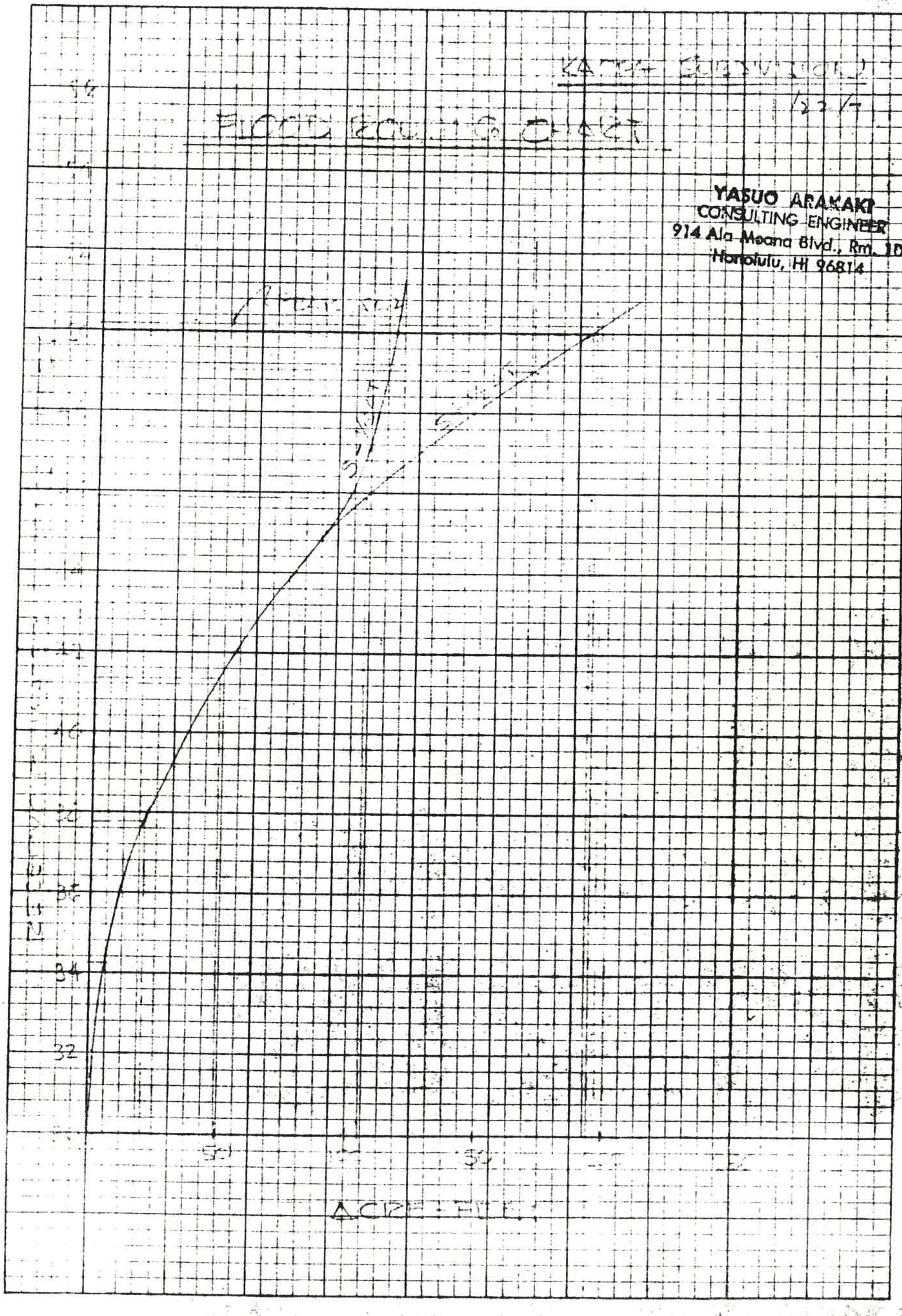
YASUO ARAKAKI
CONSULTING ENGINEER
914 Ala Moana Blvd., Rm. 104
Honolulu, HI 96814



WATER SURFACE ELEV. FT.	WATER SURFACE ACREAGE	AVE DEPTH FT.	STORAGE VOLUME AC-FT.
55	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	10	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
4[illegible]	[illegible]	[illegible]	[illegible]
46	7	8.0	10.60
[illegible]	1.9	7.5	87.21
[illegible]	[illegible]	7.0	[illegible]
43	10.1	6.5	[illegible]
[illegible]	.2	6.0	5520
41	3	5.5	4561
40	[illegible]	5.0	[illegible].00
39	[illegible]	4.5	[illegible]
38	6	4.0	22.40
37	.7	3.5	16.45
36	[illegible]	3.0	11.70
35	.2	2.5	5.00
[illegible]	[illegible]	2.0	[illegible]
[illegible]		1.5	[illegible]
[illegible]		1.0	[illegible]
[illegible]		.5	[illegible]
30	[illegible]	0	0

TOTAL

STORAGE [illegible]



YASUO ARAKAKI
CONSULTING ENGINEER
914 Ala Moana Blvd., Rm. 104
Honolulu, HI 96814

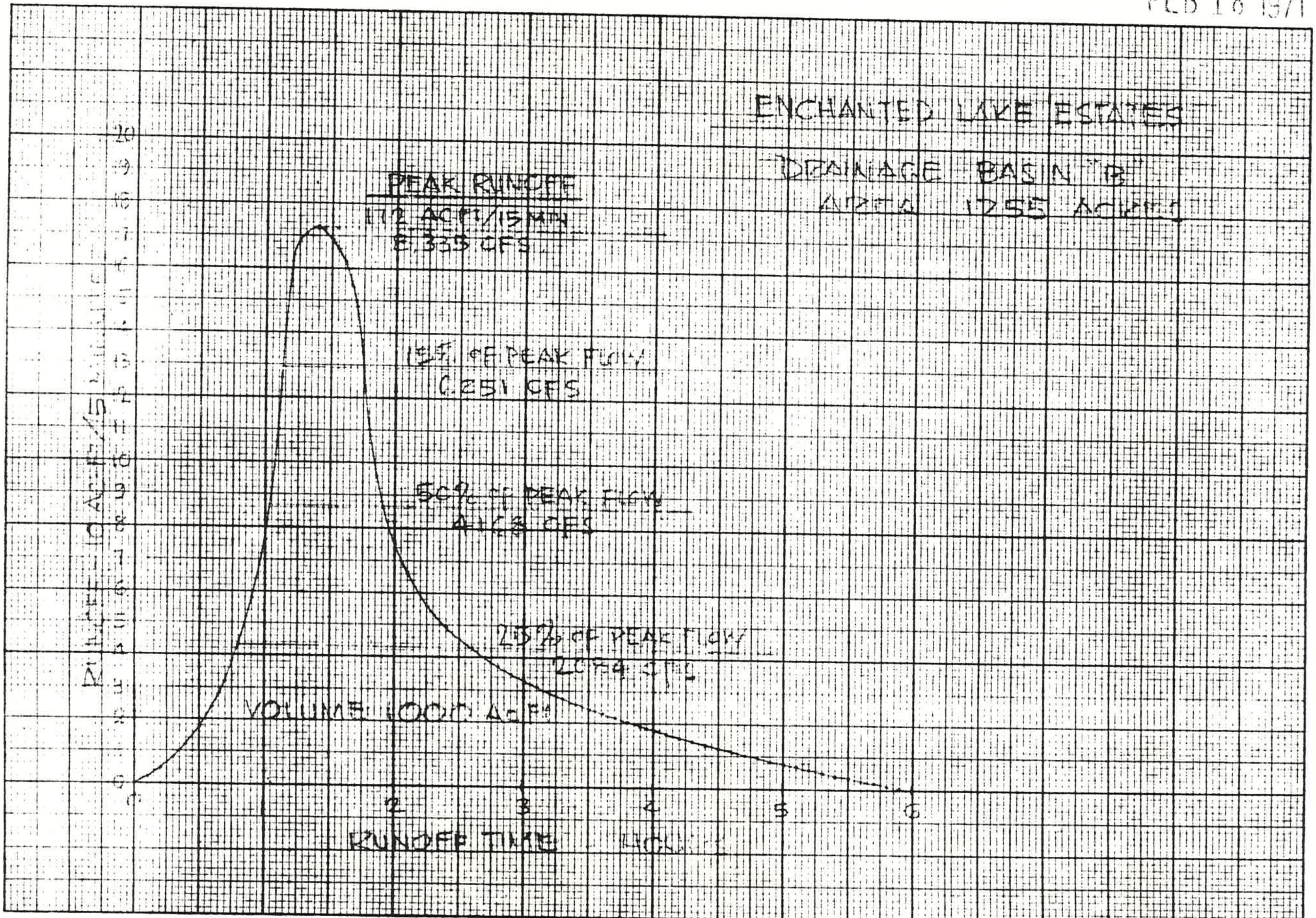
YASUO [illegible]
CONSULTING [illegible]
214 Ala Moana Blvd., Rm. 10[illegible]
Honolulu, HI 96814

?

1	2	3	4	5	6	7	8	9	
LAKE ELEV.	STORAGE AREA ACS	STORAGE CAPACITY AC-FT	OUTFLOW O AC-FT ΔT	½O · ΔT AC FT ΔT	S − ½O · ΔT AC-FT ΔT	S + ½O ΔT AC FT ΔT	FLOW TIME HRS	AVE INFLOW DURING ΔT AC-FT ΔT	[illegible]
40.0	15.0	0	0				0	1	
41.0	15.3	15.15	0		15.15	15.15	.25	5	40.65
42.0	15.6	30.60	0		30.60	30.60	.50	14	40.90
43.0	15.9	46.35	0		46.35	46.35	.75	29	41.25
44.0	16.2	62.40	0		62.40	62.40	1.00	56	[illegible]
45.0	16.5	78.75	–		78.75	78.75	1.25	95	[illegible]
46.0	16.8	95.40	7.64	3.82	91.58	99.22	1.50	80	[illegible]
47.0	17.1	112.35	21.05	10.53	101.82	122.88	1.75	53	[illegible]
48.0	17.4	129.60	38.41	19.21	110.39	148.81	2.00	37	48.85
49.0	17.7	147.15	61.05	30.53	116.62	177.68	2.25	29	48.15
49.5	17.75	155.56	74.42	37.21	118.35	192.77	2.50	23	

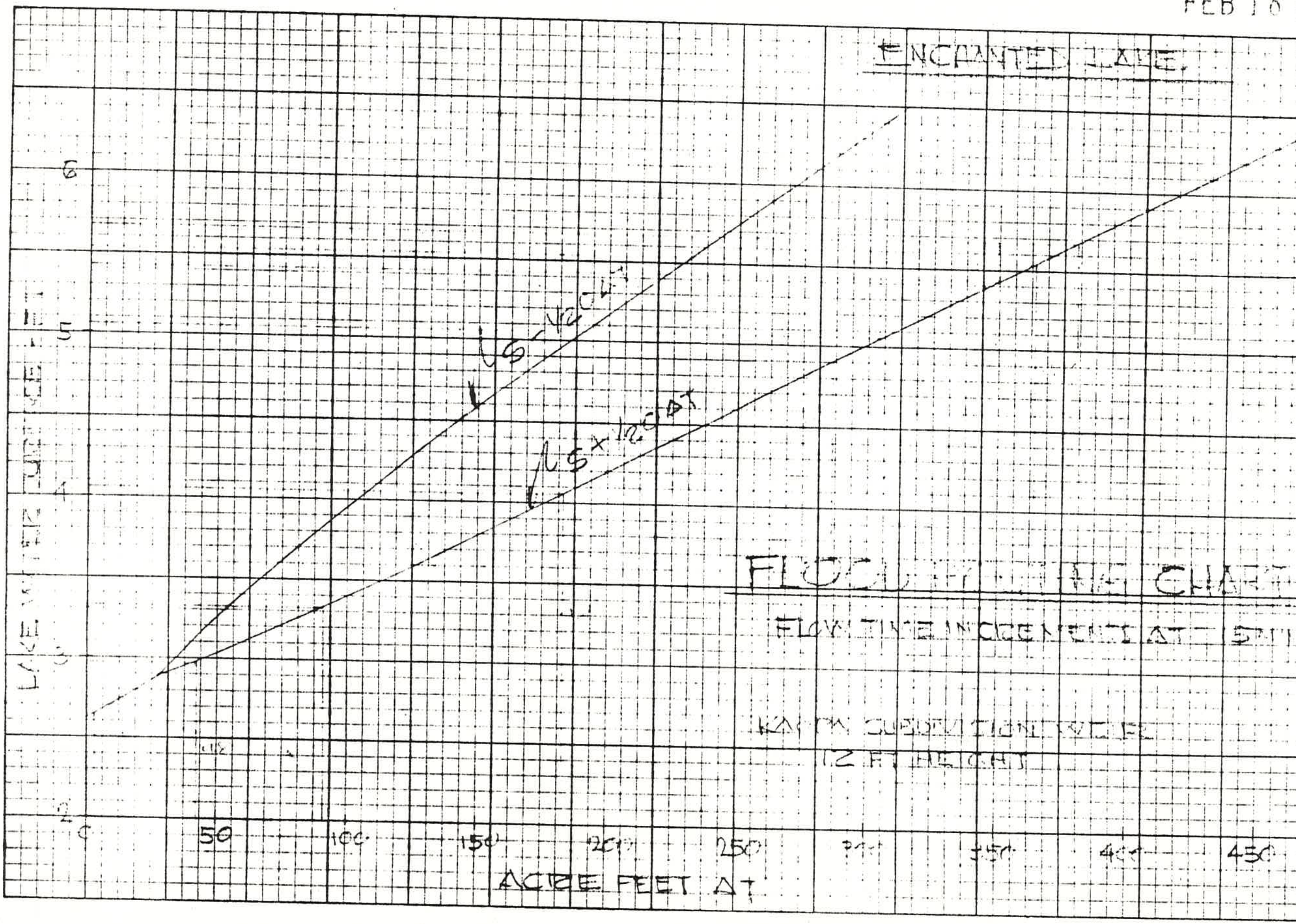
APPENDIX A-2
1971 "BASELINE" ANALYSIS
ENCHANTED LAKE SUBDIVISION

FEB 16 1971



ENCHANTED LAKE ESTATES
DRAINAGE BASIN B
AREA 1255 ACRES
PEAK RUNOFF
112 AC FT/15 MIN
8,335 CFS
15% OF PEAK FLOW
1,251 CFS
50% OF PEAK FLOW
4,168 CFS
25% OF PEAK FLOW
2,084 CFS
VOLUME 1000 AC FT
0
1
2
3
4
5
6
RUNOFF TIME
20

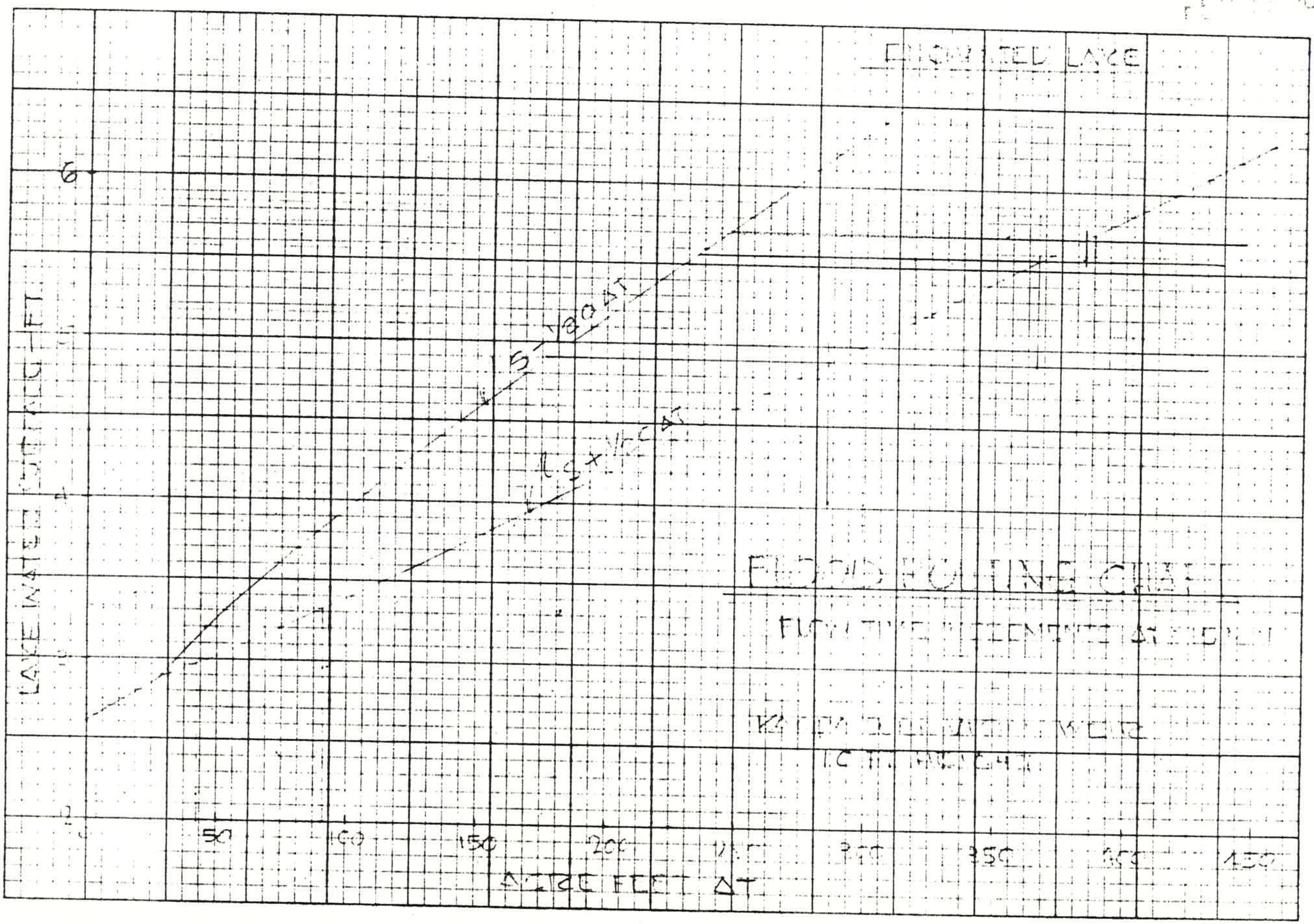
FEB 18 1971


ENCHANTED LAKE
CHART
KAPAA SUBDIVISION WEIR
12 FT HEIGHT
ACRE FEET ΔT
6
5
4
2
0
50
100
150
200
250
350
400
450

80 FT WEIR @ CREST, 12 FT HIGH

ENCHANTED LAKE 4
KACIPA SUBDIVISION BASIN

1	2	3	4	5	6	7	8	9			10
ELEV	SURFACE AREA AC	STORAGE CAPACITY AC-FT	OUTFLOW O AC-FT AT	½O AT AC-FT AT	S-½O AT AC-FT AT	S+½O AT AC-FT AT	RUN TIME HRS	AVE INFLOW DURING AT AC-FT AT BASIN A	BASIN B	TOTAL	LAKE STAGE AT END OF AT
2.2											
2.4											
2.6	100[illegible]	0									
2.8	100.2	20.02					0				
3.0	100.4	40.08	12.	6.0	34.08	46.08	.25	—	2	2	3.[illegible]
3.2	100.6	60.18	28.51	14.26	45.92	74.44	[illegible]	2	[illegible]	11.4	[illegible]
3.4	100.8	80.32	42.36	21.18	59.14	101.5[illegible]	.75	[illegible]	27	27.8	[illegible]
3.6	101.0	100.50	53.72	26.86	73.64	127.[illegible]	[illegible]	[illegible]	56	[illegible]	[illegible]
3.8	101.2	120.72	64.05	32.03	[illegible]	[illegible]	[illegible]	[illegible]	124	127.[illegible]	4.[illegible]
4.0	[illegible]	140.98	73.35	36.68	[illegible]	[illegible]	[illegible]	[illegible]	171	17[illegible]	[illegible]
4.2	[illegible]	[illegible]	81.61	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	142	[illegible]	[illegible]
4.4	[illegible]	[illegible]	89.67	[illegible]	[illegible]	[illegible]		[illegible]	101	[illegible]	[illegible]
4.6		[illegible]	97.11	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		[illegible]
4.8	[illegible]	222.42	104.96	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]
5.0	[illegible]	242.88	111.98	55.99	[illegible]	[illegible]		[illegible]			
5.2	[illegible]	263.38	119.22	[illegible]	[illegible]	[illegible]		[illegible]			
5.4	102.8	283.92	126.03	63.02	[illegible]	[illegible]		[illegible]			
5.6	[illegible]	304.50	133.27	66.64	[illegible]	[illegible]					
5.8	103.2	325.12	140.08	70.04	[illegible]	[illegible]					
6.0	103.4	345.78	147.11	73.56	[illegible]	[illegible]					
6.2	[illegible]	366.48	154.75	[illegible]	[illegible]	[illegible]					
6.4	[illegible]	387.22	161.36	[illegible]	[illegible]	[illegible]					
6.6	[illegible]										


6
50
150
ACRE FEET ΔT

FEB 18 197

80-FT WEIR (9" CREST) 10 FT HIGH

ENCHANTED LAKE & KAOPA SUBDIVISION BASIN

1	2	3	4	5	6	7	8	9			10
LAKE ELEV	STORAGE AREA ACS.	STORAGE CAPACITY AC-FT	OUTFLOW "O" ACFT ΔT	½ O·ΔT ACFT ΔT	S - ½ O ΔT ACFT ΔT	S + ½ O ΔT ACFT ΔT	FLOOD TIME HRS	AVE INFLOW DURING ΔT AC FT ΔT BASIN A	BASIN B	TOTAL	LAKE STAGE AT END OF ΔT
2.2											
2.4											
2.6	100.0	0									
2.8	100.2	20.02					0	—		—	
3.0	100.4	40.08	12.	6.0	34.08	46.08	.25	—	3	3	2.64
3.2	100.6	60.18	28.51	14.26	45.92	74.44	.50	.2	11	11.2	2.75
3.4	100.8	80.32	42.36	21.18	59.14	101.50	.75	.5	27	27.5	2.96
3.6	101.0	100.50	53.72	26.86	73.64	127.36	1.00	2.0	36	38	3.3[illegible]
3.8	101.2	120.72	64.05	32.03	88.67	152.75	1.25	3.5	124	127.5	4.04
4.0	101.4	140.98	73.35	36.68	104.30	177.66	1.50	21	171	192	5.10
4.2	101.6	161.28	81.61	40.81	120.47	202.09	1.75	52.5	148	200.5	5.72
4.4	101.8	181.62	89.67	44.84	136.78	226.46	2.00	52.5	101	153.5	5.55
4.6	102.0	202.00	97.11	48.56	153.44	250.56	2.25	41.5	65	106.5	5.56
4.8	102.2	222.42	104.96	52.48	169.94	274.90	2.50	33.4	50	83.4	5.16
5.0	102.4	242.88	111.98	55.99	186.89	298.87		27.5			
5.2	102.6	263.38	119.22	59.61	203.77	322.99		21.2			
5.4	102.8	283.92	126.03	63.02	220.90	346.94		17.5			
5.6	103.0	304.50	133.27	66.64	237.86	371.14					
[illegible]	[illegible]	325.12	140.08	70.04	255.08	395.16					
6.0	103.4	345.78	147.11	73.56	272.22	[illegible]					
6.2	[illegible]	366.48	154.75	77.38	289.10	[illegible]					
6.4	103.8	387.22	161.36	80.68	306.54	467.90					
6.6	104.0										

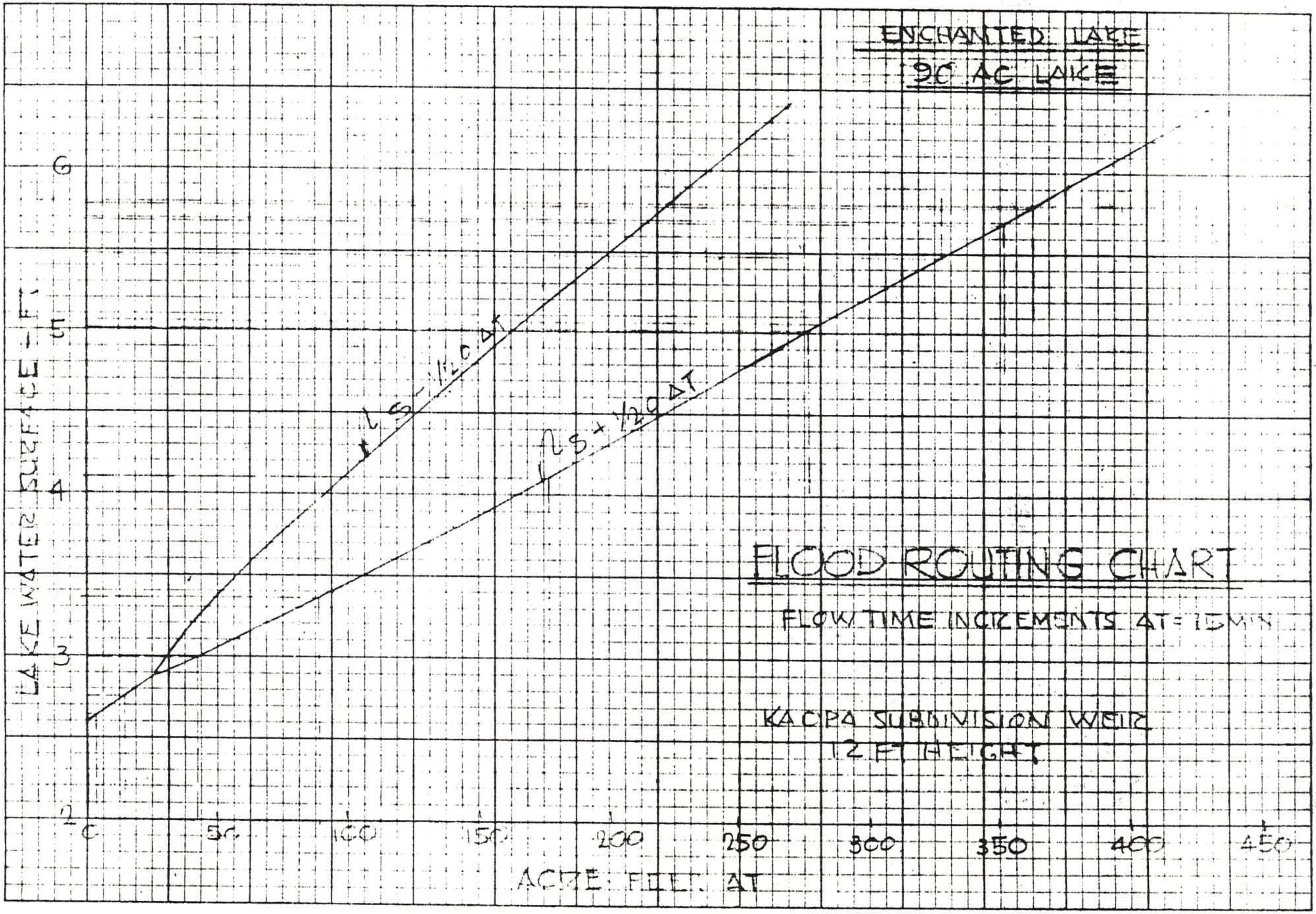
5-7-71

50 FT WEIR @ CREST [illegible]

ENCHANTED LAKE [illegible]
KAOPA SUBDIVISION [illegible]

1	2	3	4	5	6	7	8	9			10
LAKE ELEV	STORAGE AREA AC.	STORAGE CAPACITY AC-FT	OUTFLOW O AC-FT/ΔT	O/2 [illegible] AC-FT/ΔT	S-O/2ΔT AC-FT/ΔT	S+O/2ΔT AC-FT/ΔT	FLOW TIME HRS	AVG INFLOW DURING ΔT AC-FT ΔT BASIN A	BASIN B	TOTAL	LAKE STAGE AT END OF ΔT
[illegible]											
[illegible]	[illegible]	0									
[illegible]	[illegible]	18.[illegible]									
[illegible]	[illegible]	30.[illegible]	12.0				0	–			
[illegible]	[illegible]	54.1[illegible]	25.[illegible]	14.[illegible]	[illegible]	[illegible]	.25	–	3	3	2.64
[illegible]	[illegible]	72.3[illegible]	41.[illegible]	[illegible]	[illegible]	[illegible].44	.50	.4	11	11.[illegible]	2.75
[illegible]	[illegible]	90.50	53.1[illegible]	[illegible]	[illegible]	[illegible].50	.75	.8	27	27.[illegible]	3.00
[illegible]	[illegible]	108.7[illegible]	64.[illegible]	[illegible]	[illegible]	[illegible].36	1.00	2.0	56	58.0	3.36
[illegible]	[illegible]	12[illegible]	73.[illegible]	[illegible]	76.09	140.15	1.25	3.4	124	127.4	4.10
[illegible]	[illegible]	145.[illegible]	81.[illegible]	[illegible]	[illegible]	163.66	1.50	6.8	171	177.[illegible]	5.00
[illegible]	[illegible]	163.6[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1.75	39.0	148	18[illegible]	5.69
[illegible]	[illegible]	182.[illegible]	97.11	[illegible]	[illegible].18	[illegible].46	2.00	47.5	101	14[illegible]	5.79 PI
[illegible]	[illegible]	200.4[illegible]	104.[illegible]	[illegible]	[illegible]	[illegible].56	2.25	40.4	63	10[illegible]	5.48
[illegible]	[illegible]	219.[illegible]	111.38	[illegible]	141.34	[illegible].10	2.50	32.5	50	8[illegible]	5.05
[illegible]	[illegible]	237.[illegible]	119.[illegible]	[illegible]	[illegible]	274.27		27.1			
[illegible]	[illegible]	255.82	126.[illegible]	[illegible]	[illegible]	216.99		21.[illegible]			
	[illegible]	274.5[illegible]	[illegible]	[illegible]	[illegible]	318.24		17.5			
[illegible]	[illegible]	293.12	140.[illegible]	[illegible]	[illegible].66	341.14					
	[illegible]	311.[illegible]	[illegible]	[illegible]	[illegible]3.[illegible]	362.16					
	[illegible]	[illegible]	[illegible]		[illegible]	[illegible].[illegible]4					
	[illegible]	[illegible]			[illegible]	[illegible].06					
		[illegible]				[illegible].90					

REQ'D LAKE AREA
93.2 AC @ ELEV [illegible]


ENCHANTED LAKE
90 AC LAKE
S - 1/2 O ΔT
S + 1/2 O ΔT
FLOOD ROUTING CHART
FLOW TIME INCREMENTS ΔT = 15MIN
KACPA SUBDIVISION WEIR
12 FT HEIGHT
LAKE WATER SURFACE - FT
2
3
4
5
6
0
50
100
150
200
250
300
350
400
450
ACRE FEET AT

KAOPA SUBDIVISION
PROPOSED STORAGE BASIN

FEB 18 1971

STAGE VS DISCHARGE

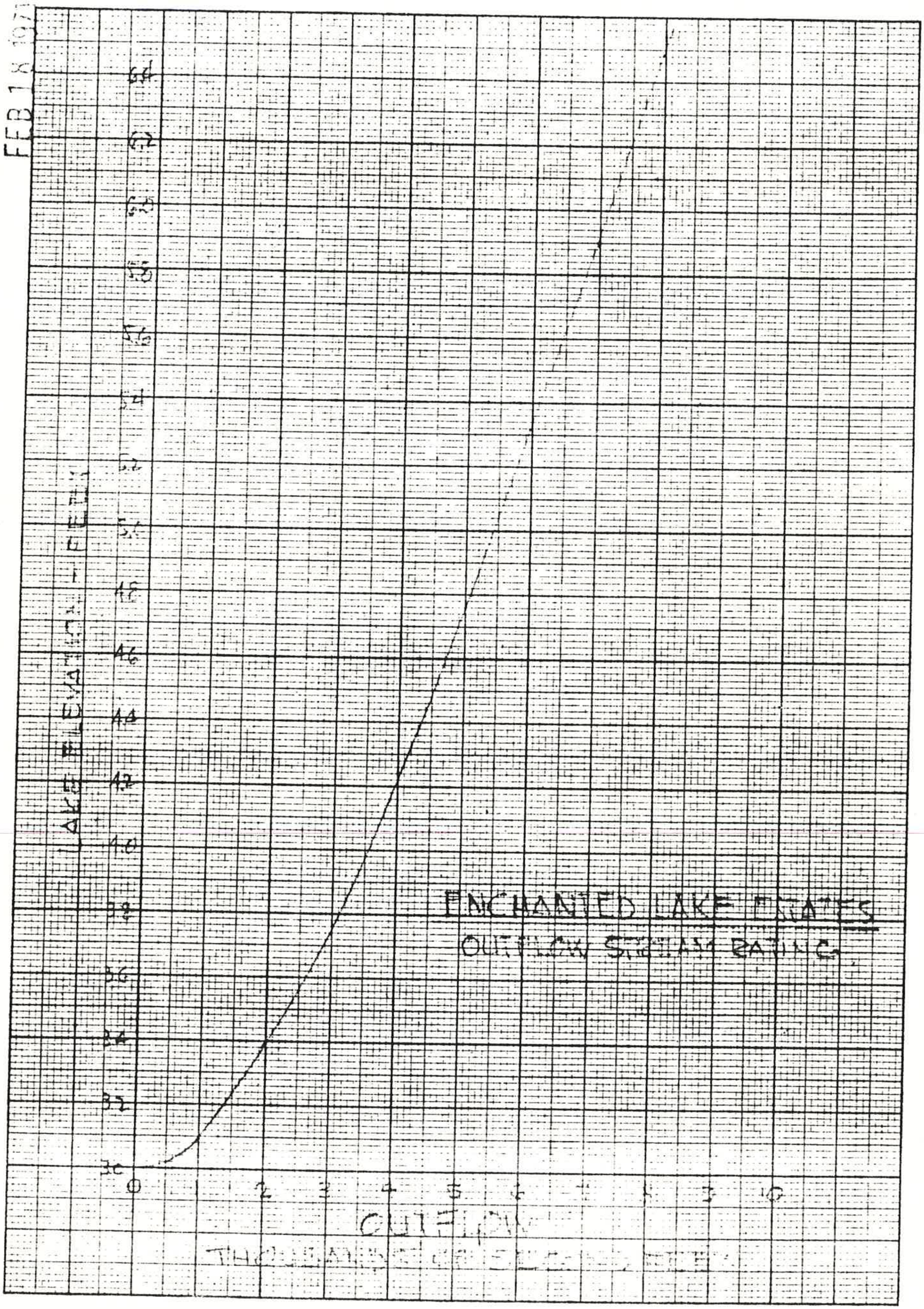
ENCHANTED LAKE

LAKE ELEV FT	STREAM OUTFLOW CFS	STREAM OUTFLOW ACFT ΔT
[illegible]	—	
[illegible]	—	
[illegible]	550	12.[illegible]
[illegible]	1380	28.51
[illegible]	2,050	42.36
[illegible]	2,600	[illegible].72
[illegible]	3,100	[illegible]
[illegible]	3,550	[illegible]
[illegible]	[illegible]50	[illegible]61
[illegible]	4,340	89.67
[illegible]	4,700	97.11
[illegible]	5,080	[illegible]
[illegible]	5,420	111.98
[illegible]2	5,770	119.22
[illegible]	6,100	12[illegible]
56	6,450	133.2[illegible]
58	6,780	140.08
[illegible]	7,120	147.11
[illegible]	7,490	154.75
[illegible]	7,810	16[illegible]

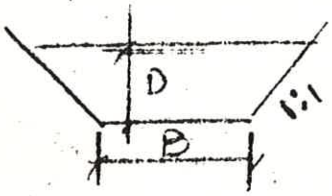
1 [illegible]

[illegible] 25 ACFT/ΔT
ΔT = 15 MINUTES

QUESTIONABLE



FEB 18 1971
LAKE ELEVATION - FEET
64
62
60
58
56
54
52
50
48
46
44
42
40
38
36
34
32
30
0
2
3
4
5
6
ENCHANTED LAKE ESTATES
OUTFLOW STREAM RATING
OUTFLOW



Q = 500 cfs
n = .030
L = 460 FT (LENGTH OF REACH)
B = 74 FT
D = 11.002

$\frac{Qn}{D^{8/3} S^{1/2}} = \frac{15}{598.5 S^{1/2}} = 9.97$

$D/B = \frac{11.002}{74} = .1487$

A = 935.17
Wp = 105.10
r = 8.90
$r^{2/3} = 4.30$

$S^{1/2} = \frac{15}{5967.05}$
$S^{1/2} = .002514$
S = .00000632
$H_L = .003'$

$V = \frac{1.486}{n} \times r^{2/3} S^{1/2}$
V = .54
Q = 504.99 cfs.

Q = 500 cfs
n = .030
L = 380 FT
B = 69 FT
D = 11.005

$\frac{Qn}{D^{8/3} S^{1/2}} = \frac{15}{599.2 S^{1/2}} = 9.30$

$D/B = \frac{11.005}{69} = .1595$

A = 880.46
Wp = 100.12
r = 8.79
$r^{2/3} = 4.26$

$S^{1/2} = \frac{15}{5572.56}$
$S^{1/2} = .002692$
S = .000007247
$H_L = .003'$

$V = \frac{1.486}{n} r^{2/3} S^{1/2}$
V = .57
Q = 501.86 cfs.

Q = 500 cfs
n = .030
L = 1595 FT
B = 64 FT
D = 11.013

$\frac{Qn}{D^{8/3} S^{1/2}} = \frac{15}{600.20 S^{1/2}}$ 8.64

$D/B = \frac{11.013}{64} = .1721$

A = 820.14
Wp = 95.14
r = 8.68
$r^{2/3} = 4.22$

$S^{1/2} = \frac{15}{5185.73}$
$S^{1/2} = .00289$
S = .00000835
$H_L = .013$

$V = \frac{1.486}{n} \times r^{2/3} S^{1/2}$
V = .60
Q = 495.68 cfs

Q = 500 cfs
n = .030
L = 440 FT
B = 59 FT
D = 11.021

$\frac{Qn}{D^{8/3} S^{1/2}} = \frac{15}{601.5 S^{1/2}} = 7.98$

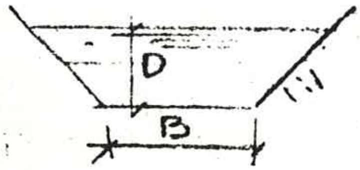
$D/B = \frac{11.021}{59} = .1868$

A = 771.69
Wp = 90.16
r = 8.56
$r^{2/3} = 4.19$

$S^{1/2} = \frac{15}{4799.97}$
$S^{1/2} = .003125$
S = .000009766
$H_L = .0043$

$V = \frac{1.486}{n} \times r^{2/3} \times S^{1/2}$
V = .65
Q = 501.60 cfs

$\Sigma(H_L)$ = LAKE WATER SURFACE = 3.02'



$Q = 1{,}000$ CFS
$n = 0.030$
$L = 460$ FT. (LENGTH OF REACH)
$B = 74$ FT.
$D = 11.005$ FT.

$$\frac{Qn}{D^{8/3} S^{1/2}} = \frac{30}{599.2\, S^{1/2}} = 9.97$$

$$D/B = \frac{11.005}{74} = .147$$

$A = 935.48$
$W_p = 105.12$
$r = 8.90$
$r^{2/3} = 4.30$

$$S^{1/2} = \frac{30}{5974.00}$$

$S^{1/2} = .0050218$
$S = .0000252$
$H_L = .012'$

$$V = \frac{1.486}{n} \times r^{2/3} S^{1/2}$$

$V = 1.07$ ✓
$Q = 1{,}000.96$ CFS

$Q = 1{,}000$ CFS
$n = 0.030$
$L = 380$ FT.
$B = 69$ FT
$D = 11.015$ FT.

$$\frac{Qn}{D^{8/3} S^{1/2}} = \frac{30}{600.7\, S^{1/2}} = 9.29$$

$$D/B = \frac{11.015}{69} = .1596$$

$A = 881.37$
$W_p = 100.16$
$r = 8.80$
$r^{2/3} = 4.26$

$$S^{1/2} = \frac{30}{5580.50}$$

$S^{1/2} = .005376$
$S = .00002890$
$H_L = .011$

$$V = \frac{1.486}{n} \times r^{2/3} S^{1/2}$$

$V = 1.135$
$Q = 1{,}000.35$ CFS

$Q = 1{,}000$ CFS
$n = .030$
$L = 1545$ FT
$B = 64$ FT
$D = 11.04$

$$\frac{Qn}{D^{8/3} S^{1/2}} = \frac{30}{604.30\, S^{1/2}} = 8.62$$

$$D/B = \frac{11.04}{64} = .1725$$

$A = 828.44$
$W_p = 95.22$
$r = 8.70$
$r^{2/3} = 4.23$

$$S^{1/2} = \frac{30}{5209.07}$$

$S^{1/2} = .005759$
$S = .00003317$
$H_L = .05$

$$V = \frac{1.486}{n} \times r^{2/3} S^{1/2}$$

$V = 1.207$
$Q = 999.93$ CFS

$Q = 1{,}000$ CFS
$n = .030$
$L = 440$ FT
$B = 59$ FT
$D = 11.08'$ FT

$$\frac{Qn}{D^{8/3} S^{1/2}} = \frac{30}{610.2\, S^{1/2}} = 7.94$$

$$D/B = \frac{11.08}{59} = .1878$$

$A = 776.49$
$W_p = 90.34$
$r = 8.60$
$r^{2/3} = 4.20$

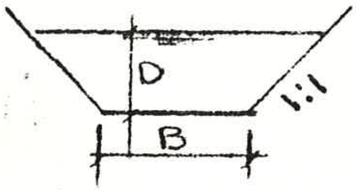
$$S^{1/2} = \frac{30}{4844.99}$$

$S^{1/2} = .006192$ ✓
$S = .0000382$ ✓
$H_L =$ [illegible]

$$V = \frac{1.486}{n} \times r^{2/3} S^{1/2}$$

$V = 1.29$
$Q = 1{,}001.67$

$\Sigma(H_L) =$ LAKE WATER SURFACE $= 3.09'$



$Q = 2{,}000$ CFS
$n = 0.030$
$L = 460$ FT (LENGTH OF REACH)
$B = 74$ FT
$D = 11.03$ FT

$$\frac{Qn}{D^{8/3}S^{1/2}} = \frac{60}{602.8\,S^{1/2}} = 9.94$$

$$D/B = \frac{11.03}{74} = .1491$$

$A = 937.88$
$W_p = 105.20$
$r = 8.92$
$r^{2/3} = 4.30$

$$S^{1/2} = \frac{60}{5991.83}$$

$S^{1/2} = .010014$
$S = .00010028$
$H_L = .046$ FT.

$$V = \frac{1.486}{n} \times r^{2/3} \times S^{1/2}$$

$V = 2.13$
$Q = 1{,}997.68$ CFS

$Q = 2{,}000$ CFS
$n = .030$
$L = 380$ FT
$B = 69$ FT
$D = 11.09$ FT

$$\frac{Qn}{D^{8/3}S^{1/2}} = \frac{60}{611.6\,S^{1/2}} = 9.23$$

$$D/B = \frac{11.09}{69} = .1607$$

$A = 888.20$
$W_p = 100.36$
$r = 8.85$
$r^{2/3} = 4.28$

$$S^{1/2} = \frac{60}{5645.07}$$

$S^{1/2} = .010629$
$S = .0001130$
$H_L = .043$

$$V = \frac{1.486}{n} r^{2/3} S^{1/2}$$

$V = 2.25$
$Q = 1{,}998.45$ CFS

$Q = 2{,}000$ CFS
$n = .030$
$L = 1545$ FT
$B = 69$ FT
$D = 11.23$

$$\frac{Qn}{D^{8/3}S^{1/2}} = \frac{60}{632.4\,S^{1/2}} = 8.48$$

$$D/B = \frac{11.23}{64} = .1755$$

$A = 844.83$
$W_p = 95.76$
$r = 8.82$
$r^{2/3} = 4.27$

$$S^{1/2} = \frac{60}{5362.75}$$

$S^{1/2} = .011188$
$S = .00012517$
$H_L = .19$

$$V = \frac{1.486}{n} r^{2/3} S^{1/2}$$

$V = 2.37$
$Q = 2{,}002.25$ CFS

$Q = 2{,}000$ CFS
$n = .030$
$L = 440$ FT
$B = 59$ FT
$D = 11.37$ FT

$$\frac{Qn}{D^{8/3}S^{1/2}} = \frac{60}{653.7\,S^{1/2}} = 7.75$$

$$D/B = \frac{11.37}{59} = .1927$$

$A = 800.11$
$W_p = 91.16$
$r = 8.78$
$r^{2/3} = 4.26$

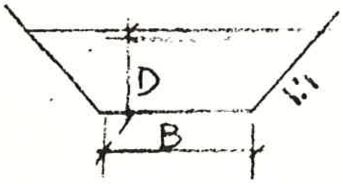
$$S^{1/2} = \frac{60}{5066.18}$$

$S^{1/2} = .011843$
$S = .000140$
$H_L = .062$

$$V = \frac{1.486}{n} r^{2/3} S^{1/2}$$

$V = 2.50$
$Q = 2{,}000.27$

$\Sigma(H_L) =$ LAKE WATER SURFACE $= 3.40'$



$Q = 3{,}000$ cfs
$n = .030$
$L = 460$ FT (LENGTH OF REACH)
$B = 74$ FT
$D = 11.06$ FT

$$\frac{Qn}{D^{8/3}S^{1/2}} = \frac{90}{607.2\,S^{1/2}} = 9.91$$

$$D/B = \frac{11.06}{74} = .1495$$

$A = 940.76$
$W_p = 105.15$
$r = 8.94$
$r^{2/3} = 4.31$

$$S^{1/2} = \frac{90}{6017.35}$$

$S^{1/2} = .014957$
$S = .0002237$
$H_L = .10$

$V = 1.486\,r^{2/3}S^{1/2}$
$V = 3.19$
$Q = 3{,}001.02$ cfs

$Q = 3{,}000$ cfs
$n = 0.030$
$L = 380$ FT
$B = 69$ FT
$D = 11.17$ FT

$$\frac{Qn}{D^{8/3}S^{1/2}} = \frac{90}{623.5\,S^{1/2}} = 9.17$$

$$D/B = \frac{11.17}{69} = .1619$$

$A = 895.50$
$W_p = 100.58$
$r = 8.90$
$r^{2/3} = 4.30$

$$S^{1/2} = \frac{90}{5717.10}$$

$S^{1/2} = .01574$
$S = .0002478$
$H_L = .094$

$$V = \frac{1.486}{n}\,r^{2/3}S^{1/2}$$

$V = 3.35$
$Q = 2{,}999.93$ cfs

$Q = 3{,}000$ CFS
$n = .030$
$L = 1545$ FT
$B = 64$ FT
$D = 11.42$

$$\frac{Qn}{D^{8/3}S^{1/2}} = \frac{90}{661.4\,S^{1/2}} = 8.35$$

$$D/B = \frac{11.42}{64} = .1784$$

$A = 861.30$
$W_p = 96.30$
$r = 8.94$
$r^{2/3} = 4.31$

$$S^{1/2} = \frac{90}{5522.69}$$

$S^{1/2} = .016296$
$S = .0002656$
$H_L = .41$

$$V = \frac{1.486}{n}\,r^{2/3}S^{1/2}$$

$V = 3.48$
$Q = 2{,}997.32$

$Q = 3{,}000$ CFS
$n = .030$
$L = 440$ FT
$B = 59$ FT
$D = 11.68$ FT

$$\frac{Qn}{D^{8/3}S^{1/2}} = \frac{90}{702.3\,S^{1/2}}$$

$$D/B = \frac{11.68}{59} = .1980$$

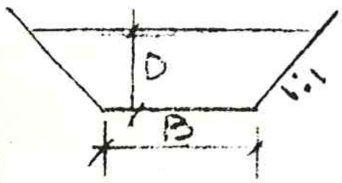
$A = 821.50$
$W_p = 92.04$
$r = 8.97$
$r^{2/3} = 4.32$

$$S^{1/2} = \frac{90}{5302.37}$$

$S^{1/2} = .016974$
$S = .000[illegible]$
$H_L = .13$

$V = 1.486\,r^{2/3}$ [illegible]
$V = 3.63$
$Q = 2{,}996.71$

$\Sigma(H_L) =$ LAKE WATER SURFACE $= 3.74'$



$\frac{Qn}{D^{8/3} S^{1/2}} = \frac{120}{611.6\ S^{1/2}} = 9.88$ $\quad S^{1/2} = \frac{120}{6043}$

$S^{1/2} = .0199$

$D/B = \frac{11.09}{74} = .150$ $\quad S = .000396$

$H_L = .18$

Q = 4,000 CFS
n = .030
L = 460 FT (LENGTH OF REACH)
B = 74 FT
D = 11.09

A = 943.65
W_p = 105.36
r = 8.96
$r^{2/3}$ = 4.31

$V = \frac{1.486}{n} r^{2/3} S^{1/2}$
V = 4.24
Q = 4,001.08 cfs

Q = 4,000 cfs
n = .030
L = 380 FT
B = 69 FT
D = 11.27

$\frac{Qn}{D^{8/3} S^{1/2}} = \frac{120}{638.5\ S^{1/2}} = 9.10$ $\quad S^{1/2} = \frac{120}{5810.31}$

$D/B = \frac{11.27}{69} = .1633$

$S^{1/2} = .02065$
S = .000426
H_L = .16

A = 904.60
W_p = 100.88
r = 8.97
$r^{2/3}$ = 4.32

$V = \frac{1.486}{n} r^{2/3} S^{1/2}$
V = 4.42
Q = 3,998.51 cfs

Q = 4,000 cfs
n = .030
L = 1545 FT
B = 64 FT
D = 11.70

$\frac{Qn}{D^{8/3} S^{1/2}} = \frac{120}{705.5\ S^{1/2}} = 8.15$ $\quad S^{1/2} = \frac{120}{5749.83}$

$D/B = \frac{11.70}{64} = .1828$

$S^{1/2}$ = .02087
S = .000436
H_L = .67

A = 885.69
W_p = 97.08
r = 9.12
$r^{2/3}$ = 4.37

$V = \frac{1.486}{n} r^{2/3} S^{1/2}$
V = 4.52
Q = 4,003.92 cfs

Q = 4,000 cfs
n = .030
L = 440 FT
B = 59 FT
D = 12.14 FT

$\frac{Qn}{D^{8/3} S^{1/2}} = \frac{120}{778.5\ S^{1/2}} = 7.27$ $\quad S^{1/2} = \frac{120}{5659.70}$

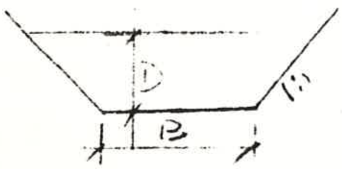
$D/B = \frac{12.14}{59} = .2058$

$S^{1/2}$ = .02120
S = .000449
H_L = .20

A = 863.64
W_p = 93.34
r = 9.25
$r^{2/3}$ = 4.41

$V = \frac{1.486}{n} r^{2/3} S^{1/2}$
V = 4.63
Q = 3998.7 cfs

$\Sigma(H_L)$ = LAKE WATER SURFACE : 4.24'



Q = 5,000 CFS
n = .030
L = 460 FT (LENGTH OF REACH)
B = 74 FT
D = 11.16

$\frac{Qn}{D^{8/3} S^{1/2}} = \frac{150}{622.0 S^{1/2}} = 9.82$

$D/B = \frac{11.16}{74} = .151$

A = 950.39
Wp = [illegible]
r = 9.00
$r^{2/3}$ = 4.33

$S^{1/2} = \frac{150}{6108}$
$S^{1/2}$ = .02456
S = .000603
H_L = .28

$V = \frac{1.486}{n} r^{2/3} S^{1/2}$
V = 5.27
Q = 5,009 CFS

Q = 5,000 CFS
n = [illegible]
L = [illegible]
B = 69 FT
D = 11.42

$\frac{Qn}{D^{8/3} S^{1/2}} = \frac{150}{661.4 S^{1/2}} =$ [illegible]

$D/B = \frac{11.42}{69} = .1655$

A = [illegible].40
Wp = [illegible]
r = 9.07
$r^{2/3}$ = 4.35

$S^{1/2} = \frac{150}{5939.37}$
$S^{1/2}$ = [illegible]
S = [illegible]638
H_L = .24

$V = \frac{1.486}{n} r^{2/3} S^{1/2}$
V = 5.44
Q = 4,996 CFS

Q = 5,000 CFS
n = .030
L = 1545 FT
B = 64 FT
D = 12.00

$\frac{Qn}{D^{8/3} S^{1/2}} \quad \frac{150}{754.8 S^{1/2}} = 7.93$

$D/B = \frac{12.00}{64} = .188$

A = 912.00
Wp = 97.94
r = 9.31
$r^{2/3}$ = 4.43

$S^{1/2} = \frac{150}{5985.56}$
$S^{1/2}$ = .025060
S = .000628
H_L = .97

$V = \frac{1.486}{n} r^{2/3} S^{1/2}$
V = 5.50
Q = 5,016 CFS

Q = 5,000 CFS
n = .030
L = 440 FT
B = [illegible] FT
D = 12.66 FT

$\frac{Qn}{D^{8/3} S^{1/2}} = \frac{150}{870.6 S^{1/2}} = 6.98$

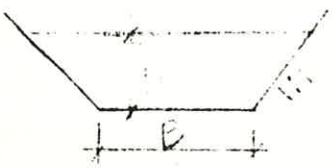
$D/B = \frac{12.66}{[illegible]} = .21[illegible]$

A = 907.22
Wp = 90.80
r = [illegible]
$r^{2/3}$ = 4.51

$S^{1/2} \quad \frac{150}{6076.79}$
$S^{1/2}$ = .02468
S = [illegible]609
H_L = [illegible]

$V = 1.486 r^{2/3} S^{1/2}$
V = 5.51
Q = 4,999 CFS

$\Sigma(H_L)$ = LAKE WATER SURFACE = 4.76



$\frac{Qn}{D^{8/3}S^{1/2}} = \frac{210}{6{,}?17 S^{1/2}} = 1.16$ $\quad S^{1/2} = [illegible]3362094$

$S = .[illegible]30307$

$D/B = \frac{11.28}{74} = .152$ $\quad H = 0.52$

Q = 7,000 cfs
n = .030
L = 460 FT [illegible]
B = 74 FT
D = 11.28

A = 961.96
W_p = 105.90
r = 9.08
$r^{2/3}$ = 4.35

$V = \frac{1.49}{n}$ [illegible]
V = 7.26
Q = 6,984 CFS

Q = [illegible] cfs
n = .030
L = [illegible] FT
B = 69 FT
D = 11.74

$\frac{Qn}{D^{8/3}S^{1/2}} = \frac{210}{[illegible] S^{1/2}} = 8.74$ $\quad S^{1/2} = [illegible]$

$D/B = \frac{11.74}{69}$ .170 $\quad S = [illegible]3378$

$H = [illegible]3$

A = 947.89
W_p = 102.21
r = 9.27
$r^{2/3}$ = 4.41

V = [illegible]
V = 7.3[illegible]
Q = [illegible]6 [illegible]

Q = ~~7,000~~ cfs
n = .030
L = 1505 FT
B = 64 FT
D = 12.74

$\frac{Qn}{D^{8/3}S^{1/2}} = \frac{210}{885.36 S^{1/2}} = 7.51$ $\quad S^{1/2} = 0.[illegible]15834$

$D/B = \frac{12.74}{64}$ .199 $\quad S = [illegible]09775$

H_L = 1.54

A = 977.67
W_p = 100.03
r = 9.77
$r^{2/3}$ = 4.57

V = [illegible]
7.15
Q = [illegible] CFS

12.52

Q = 7,000 CFS
n = .030
L = 440 FT
B = 59 FT
D = 13.72

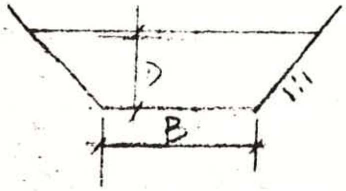
$\frac{Qn}{D^{8/3}S^{1/2}} = \frac{210}{1083.01 S^{1/2}} = 6.45$ $\quad S^{1/2} = 0.0300626$

$D/B = \frac{13.74}{[illegible]}$ .233 $\quad S = 0.000090376$

A = [illegible]
W_p = [illegible]
r = 10.20
$r^{2/3}$ = 4.70

$V = \frac{1.49}{n}$ [illegible]
V = [illegible]
Q = 6,984

$\Sigma(H_L)$ = LAKE WATER SURFACE = 5.89



$Q = 6{,}000$ CFS
$n = .030$
$L = 460$ FT (LENGTH OF REACH)
$B = 74$ FT
$D = 11.20$

$\frac{Qn}{D^{8/3} S^{1/2}} = \frac{180}{627.9 S^{1/2}} = 9.82$

$D/B = \frac{11.20}{74} = .151$

$A = 952.24$
$W_p = 105.68$
$r = 9.03$
$r^{2/3} = 4.34$

$S^{1/2} = \frac{180}{6165.97}$
$S^{1/2} = .029192$
$S = .000852$
$H_L = .39$

$V = \frac{1.486}{n} r^{2/3} S^{1/2}$
$V = 6.28$
$Q = 5{,}9$[illegible] CFS

$Q = 6{,}000$ CFS
$n = .030$
$L = 380$ FT
$B = 69$ FT
$D = 11.56$

$\frac{Qn}{D^{8/3} S^{1/2}} = \frac{180}{[illegible] S^{1/2}} = 8.85$

$D/B = \frac{11.56}{69} = .168$

$A = 931.27$
$W_p = 101.70$
$r = 9.16$
$r^{2/3} = 4.38$

$S^{1/2} = \frac{180}{6046.32}$
$S^{1/2} = .02977$
$S = .000886$
$H_L = .34$

$V = \frac{1.486}{n} r^{2/3} S^{1/2}$
$V = 6.46$
$Q = 6{,}0$[illegible] CFS

$Q = 6{,}000$ CFS
$n = .030$
$L = 1545$ FT
$B = 64$ FT
$D = 12.36$

$\frac{Qn}{D^{8/3} S^{1/2}} = \frac{180}{816.7 S^{1/2}} = 7.74$

$D/B = \frac{12.36}{64} = .193$

$A = 943.81$
$W_p = 98.96$
$r = 9.54$
$r^{2/3} = 4.50$

$S^{1/2} = \frac{180}{6321.26}$
$S^{1/2} = .028475$
$S = .0008108$
$H_L = 1.25$

$V = \frac{1.486}{n} r^{2/3} S^{1/2}$
$V = 6.35$
$Q = 5{,}993$ CFS

$Q = 6{,}000$ CFS
$n = .030$
$L = 440$ FT
$B = 59$ FT
$D = 13.16$

$\frac{Qn}{D^{8/3} S^{1/2}} = \frac{180}{965.3 S^{1/2}} = 6.73$

$D/B = \frac{13.16}{59} = .223$

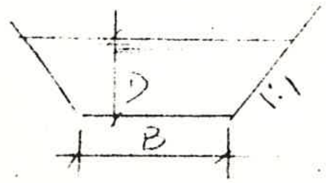
[illegible]
[illegible] 22

$S^{1/2} = \frac{180}{6496.47}$
$S^{1/2} = .027707$
$S = .000768$
$H_L = .34$

$V = \frac{1.486}{n}$ [illegible]
$V = 6.31$

$\Sigma(H_L) =$ LAKE WATER SURFACE = 5.32

$Q = 5{,}992$ CFS



$\frac{Q}{D^{8/3} S^{1/2}} = \frac{240}{649.08\, S^{1/2}} = 9.?$ $\quad S^{1/2} = 0.0?819$

$S = .00014531$

$D/B = \frac{11.34}{74} = .153$ $\quad H_L = 0.?7$

Q = 8,000 CFS
n = .030
L = 400 FT (LENGTH [illegible])
B = 74 FT
D = 11.34

A = 9[illegible].76
W_p = 106.07
r = 9.12
$r^{2/3}$ = 4.37

$V = \frac{1.486}{n} r^{2/3} S^{1/2}$
V = 8.25
Q = 7,9[illegible] CFS

Q = 8,000 CFS $\quad \frac{Q n}{D^{8/3} S^{1/2}} = \frac{240}{944.?? S^{1/2}} = ?.?0$ $\quad S^{1/2}$ = [illegible]
n = .030
L = [illegible] FT $\quad S$ = [illegible]
B = 69 FT $\quad D/B = \frac{11.94}{69} = .173$ $\quad H_L$ = [illegible]
D = 11.94

A = 966.42
W_p = [illegible]
r = 9.40
$r^{2/3}$ = 4.46

$V = \frac{1.486}{n} r^{2/3} S^{1/2}$
V = 8.28
Q = 8,000 CFS

Q = 8,000 CFS $\quad \frac{Qn}{D^{8/3} S^{1/2}} = \frac{240}{957.54\, S^{1/2}} = 7.30$ $\quad S^{1/2} = 0.0343346$
n = .030 $\quad S = 0.00117886$
L = 1545 FT $\quad D/B = \frac{13.12}{64} = .205$ $\quad H_L = 1.82$
B = 64 FT
D = 13.12

A = 1011.81
W_p = 101.11
r = 10.01
$r^{2/3}$ = 4.64

$V = \frac{1.486}{n} r^{2/3} S^{1/2}$
V = 7.89
Q = 7,984 CFS

14.02

Q = 8,000 CFS $\quad \frac{Qn}{D^{8/3} S^{1/2}} = \frac{240}{1195.78\, S^{1/2}} = 6.27$ $\quad S^{1/2} = 0.0322678$
n = .030 $\quad S = 0.0010412$
L = 440 FT $\quad D/B = \frac{14.26}{59} = .242$ $\quad H_L$ = [illegible]
B = 59 FT
D = 14.26

A = 1044.6?
W_p = 9?.32
r = 10.?
$r^{2/3}$ = 4.?0

V = [illegible]
Q = 8,015 CFS

$\Sigma(H_L)$ = LAKE WATER SURFACE = 6.4?

EARTH CHANNELS

KENNEDY FORMULA

$V_0 = CD^x$

V_0 = NON-SILTING, NON-ERODING VELOCITY, FPS
x = 0.64 MODERATELY SILTY WATER
C = 0.56 FOR EXTREMLY FINE SOILS
0.84 FOR FINE LIGHT SANDY SOILS
0.92 FOR COURSE LIGHT, SANDY SOILS
1.01 FOR SANDY LOAMY SILTS
1.09 FOR COURSE SILT
D = FLOW DEPTH
V_A = ALLOWABLE INCREASED VELOCITY DUE TO DEPTH $\left(\frac{1}{28}\right)(D-3)$, D=10 MAX.

FLOW DEPTH FT.	C = 0.56		C = 0.84		C = 0.92		C = 1.01		C = 1.09	
	V_0	V_A	V_0	V_A	V_0	V_A	V_0	V_A	V_0	V_A
4	1.36		2.04		2.23		2.45		2.65	
5	1.57		2.35	2.52	2.58	2.76	2.83	3.03	3.05	3.27
6	1.76		2.64	2.92	2.90	3.21	3.18	3.52	3.43	3.80
7	1.95		2.92	3.34	3.20	3.66	3.51	4.01	3.79	4.33
8	2.12		3.18	3.52	3.48	3.85	3.82	3.54	4.12	4.56
9	2.29		3.43	4.16	3.75	4.55	4.12	5.00	4.45	5.40
10	2.44	3.05	3.67	4.59	4.02	5.03	4.41	5.51	4.75	5.94
11	2.60		3.90		4.27		4.69		5.06	
12	2.75		4.12		4.51		4.95		5.35	
13	2.89		4.34		4.75		5.21		5.63	
14	3.03		4.55		4.98		5.47		5.90	
15	3.17		4.75		5.21		5.72		6.17	
16	3.30		4.95		5.43		5.96		6.43	

SCS CN Runoff Computations

Appendix B

APPENDIX B-1
HYDROLOGIC INVESTIGATION AND ANALYSIS
EXISTING CONDITIONS
SCS RUNOFF COMPUTATIONS
10-YEAR 24-HOUR STORM EVENT

TR-55 TABULAR HYDROGRAPH METHOD
Type I Distribution
(24 hr. Duration Storm)

Executed: 04-21-1993 09:11:19
Watershed file: --> c:\pondpack\kaele\KAELE10 .WSD
Hydrograph file: --> c:\pondpack\kaele\KAELE10 .HYD

KAELEPULU STREAM DRAINAGE STUDY
KAILUA, OAHU, HAWAII

10-YEAR, 24-HOUR RUNOFF COMPUTATIONS

>>>> Input Parameters Used to Compute Hydrograph <<<<

Subarea Description	AREA (acres)	CN	Tc (hrs)	* Tt (hrs)	Precip. (in)	Runoff (in)	Ia/p input/used	
BASIN NO. 1	74.33	77.0	0.40	0.00	8.50	5.73	.07	.10
BASIN NO. 2	612.61	80.0	0.75	0.00	8.50	6.10	.06	.10
BASIN NO. 3	442.14	80.0	0.50	0.00	8.50	6.10	.06	.10
BASIN NO. 4	1123.10	84.0	0.75	0.00	9.00	7.06	.04	.10
BASIN NO. 5	501.86	68.0	0.50	0.00	9.10	5.17	.1	.10

* Travel time from subarea outfall to composite watershed outfall point.
Total area = 2754.04 acres or 4.3032 sq.mi
Peak discharge = 6212 cfs

WARNING: Drainage areas of two or more subareas
differ by a factor of 5 or greater.

>>>> Computer Modifications of Input Parameters <<<<<

Subarea Description	Input Values Tc (hr)	Input Values * Tt (hr)	Rounded Values Tc (hr)	Rounded Values * Tt (hr)	Ia/p Interpolated (Yes/No)	Ia/p Messages
BASIN NO. 1	0.44	0.00	0.40	0.00	No	Computed Ia/p < .1
BASIN NO. 2	0.87	0.00	0.75	0.00	No	Computed Ia/p < .1
BASIN NO. 3	0.50	0.00	**	**	No	Computed Ia/p < .1
BASIN NO. 4	0.69	0.00	0.75	0.00	No	Computed Ia/p < .1
BASIN NO. 5	0.54	0.00	0.50	0.00	No	--

* Travel time from subarea outfall to composite watershed outfall point.
** Tc & Tt are available in the hydrograph tables.

TR-55 TABULAR HYDROGRAPH METHOD
Type I Distribution
(24 hr. Duration Storm)

Executed: 04-21-1993 09:11:19
Watershed file: --> c:\pondpack\kaele\KAELE10 .WSD
Hydrograph file: --> c:\pondpack\kaele\KAELE10 .HYD

KAELEPULU STREAM DRAINAGE STUDY
KAILUA, OAHU, HAWAII

10-YEAR, 24-HOUR RUNOFF COMPUTATIONS

>>>> Summary of Subarea Times to Peak <<<<

Subarea	Peak Discharge at Composite Outfall (cfs)	Time to Peak at Composite Outfall (hrs)
BASIN NO. 1	206	10.3
BASIN NO. 2	1360	10.7
BASIN NO. 3	1188	10.4
BASIN NO. 4	2887	10.7
BASIN NO. 5	1143	10.4
Composite Watershed	6212	10.5

TR-55 TABULAR HYDROGRAPH METHOD
Type I Distribution
(24 hr. Duration Storm)

Executed: 04-21-1993 09:11:19
Watershed file: --> c:\pondpack\kaele\KAELE10 .WSD
Hydrograph file: --> c:\pondpack\kaele\KAELE10 .HYD

KAELEPULU STREAM DRAINAGE STUDY
KAILUA, OAHU, HAWAII

10-YEAR, 24-HOUR RUNOFF COMPUTATIONS

Composite Hydrograph Summary (cfs)

Subarea Description	9.0 hr	9.3 hr	9.6 hr	9.9 hr	10.0 hr	10.1 hr	10.2 hr	10.3 hr	10.4 hr
BASIN NO. 1	15	21	28	44	64	104	166	206	202
BASIN NO. 2	93	128	175	239	274	344	479	695	975
BASIN NO. 3	88	118	160	236	308	468	737	1041	1188
BASIN NO. 4	198	273	372	508	582	731	1016	1474	2069
BASIN NO. 5	85	114	154	227	296	450	709	1001	1143
Total (cfs)	479	654	889	1254	1524	2097	3107	4417	5577

Subarea Description	10.5 hr	10.6 hr	10.7 hr	10.8 hr	11.0 hr	11.2 hr	11.4 hr	11.6 hr	11.8 hr
BASIN NO. 1	162	124	99	81	59	49	43	39	37
BASIN NO. 2	1220	1337	1360	1238	940	712	566	467	403
BASIN NO. 3	1142	965	784	641	455	354	299	265	244
BASIN NO. 4	2589	2837	2887	2627	1995	1511	1202	991	855
BASIN NO. 5	1099	928	754	616	438	341	288	255	235
Total (cfs)	6212	6191	5884	5203	3887	2967	2398	2017	1774

TR-55 TABULAR HYDROGRAPH METHOD
Type I Distribution
(24 hr. Duration Storm)

Executed: 04-21-1993 09:11:19
Watershed file: --> c:\pondpack\kaele\KAELE10 .WSD
Hydrograph file: --> c:\pondpack\kaele\KAELE10 .HYD

KAELEPULU STREAM DRAINAGE STUDY
KAILUA, OAHU, HAWAII

10-YEAR, 24-HOUR RUNOFF COMPUTATIONS

Composite Hydrograph Summary (cfs)

Subarea Description	12.0 hr	12.3 hr	12.6 hr	13.0 hr	13.5 hr	14.0 hr	14.5 hr	15.0 hr	15.5 hr
BASIN NO. 1	35	33	31	29	26	23	21	19	19
BASIN NO. 2	362	327	298	269	245	222	193	181	169
BASIN NO. 3	232	215	198	185	169	147	131	126	122
BASIN NO. 4	768	694	632	570	520	471	409	384	359
BASIN NO. 5	223	207	191	178	162	142	126	122	118
Total (cfs)	1620	1476	1350	1231	1122	1005	880	832	787

Subarea Description	16.0 hr	17.0 hr	18.0 hr	20.0 hr	24.0 hr
BASIN NO. 1	19	17	17	14	9
BASIN NO. 2	163	158	146	128	82
BASIN NO. 3	118	110	105	88	59
BASIN NO. 4	347	335	310	273	173
BASIN NO. 5	114	105	101	85	57
Total (cfs)	761	725	679	588	380

TR-55 TABULAR HYDROGRAPH METHOD
Type I Distribution
(24 hr. Duration Storm)

Executed: 04-21-1993 09:11:19
Watershed file: --> c:\pondpack\kaele\KAELE10 .WSD
Hydrograph file: --> c:\pondpack\kaele\KAELE10 .HYD

KAELEPULU STREAM DRAINAGE STUDY
KAILUA, OAHU, HAWAII

10-YEAR, 24-HOUR RUNOFF COMPUTATIONS

Time (hrs)	Flow (cfs)	Time (hrs)	Flow (cfs)
9.0	479	12.8	1291
9.1	537	12.9	1261
9.2	596	13.0	1231
9.3	654	13.1	1209
9.4	732	13.2	1187
9.5	811	13.3	1166
9.6	889	13.4	1144
9.7	1011	13.5	1122
9.8	1132	13.6	1099
9.9	1254	13.7	1075
10.0	1524	13.8	1052
10.1	2097	13.9	1028
10.2	3107	14.0	1005
10.3	4417	14.1	980
10.4	5577	14.2	955
10.5	6212	14.3	930
10.6	6191	14.4	905
10.7	5884	14.5	880
10.8	5203	14.6	870
10.9	4545	14.7	861
11.0	3887	14.8	851
11.1	3427	14.9	842
11.2	2967	15.0	832
11.3	2682	15.1	823
11.4	2398	15.2	814
11.5	2208	15.3	805
11.6	2017	15.4	796
11.7	1895	15.5	787
11.8	1774	15.6	782
11.9	1697	15.7	777
12.0	1620	15.8	771
12.1	1572	15.9	766
12.2	1524	16.0	761
12.3	1476	16.1	757
12.4	1434	16.2	754
12.5	1392	16.3	750
12.6	1350	16.4	747

12.7	1320	16.5	743

TR-55 TABULAR HYDROGRAPH METHOD
Type I Distribution
(24 hr. Duration Storm)

Executed: 04-21-1993 09:11:19
Watershed file: --> c:\pondpack\kaele\KAELE10 .WSD
Hydrograph file: --> c:\pondpack\kaele\KAELE10 .HYD

KAELEPULU STREAM DRAINAGE STUDY
KAILUA, OAHU, HAWAII

10-YEAR, 24-HOUR RUNOFF COMPUTATIONS

Time (hrs)	Flow (cfs)	Time (hrs)	Flow (cfs)
16.6	739	20.4	567
16.7	736	20.5	562
16.8	732	20.6	557
16.9	729	20.7	552
17.0	725	20.8	546
17.1	720	20.9	541
17.2	716	21.0	536
17.3	711	21.1	531
17.4	707	21.2	526
17.5	702	21.3	520
17.6	697	21.4	515
17.7	693	21.5	510
17.8	688	21.6	505
17.9	684	21.7	500
18.0	679	21.8	494
18.1	674	21.9	489
18.2	670	22.0	484
18.3	665	22.1	479
18.4	661	22.2	474
18.5	656	22.3	468
18.6	652	22.4	463
18.7	647	22.5	458
18.8	643	22.6	453
18.9	638	22.7	448
19.0	634	22.8	442
19.1	629	22.9	437
19.2	624	23.0	432
19.3	620	23.1	427
19.4	615	23.2	422
19.5	611	23.3	416
19.6	606	23.4	411
19.7	602	23.5	406
19.8	597	23.6	401
19.9	593	23.7	396
20.0	588	23.8	390
20.1	583	23.9	385
20.2	578		
20.3	572		

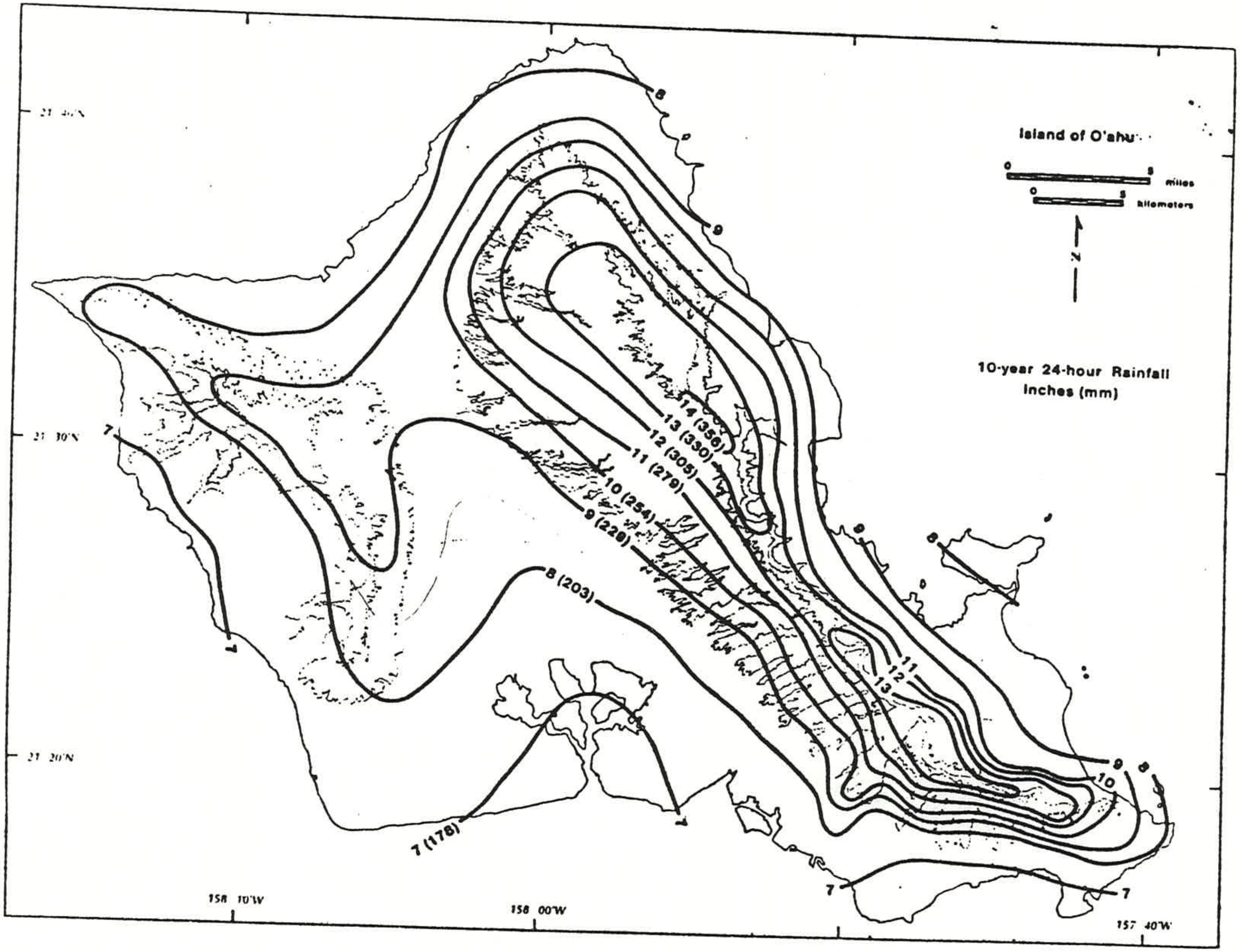


Figure 16. Map of 10-yr 24-hr rainfall, O'ahu, Hawai'i

APPENDIX B-2
HYDROLOGIC INVESTIGATION AND ANALYSIS
EXISTING CONDITIONS
SCS RUNOFF COMPUTATIONS
50-YEAR 24-HOUR STORM EVENT

TR-55 TABULAR HYDROGRAPH METHOD
Type I Distribution
(24 hr. Duration Storm)

Executed: 04-21-1993 09:09:17
Watershed file: --> c:\pondpack\kaele\KAELE50 .WSD
Hydrograph file: --> c:\pondpack\kaele\KAELE50 .HYD

KAELEPULU STREAM DRAINAGE STUDY
KAILUA, OAHU, HAWAII

50-YEAR, 24-HOUR RUNOFF COMPUTATIONS

>>>> Input Parameters Used to Compute Hydrograph <<<<

Subarea Description	AREA (acres)	CN	Tc (hrs)	* Tt (hrs)	Precip. (in)	Runoff (in)	Ia/p input/used	
BASIN NO. 1	74.33	77.0	0.40	0.00	11.50	8.56	.05	.10
BASIN NO. 2	612.61	80.0	0.75	0.00	12.00	9.45	.04	.10
BASIN NO. 3	442.14	80.0	0.50	0.00	12.00	9.45	.04	.10
BASIN NO. 4	1123.10	84.0	0.75	0.00	12.50	10.40	.03	.10
BASIN NO. 5	501.86	68.0	0.50	0.00	13.00	8.67	.07	.10

* Travel time from subarea outfall to composite watershed outfall point.
Total area = 2754.04 acres or 4.3032 sq.mi
Peak discharge = 9559 cfs

WARNING: Drainage areas of two or more subareas differ by a factor of 5 or greater.

>>>> Computer Modifications of Input Parameters <<<<<

Subarea Description	Input Values Tc (hr)	Input Values * Tt (hr)	Rounded Values Tc (hr)	Rounded Values * Tt (hr)	Ia/p Interpolated (Yes/No)	Ia/p Messages
BASIN NO. 1	0.44	0.00	0.40	0.00	No	Computed Ia/p < .1
BASIN NO. 2	0.87	0.00	0.75	0.00	No	Computed Ia/p < .1
BASIN NO. 3	0.50	0.00	**	**	No	Computed Ia/p < .1
BASIN NO. 4	0.69	0.00	0.75	0.00	No	Computed Ia/p < .1
BASIN NO. 5	0.54	0.00	0.50	0.00	No	Computed Ia/p < .1

* Travel time from subarea outfall to composite watershed outfall point.
** Tc & Tt are available in the hydrograph tables.

TR-55 TABULAR HYDROGRAPH METHOD
Type I Distribution
(24 hr. Duration Storm)

Executed: 04-21-1993 09:09:17
Watershed file: --> c:\pondpack\kaele\KAELE50 .WSD
Hydrograph file: --> c:\pondpack\kaele\KAELE50 .HYD

KAELEPULU STREAM DRAINAGE STUDY
KAILUA, OAHU, HAWAII

50-YEAR, 24-HOUR RUNOFF COMPUTATIONS

>>>> Summary of Subarea Times to Peak <<<<

Subarea	Peak Discharge at Composite Outfall (cfs)	Time to Peak at Composite Outfall (hrs)
BASIN NO. 1	308	10.3
BASIN NO. 2	2108	10.7
BASIN NO. 3	1841	10.4
BASIN NO. 4	4252	10.7
BASIN NO. 5	1917	10.4
Composite Watershed	9559	10.5

TR-55 TABULAR HYDROGRAPH METHOD
Type I Distribution
(24 hr. Duration Storm)

Executed: 04-21-1993 09:09:17
Watershed file: --> c:\pondpack\kaele\KAELE50 .WSD
Hydrograph file: --> c:\pondpack\kaele\KAELE50 .HYD

KAELEPULU STREAM DRAINAGE STUDY
KAILUA, OAHU, HAWAII

50-YEAR, 24-HOUR RUNOFF COMPUTATIONS

Composite Hydrograph Summary (cfs)

Subarea Description	9.0 hr	9.3 hr	9.6 hr	9.9 hr	10.0 hr	10.1 hr	10.2 hr	10.3 hr	10.4 hr
BASIN NO. 1	23	31	42	66	95	156	249	308	302
BASIN NO. 2	145	199	271	371	425	534	742	1076	1511
BASIN NO. 3	137	183	248	366	477	725	1142	1613	1841
BASIN NO. 4	292	402	548	748	858	1077	1497	2172	3048
BASIN NO. 5	143	190	258	381	496	755	1190	1679	1917
Total (cfs)	740	1005	1367	1932	2351	3247	4820	6848	8619

Subarea Description	10.5 hr	10.6 hr	10.7 hr	10.8 hr	11.0 hr	11.2 hr	11.4 hr	11.6 hr	11.8 hr
BASIN NO. 1	243	185	148	121	88	73	64	59	56
BASIN NO. 2	1891	2071	2108	1918	1456	1104	877	724	624
BASIN NO. 3	1769	1495	1214	992	705	548	464	411	379
BASIN NO. 4	3814	4179	4252	3869	2938	2227	1770	1460	1259
BASIN NO. 5	1842	1557	1265	1033	734	571	483	428	394
Total (cfs)	9559	9487	8987	7933	5921	4523	3658	3082	2712

TR-55 TABULAR HYDROGRAPH METHOD
Type I Distribution
(24 hr. Duration Storm)

Executed: 04-21-1993 09:09:17
Watershed file: --> c:\pondpack\kaele\KAELE50 .WSD
Hydrograph file: --> c:\pondpack\kaele\KAELE50 .HYD

KAELEPULU STREAM DRAINAGE STUDY
KAILUA, OAHU, HAWAII

50-YEAR, 24-HOUR RUNOFF COMPUTATIONS

Composite Hydrograph Summary (cfs)

Subarea Description	12.0 hr	12.3 hr	12.6 hr	13.0 hr	13.5 hr	14.0 hr	14.5 hr	15.0 hr	15.5 hr
BASIN NO. 1	53	49	46	43	39	35	31	29	29
BASIN NO. 2	561	507	461	416	380	344	299	280	262
BASIN NO. 3	359	333	307	287	261	228	202	196	189
BASIN NO. 4	1132	1022	931	840	767	694	602	566	529
BASIN NO. 5	374	347	320	299	272	238	211	204	197
Total (cfs)	2479	2258	2065	1885	1719	1539	1345	1275	1206

Subarea Description	16.0 hr	17.0 hr	18.0 hr	20.0 hr	24.0 hr
BASIN NO. 1	28	26	25	21	14
BASIN NO. 2	253	244	226	199	127
BASIN NO. 3	183	170	163	137	91
BASIN NO. 4	511	493	456	402	256
BASIN NO. 5	190	177	170	143	95
Total (cfs)	1165	1110	1040	902	583

TR-55 TABULAR HYDROGRAPH METHOD
Type I Distribution
(24 hr. Duration Storm)

Executed: 04-21-1993 09:09:17
Watershed file: --> c:\pondpack\kaele\KAELE50 .WSD
Hydrograph file: --> c:\pondpack\kaele\KAELE50 .HYD

KAELEPULU STREAM DRAINAGE STUDY
KAILUA, OAHU, HAWAII

50-YEAR, 24-HOUR RUNOFF COMPUTATIONS

Time (hrs)	Flow (cfs)	Time (hrs)	Flow (cfs)
9.0	740	12.8	1975
9.1	828	12.9	1930
9.2	917	13.0	1885
9.3	1005	13.1	1852
9.4	1126	13.2	1819
9.5	1246	13.3	1785
9.6	1367	13.4	1752
9.7	1555	13.5	1719
9.8	1744	13.6	1683
9.9	1932	13.7	1647
10.0	2351	13.8	1611
10.1	3247	13.9	1575
10.2	4820	14.0	1539
10.3	6848	14.1	1500
10.4	8619	14.2	1461
10.5	9559	14.3	1423
10.6	9487	14.4	1384
10.7	8987	14.5	1345
10.8	7933	14.6	1331
10.9	6927	14.7	1317
11.0	5921	14.8	1303
11.1	5222	14.9	1289
11.2	4523	15.0	1275
11.3	4090	15.1	1261
11.4	3658	15.2	1247
11.5	3370	15.3	1234
11.6	3082	15.4	1220
11.7	2897	15.5	1206
11.8	2712	15.6	1198
11.9	2596	15.7	1190
12.0	2479	15.8	1181
12.1	2405	15.9	1173
12.2	2332	16.0	1165
12.3	2258	16.1	1160
12.4	2194	16.2	1154
12.5	2129	16.3	1149
12.6	2065	16.4	1143

12.7	2020	16.5	1138

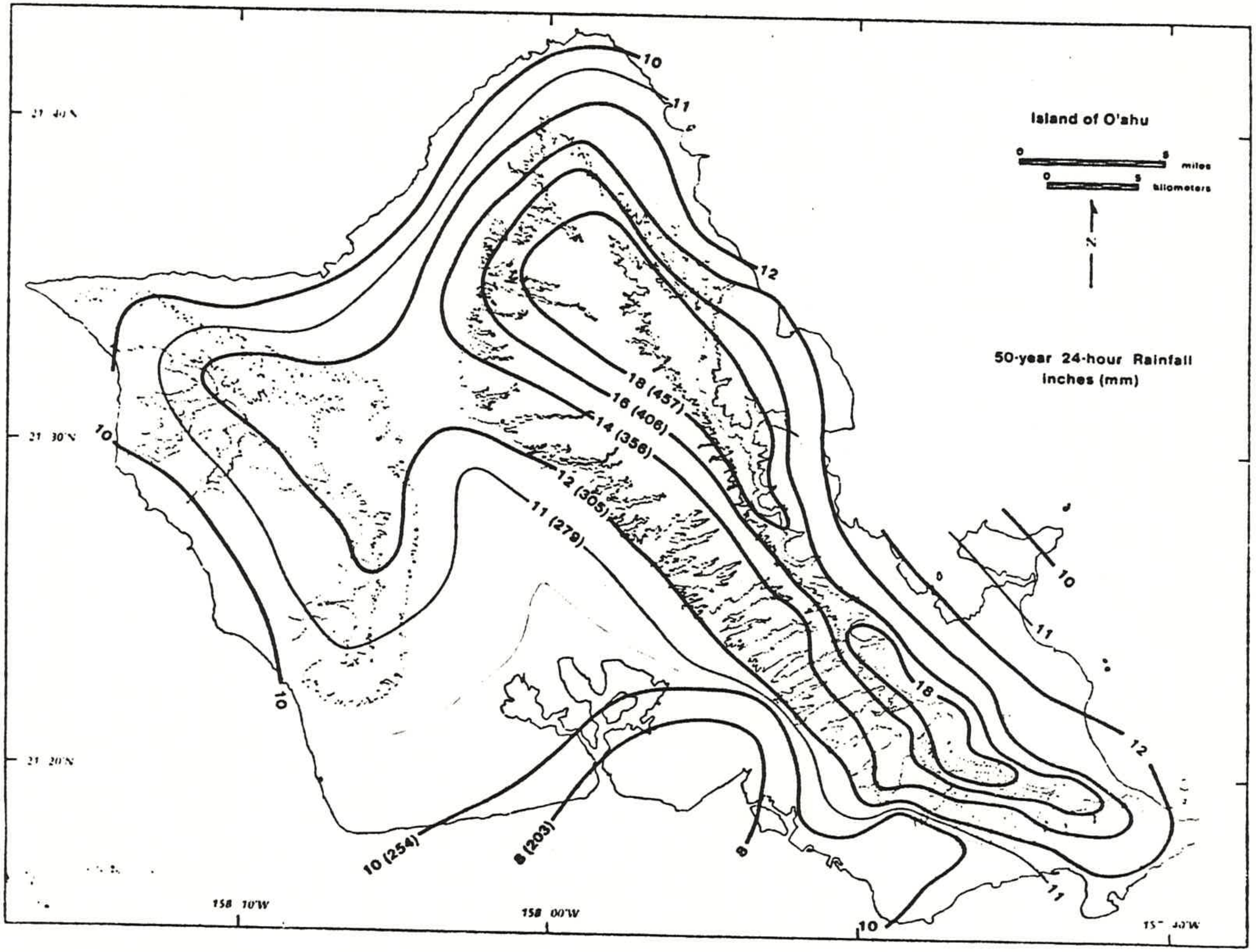
TR-55 TABULAR HYDROGRAPH METHOD
Type I Distribution
(24 hr. Duration Storm)

Executed: 04-21-1993 09:09:17
Watershed file: --> c:\pondpack\kaele\KAELE50 .WSD
Hydrograph file: --> c:\pondpack\kaele\KAELE50 .HYD

KAELEPULU STREAM DRAINAGE STUDY
KAILUA, OAHU, HAWAII

50-YEAR, 24-HOUR RUNOFF COMPUTATIONS

Time (hrs)	Flow (cfs)	Time (hrs)	Flow (cfs)
16.6	1132	20.4	870
16.7	1127	20.5	862
16.8	1121	20.6	854
16.9	1116	20.7	846
17.0	1110	20.8	838
17.1	1103	20.9	830
17.2	1096	21.0	822
17.3	1089	21.1	814
17.4	1082	21.2	806
17.5	1075	21.3	798
17.6	1068	21.4	790
17.7	1061	21.5	782
17.8	1054	21.6	774
17.9	1047	21.7	766
18.0	1040	21.8	758
18.1	1033	21.9	750
18.2	1026	22.0	743
18.3	1019	22.1	735
18.4	1012	22.2	727
18.5	1006	22.3	719
18.6	999	22.4	711
18.7	992	22.5	703
18.8	985	22.6	695
18.9	978	22.7	687
19.0	971	22.8	679
19.1	964	22.9	671
19.2	957	23.0	663
19.3	950	23.1	655
19.4	943	23.2	647
19.5	937	23.3	639
19.6	930	23.4	631
19.7	923	23.5	623
19.8	916	23.6	615
19.9	909	23.7	607
20.0	902	23.8	599
20.1	894	23.9	591
20.2	886		
20.3	878		



. Figure 17. Map of 50-yr 24-hr rainfall, O'ahu, Hawai'i

APPENDIX B-3
HYDROLOGIC INVESTIGATION AND ANALYSIS
EXISTING CONDITIONS
SCS RUNOFF COMPUTATIONS
100-YEAR 24-HOUR STORM EVENT

(3)

TR-55 TABULAR HYDROGRAPH METHOD
Type I Distribution
(24 hr. Duration Storm)

Executed: 04-02-1993 10:49:25
Watershed file: --> C:\PONDPACK\KAELE\KAELE1 .WSD
Hydrograph file: --> C:\PONDPACK\KAELE\KAELE1 .HYD

KAELEPULU STREAM DRAINAGE STUDY
KAILUA, OAHU, HAWAII

100-YEAR, 24-HOUR RUNOFF COMPUTATIONS

>>>> Input Parameters Used to Compute Hydrograph <<<<

Subarea Description	AREA (acres)	CN	Tc (hrs)	* Tt (hrs)	Precip. (in)	Runoff (in)	Ia/p input/used	
BASIN NO. 1	74.33	77.0	0.40	0.00	12.00	9.04	.05	.10
BASIN NO. 2	612.61	80.0	0.75	0.00	13.00	10.40	.04	.10
BASIN NO. 3	442.14	80.0	0.50	0.00	13.00	10.40	.04	.10
BASIN NO. 4	1123.10	84.0	0.75	0.00	14.00	11.90	.03	.10
BASIN NO. 5	501.86 1025	68.0	0.50	0.00	15.00	10.50	.06	.10

* Travel time from subarea outfall to composite watershed outfall point.
Total area = 2754.04 acres or 4.3032 sq.mi
Peak discharge = 10879 cfs

WARNING: Drainage areas of two or more subareas
differ by a factor of 5 or greater.

>>>> Computer Modifications of Input Parameters <<<<<

Subarea Description	Input Values Tc (hr)	Input Values * Tt (hr)	Rounded Values Tc (hr)	Rounded Values * Tt (hr)	Ia/p Interpolated (Yes/No)	Ia/p Messages
BASIN NO. 1	0.44	0.00	0.40	0.00	No	Computed Ia/p < .1
BASIN NO. 2	0.87	0.00	0.75	0.00	No	Computed Ia/p < .1
BASIN NO. 3	0.50	0.00	**	**	No	Computed Ia/p < .1
BASIN NO. 4	0.69	0.00	0.75	0.00	No	Computed Ia/p < .1
BASIN NO. 5	0.54	0.00	0.50	0.00	No	Computed Ia/p < .1

* Travel time from subarea outfall to composite watershed outfall point.
** Tc & Tt are available in the hydrograph tables.

TR-55 TABULAR HYDROGRAPH METHOD
Type I Distribution
(24 hr. Duration Storm)

Executed: 04-02-1993 10:49:25
Watershed file: --> C:\PONDPACK\KAELE\KAELE1 .WSD
Hydrograph file: --> C:\PONDPACK\KAELE\KAELE1 .HYD

KAELEPULU STREAM DRAINAGE STUDY
KAILUA, OAHU, HAWAII

100-YEAR, 24-HOUR RUNOFF COMPUTATIONS

>>>> Summary of Subarea Times to Peak <<<<

Subarea	Peak Discharge at Composite Outfall (cfs)	C&C	1971	Time to Peak at Composite Outfall (hrs)
BASIN NO. 1	325	560	475	10.3
BASIN NO. 2	2319	3770	4065	10.7
BASIN NO. 3	2026	2820	2735	10.4
BASIN NO. 4	4866	6470	8335	10.7
BASIN NO. 5	2322	3160	3665	10.4
Composite Watershed	10879			10.5

TR-55 TABULAR HYDROGRAPH METHOD
Type I Distribution
(24 hr. Duration Storm)

Executed: 04-02-1993 10:49:25
Watershed file: --> C:\PONDPACK\KAELE\KAELE1 .WSD
Hydrograph file: --> C:\PONDPACK\KAELE\KAELE1 .HYD

KAELEPULU STREAM DRAINAGE STUDY
KAILUA, OAHU, HAWAII

100-YEAR, 24-HOUR RUNOFF COMPUTATIONS

Composite Hydrograph Summary (cfs)

Subarea Description	9.0 hr	9.3 hr	9.6 hr	9.9 hr	10.0 hr	10.1 hr	10.2 hr	10.3 hr	10.4 hr
BASIN NO. 1	24	33	44	69	101	165	262	325	319
BASIN NO. 2	159	219	299	408	468	587	816	1185	1662
BASIN NO. 3	151	201	273	402	524	798	1257	1775	2026
BASIN NO. 4	334	459	626	856	981	1232	1712	2485	3487
BASIN NO. 5	173	231	313	461	601	914	1441	2034	2322
Total (cfs)	841	1143	1555	2196	2675	3696	5488	7804	9816

Subarea Description	10.5 hr	10.6 hr	10.7 hr	10.8 hr	11.0 hr	11.2 hr	11.4 hr	11.6 hr	11.8 hr
BASIN NO. 1	256	195	156	128	93	77	67	62	59
BASIN NO. 2	2081	2280	2319	2110	1603	1214	966	796	687
BASIN NO. 3	1947	1645	1336	1092	776	604	510	453	417
BASIN NO. 4	4364	4782	4866	4427	3362	2548	2026	1671	1441
BASIN NO. 5	2231	1886	1531	1252	889	692	585	519	478
Total (cfs)	10879	10788	10208	9009	6723	5135	4154	3501	3082

TR-55 TABULAR HYDROGRAPH METHOD
Type I Distribution
(24 hr. Duration Storm)

Executed: 04-02-1993 10:49:25
Watershed file: --> C:\PONDPACK\KAELE\KAELE1 .WSD
Hydrograph file: --> C:\PONDPACK\KAELE\KAELE1 .HYD

KAELEPULU STREAM DRAINAGE STUDY
KAILUA, OAHU, HAWAII

100-YEAR, 24-HOUR RUNOFF COMPUTATIONS

Composite Hydrograph Summary (cfs)

Subarea Description	12.0 hr	12.3 hr	12.6 hr	13.0 hr	13.5 hr	14.0 hr	14.5 hr	15.0 hr	15.5 hr
BASIN NO. 1	56	51	48	45	41	37	33	30	30
BASIN NO. 2	617	557	508	458	418	378	329	309	289
BASIN NO. 3	395	366	338	316	287	251	223	216	208
BASIN NO. 4	1295	1169	1065	961	877	794	689	647	606
BASIN NO. 5	453	420	387	362	329	288	255	247	239
Total (cfs)	2816	2563	2346	2142	1952	1748	1529	1449	1372

Subarea Description	16.0 hr	17.0 hr	18.0 hr	20.0 hr	24.0 hr
BASIN NO. 1	29	27	26	22	15
BASIN NO. 2	279	269	249	219	139
BASIN NO. 3	201	187	180	151	101
BASIN NO. 4	585	564	522	459	292
BASIN NO. 5	231	214	206	173	115
Total (cfs)	1325	1261	1183	1024	662

TR-55 TABULAR HYDROGRAPH METHOD
Type I Distribution
(24 hr. Duration Storm)

Executed: 04-02-1993 10:49:25
Watershed file: --> C:\PONDPACK\KAELE\KAELE1 .WSD
Hydrograph file: --> C:\PONDPACK\KAELE\KAELE1 .HYD

KAELEPULU STREAM DRAINAGE STUDY
KAILUA, OAHU, HAWAII

100-YEAR, 24-HOUR RUNOFF COMPUTATIONS

Time (hrs)	Flow (cfs)	Time (hrs)	Flow (cfs)
9.0	841	12.8	2244
9.1	942	12.9	2193
9.2	1042	13.0	2142
9.3	1143	13.1	2104
9.4	1280	13.2	2066
9.5	1418	13.3	2028
9.6	1555	13.4	1990
9.7	1769	13.5	1952
9.8	1982	13.6	1911
9.9	2196	13.7	1870
10.0	2675	13.8	1830
10.1	3696	13.9	1789
10.2	5488	14.0	1748
10.3	7804	14.1	1704
10.4	9816	14.2	1660
10.5	10879	14.3	1617
10.6	10788	14.4	1573
10.7	10208	14.5	1529
10.8	9009	14.6	1513
10.9	7866	14.7	1497
11.0	6723	14.8	1481
11.1	5929	14.9	1465
11.2	5135	15.0	1449
11.3	4644	15.1	1434
11.4	4154	15.2	1418
11.5	3828	15.3	1403
11.6	3501	15.4	1387
11.7	3291	15.5	1372
11.8	3082	15.6	1363
11.9	2949	15.7	1353
12.0	2816	15.8	1344
12.1	2732	15.9	1334
12.2	2647	16.0	1325
12.3	2563	16.1	1319
12.4	2491	16.2	1312
12.5	2418	16.3	1306
12.6	2346	16.4	1299

12.7	2295	16.5	1293

TR-55 TABULAR HYDROGRAPH METHOD
Type I Distribution
(24 hr. Duration Storm)

Executed: 04-02-1993 10:49:25
Watershed file: --> C:\PONDPACK\KAELE\KAELE1 .WSD
Hydrograph file: --> C:\PONDPACK\KAELE\KAELE1 .HYD

KAELEPULU STREAM DRAINAGE STUDY
KAILUA, OAHU, HAWAII

100-YEAR, 24-HOUR RUNOFF COMPUTATIONS

Time (hrs)	Flow (cfs)
16.6	1287
16.7	1280
16.8	1274
16.9	1267
17.0	1261
17.1	1253
17.2	1245
17.3	1238
17.4	1230
17.5	1222
17.6	1214
17.7	1206
17.8	1199
17.9	1191
18.0	1183
18.1	1175
18.2	1167
18.3	1159
18.4	1151
18.5	1143
18.6	1135
18.7	1127
18.8	1119
18.9	1111
19.0	1104
19.1	1096
19.2	1088
19.3	1080
19.4	1072
19.5	1064
19.6	1056
19.7	1048
19.8	1040
19.9	1032
20.0	1024
20.1	1015
20.2	1006
20.3	997

Time (hrs)	Flow (cfs)
20.4	988
20.5	979
20.6	970
20.7	961
20.8	952
20.9	943
21.0	934
21.1	924
21.2	915
21.3	906
21.4	897
21.5	888
21.6	879
21.7	870
21.8	861
21.9	852
22.0	843
22.1	834
22.2	825
22.3	816
22.4	807
22.5	798
22.6	789
22.7	780
22.8	771
22.9	762
23.0	753
23.1	743
23.2	734
23.3	725
23.4	716
23.5	707
23.6	698
23.7	689
23.8	680
23.9	671

Quick TR-55 Ver.5.42   S/N:1240540233
Executed: 10:47:58   04-02-1993

KAELEPULU STREAM DRAINAGE STUDY
KAILUA, OAHU, HAWAII

ESTIMATION OF RUNOFF CURVE NUMBER

RUNOFF CURVE NUMBER SUMMARY

::

Subarea Description	Area (acres)	CN (weighted)
BASIN NO. 1	74.33	77
BASIN NO. 2	612.61	80
BASIN NO. 3	442.14	80
BASIN NO. 4	1123.21	84
BASIN NO. 5	501.86	68

Quick TR-55 Ver.5.42   S/N:1240540233
Executed: 10:47:58   04-02-1993

KAELEPULU STREAM DRAINAGE STUDY
KAILUA, OAHU, HAWAII

ESTIMATION OF RUNOFF CURVE NUMBER

RUNOFF CURVE NUMBER DATA

::

Composite Area: BASIN NO. 1

SURFACE DESCRIPTION		AREA (acres)	CN	
RESIDENTIAL LOTS	HSG=B	23.10	85	
OPEN SPACE	HSG=B	34.23	61	
IMPERVIOUS		17.00	98	
COMPOSITE AREA --->		74.33	76.9	(77)

::

Composite Area: BASIN NO. 2

SURFACE DESCRIPTION		AREA (acres)	CN	
RESIDENTIAL LOTS	HSG=A	315.37	77	
RESIDENTIAL LOTS	HSG=B	59.70	85	
OPEN SPACE, GOOD	HSG=A	40.45	39	
PASTURE, FAIR	HSG=D	81.86	84	
MARSH		115.23	98	
COMPOSITE AREA --->		612.61	80.2	(80)

::

Composite Area: BASIN NO. 3

SURFACE DESCRIPTION		AREA (acres)	CN
RESIDENTIAL LOTS	HSG=D	23.43	92
RESIDENTIAL LOTS	HSG=B	135.46	85

Quick TR-55 Ver.5.42   S/N:1240540233
Executed: 10:47:58   04-02-1993

OPEN SPACE, GOOD	HSG=D	213.11	80	
OPEN SPACE, GOOD	HSG=B	61.99	61	
STREAM	HSG=C	8.15	98	
COMPOSITE AREA --->		442.14	79.8	(80)

::

Composite Area: BASIN NO. 4

SURFACE DESCRIPTION		AREA (acres)	CN	
RESIDENTIAL LOTS	HSG=D	397.24	92	
RESIDENTIAL LOTS	HSG=B	326.09	85	
OPEN SPACE, GOOD	HSG=D	11.35	80	
OPEN SPACE, GOOD	HSG=B	14.77	61	
PASTURE, GOOD	HSG=D	21.61	80	
FARMSTEAD	HSG=D	17.47	86	
FARMSTEAD	HSG=B	15.72	74	
WOODS, FAIR	HSG=D	70.86	79	
WOODS, GOOD	HSG=B	140.61	55	
IMPERVIOUS		107.49	98	
COMPOSITE AREA --->		1123.21	84.0	(84)

::

Composite Area: BASIN NO. 5

SURFACE DESCRIPTION		AREA (acres)	CN	
RESIDENTIAL LOTS,	HSG=D	6.25	92	
RESIDENTIAL LOTS,	HSG=B	65.51	85	
WOODS, FAIR	HSG=D	89.28	79	
WOODS, GOOD	HSG=B	202.99	55	
FARMSTEAD	HSG=D	5.33	86	
FARMSTEAD	HSG=B	71.10	74	
OPEN SPACE	HSG=B	55.20	61	
IMPERVIOUS		6.20	98	
COMPOSITE AREA --->		501.86	67.9	(68)

::

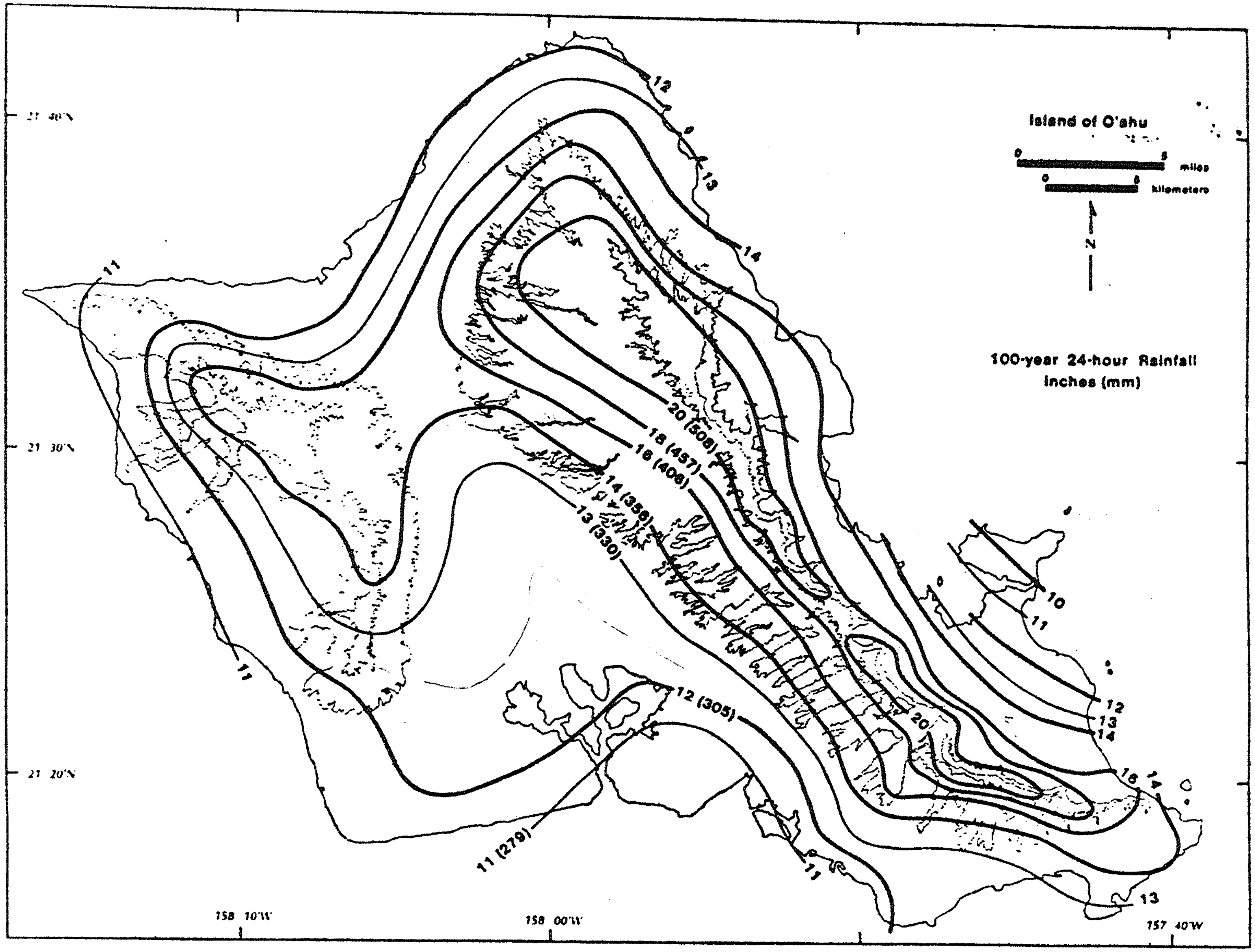


Figure 18. Map of 100-yr 24-hr rainfall, O'ahu, Hawai'i

HEC-1 Runoff Computations
Appendix C

Kaelepulu Stream Drainage Study

APPENDIX C-1
HYDROLOGIC INVESTIGATION AND ANALYSIS
EXISTING CONDITIONS
HEC-1 RUNOFF COMPUTATIONS
10-YEAR 24-HOUR STORM EVENT

10-YEAR (3)

HEC1 S/N: 1906360105 HMVersion: 6.31 Data File: KAELE10.hc1

```
*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              MAY   1991               *
*           VERSION 4.0.1E              *
*                                       *
* RUN DATE  04/21/1993  TIME  10:53:39  *
*                                       *
*****************************************
```

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

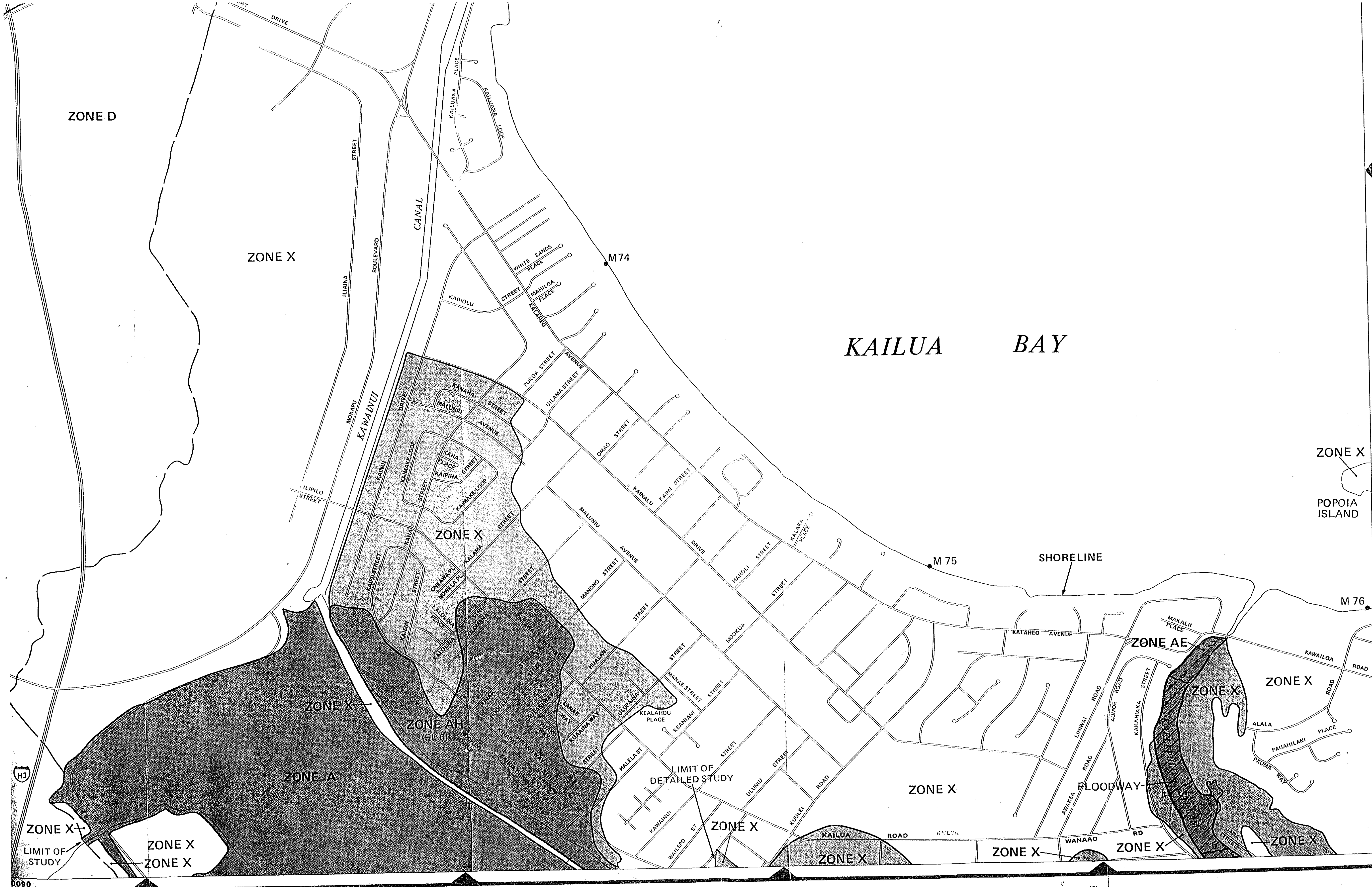
```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X               X
XXXXXXX  XXXX     X       XXXXX   X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX         XXX
```

```
::::::::::::::::::::::::::::::::::::::::::::
::::::::::::::::::::::::::::::::::::::::::::
:::                                      :::
:::  Full Microcomputer Implementation   :::
:::                 by                   :::
:::        Haestad Methods, Inc.         :::
:::                                      :::
::::::::::::::::::::::::::::::::::::::::::::
::::::::::::::::::::::::::::::::::::::::::::
```

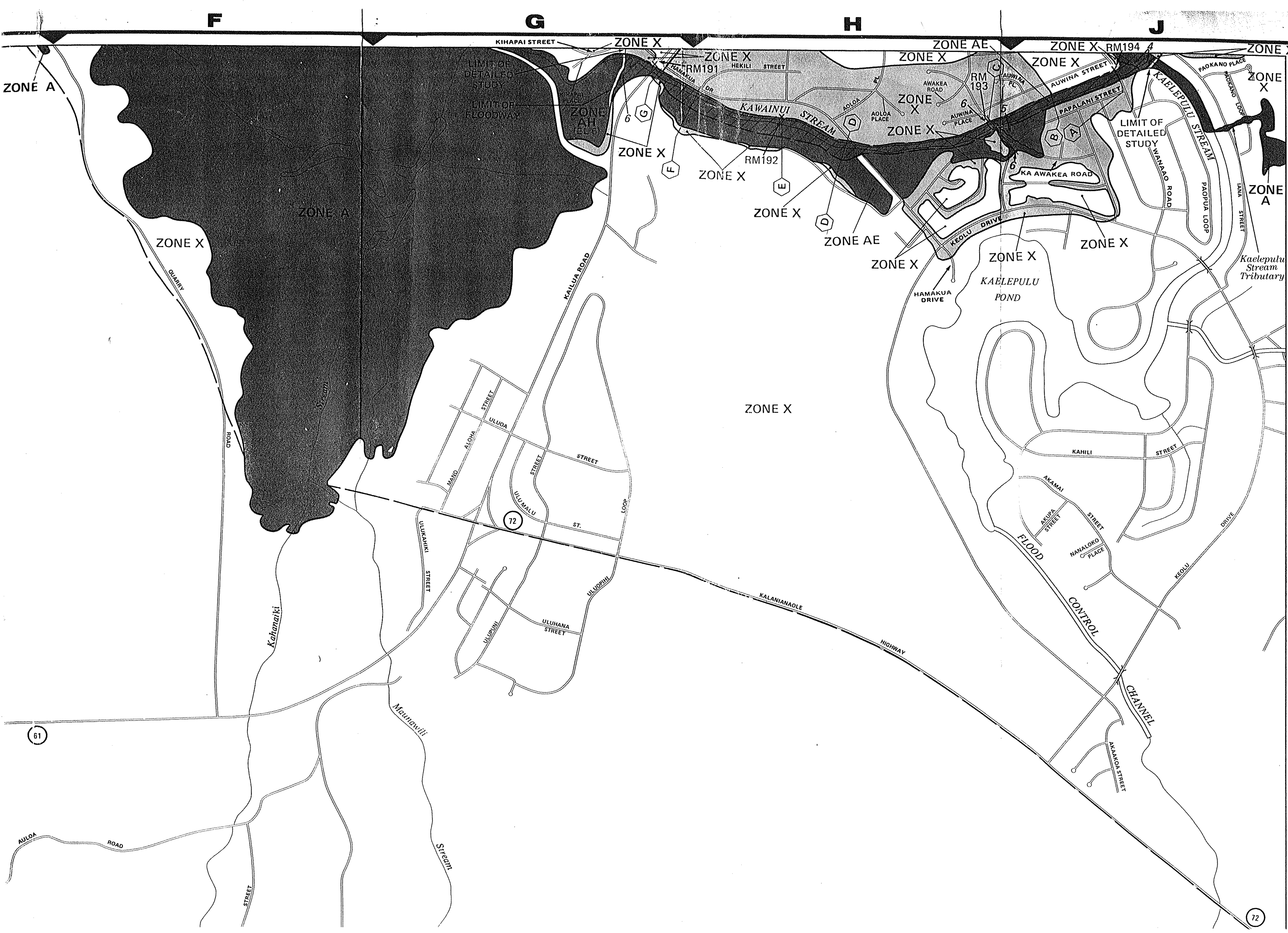
37 Brookside Road * Waterbury, Connecticut 06708 * (203) 755-1666

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 -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



To deterr
agent or
638-6620



LI

SPECIAL FL
BY 100-YEA
ZONE A
ZONE AE
ZONE AH
ZONE A0
ZONE A99
ZONE V
ZONE VE

FLOODWAY

OTHER FLO
ZONE X

OTHER ARE
ZONE X
ZONE D

513

D D

(EL 987)

RM7 X

*Referenced to the National

This map is for use in adn
Program; it does not necess
particularly from local drain
features outside Special Flo

Areas of special flood hazar
AE, AH, AO, A99, V, V1-30 A

Certain areas not in Special
flood control structures.

Boundaries of the floodway
interpolated between cross
hydraulic considerations wi
Emergency Management Ag

Floodway widths in some ar
Floodway widths are provide

Coastal base flood elevation

Elevations reference marks

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

  1           ID      KAELEPULU STREAM DRAINAGE STUDY
  2           ID      KAOPA DETENTION BASIN INFLOW HYDROGRAPH
  3           ID       10-YEAR 24-HOUR RUNOFF COMPUTATIONS
              *DIAGRAM
  4           IT      15  1JAN88    1200     100
  5           IO       1
  6           IN      60  1JAN88     100

  7           KK  BASIN1
  8           KM              BASIN NO. 1
  9           BA  .11614
 10           PH          .11614    0.53    1.08    2.00    2.70    3.50    5.00    6.70    8.50
 11           LS              77
 12           UD    .264

 13           KK  BASIN2
 14           KM              BASIN NO. 2
 15           BA  .95720
 16           PH         0.95720    0.53    1.08    2.00    2.70    3.50    5.00    6.70    8.50
 17           LS              78
 18           UD    .522

 19           KK  BASIN3
 20           KM              BASIN NO. 3
 21           BA  .69084
 22           PH          .69084    0.66    1.35    2.50    3.25    4.00    5.50    7.25    9.00
 23           LS              80
 24           UD   0.300

 25           KK  BASIN4
 26           KM              BASIN NO. 4
 27           BA  1.7548
 28           PH          1.7548    0.66    1.35    2.50    3.25    4.00    5.50    7.25    9.00
 29           LS              84
 30           UD    .414

 31           KK  BASIN5
 32           KM              BASIN NO. 5
 33           BA  .78416
 34           PH        .7841648    0.66    1.35    2.50    3.25    4.00    5.50    7.25    9.00
 35           LS              68
 36           UD    .324
 37           ZZ
```

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

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

   7      BASIN1
              .
              .
  13          .      BASIN2
              .          .
              .          .
  19          .          .      BASIN3
              .          .          .
              .          .          .
  25          .          .          .      BASIN4
              .          .          .          .
              .          .          .          .
  31          .          .          .          .      BASIN5

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

```
HEC1 S/N: 1906360105        HMVersion: 6.31    Data File: KAELE10.hc1

*****************************************                                                *****************************************
*                                       *                                                *                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                                *   U.S. ARMY CORPS OF ENGINEERS        *
*              MAY   1991               *                                                *   HYDROLOGIC ENGINEERING CENTER       *
*           VERSION 4.0.1E              *                                                *        609 SECOND STREET              *
*                                       *                                                *     DAVIS, CALIFORNIA 95616           *
*  RUN DATE  00/02/  56  TIME  00:53:05 *                                                *        (916) 756-1104                 *
*                                       *                                                *                                       *
*****************************************                                                *****************************************



                              KAELEPULU STREAM DRAINAGE STUDY
                              KAOPA DETENTION BASIN INFLOW HYDROGRAPH
                               10-YEAR 24-HOUR RUNOFF COMPUTATIONS

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

     IT         HYDROGRAPH TIME DATA
                       NMIN         15  MINUTES IN COMPUTATION INTERVAL
                      IDATE     1JAN88  STARTING DATE
                      ITIME       1200  STARTING TIME
                         NQ        100  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE     2JAN88  ENDING DATE
                     NDTIME       1245  ENDING TIME
                      ICENT         19  CENTURY MARK

                  COMPUTATION INTERVAL    0.25 HOURS
                       TOTAL TIME BASE   24.75 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

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

           **************
           *            *
   7 KK    *   BASIN1   *
           *            *
           **************

                                   BASIN NO. 1

              SUBBASIN RUNOFF DATA

   9 BA         SUBBASIN CHARACTERISTICS
                      TAREA       0.12  SUBBASIN AREA

                PRECIPITATION DATA

  10 PH                                  DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                ..... HYDRO-35 ......   ................ TP-40 ................   ............ TP-49 ...........
                5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR    2-DAY   4-DAY   7-DAY  10-DAY
                 0.53    1.08    2.00    2.70    3.50    5.00    6.70    8.50     0.00    0.00    0.00    0.00

                                                      STORM AREA =     0.12

  11 LS         SCS LOSS RATE
                      STRTL       0.60  INITIAL ABSTRACTION
                     CRVNBR      77.00  CURVE NUMBER
                      RTIMP       0.00  PERCENT IMPERVIOUS AREA

  12 UD         SCS DIMENSIONLESS UNITGRAPH
                       TLAG       0.26  LAG
```

***

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

UNIT HYDROGRAPH
7 END-OF-PERIOD ORDINATES

105.	125.	45.	16.	6.	2.	1.

***

HYDROGRAPH AT STATION BASIN1

***

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1	JAN	1200	1	0.00	0.00	0.00	0.	*	2	JAN	0030	51	0.26	0.04	0.22	150.
1	JAN	1215	2	0.03	0.03	0.00	0.	*	2	JAN	0045	52	0.20	0.03	0.17	91.
1	JAN	1230	3	0.03	0.03	0.00	0.	*	2	JAN	0100	53	0.16	0.02	0.14	63.
1	JAN	1245	4	0.03	0.03	0.00	0.	*	2	JAN	0115	54	0.21	0.03	0.18	54.
1	JAN	1300	5	0.03	0.03	0.00	0.	*	2	JAN	0130	55	0.20	0.03	0.17	53.
1	JAN	1315	6	0.03	0.03	0.00	0.	*	2	JAN	0145	56	0.15	0.02	0.13	47.
1	JAN	1330	7	0.03	0.03	0.00	0.	*	2	JAN	0200	57	0.14	0.02	0.12	41.
1	JAN	1345	8	0.03	0.03	0.00	0.	*	2	JAN	0215	58	0.13	0.02	0.11	37.
1	JAN	1400	9	0.03	0.03	0.00	0.	*	2	JAN	0230	59	0.12	0.01	0.11	34.
1	JAN	1415	10	0.03	0.03	0.00	0.	*	2	JAN	0245	60	0.12	0.01	0.10	33.
1	JAN	1430	11	0.03	0.03	0.00	0.	*	2	JAN	0300	61	0.11	0.01	0.10	31.
1	JAN	1445	12	0.04	0.04	0.00	0.	*	2	JAN	0315	62	0.09	0.01	0.08	28.
1	JAN	1500	13	0.04	0.04	0.00	0.	*	2	JAN	0330	63	0.08	0.01	0.07	25.
1	JAN	1515	14	0.04	0.04	0.00	0.	*	2	JAN	0345	64	0.08	0.01	0.07	23.
1	JAN	1530	15	0.04	0.04	0.00	0.	*	2	JAN	0400	65	0.08	0.01	0.07	22.
1	JAN	1545	16	0.04	0.04	0.00	0.	*	2	JAN	0415	66	0.07	0.01	0.07	21.
1	JAN	1600	17	0.04	0.04	0.00	0.	*	2	JAN	0430	67	0.07	0.01	0.06	20.
1	JAN	1615	18	0.04	0.04	0.00	0.	*	2	JAN	0445	68	0.07	0.01	0.06	19.
1	JAN	1630	19	0.04	0.04	0.00	0.	*	2	JAN	0500	69	0.07	0.01	0.06	19.
1	JAN	1645	20	0.04	0.04	0.00	0.	*	2	JAN	0515	70	0.07	0.01	0.06	18.
1	JAN	1700	21	0.04	0.04	0.00	0.	*	2	JAN	0530	71	0.06	0.01	0.06	18.
1	JAN	1715	22	0.04	0.04	0.00	1.	*	2	JAN	0545	72	0.06	0.01	0.06	17.
1	JAN	1730	23	0.04	0.04	0.01	1.	*	2	JAN	0600	73	0.06	0.01	0.05	17.
1	JAN	1745	24	0.05	0.04	0.01	2.	*	2	JAN	0615	74	0.05	0.00	0.04	15.
1	JAN	1800	25	0.05	0.04	0.01	2.	*	2	JAN	0630	75	0.05	0.00	0.04	14.
1	JAN	1815	26	0.06	0.05	0.01	3.	*	2	JAN	0645	76	0.05	0.00	0.04	13.
1	JAN	1830	27	0.06	0.05	0.01	3.	*	2	JAN	0700	77	0.04	0.00	0.04	12.
1	JAN	1845	28	0.06	0.05	0.02	4.	*	2	JAN	0715	78	0.04	0.00	0.04	12.
1	JAN	1900	29	0.06	0.05	0.02	5.	*	2	JAN	0730	79	0.04	0.00	0.04	12.
1	JAN	1915	30	0.07	0.05	0.02	5.	*	2	JAN	0745	80	0.04	0.00	0.04	12.
1	JAN	1930	31	0.07	0.05	0.02	6.	*	2	JAN	0800	81	0.04	0.00	0.04	11.
1	JAN	1945	32	0.07	0.05	0.02	7.	*	2	JAN	0815	82	0.04	0.00	0.04	11.
1	JAN	2000	33	0.07	0.05	0.03	7.	*	2	JAN	0830	83	0.04	0.00	0.04	11.
1	JAN	2015	34	0.08	0.05	0.03	8.	*	2	JAN	0845	84	0.04	0.00	0.03	11.
1	JAN	2030	35	0.08	0.05	0.03	9.	*	2	JAN	0900	85	0.04	0.00	0.03	10.
1	JAN	2045	36	0.08	0.05	0.04	10.	*	2	JAN	0915	86	0.04	0.00	0.03	10.
1	JAN	2100	37	0.08	0.05	0.04	11.	*	2	JAN	0930	87	0.04	0.00	0.03	10.
1	JAN	2115	38	0.11	0.06	0.05	13.	*	2	JAN	0945	88	0.04	0.00	0.03	10.
1	JAN	2130	39	0.11	0.05	0.06	15.	*	2	JAN	1000	89	0.03	0.00	0.03	10.
1	JAN	2145	40	0.12	0.05	0.06	17.	*	2	JAN	1015	90	0.03	0.00	0.03	10.
1	JAN	2200	41	0.12	0.05	0.07	19.	*	2	JAN	1030	91	0.03	0.00	0.03	9.
1	JAN	2215	42	0.13	0.05	0.08	21.	*	2	JAN	1045	92	0.03	0.00	0.03	9.
1	JAN	2230	43	0.14	0.05	0.09	24.	*	2	JAN	1100	93	0.03	0.00	0.03	9.
1	JAN	2245	44	0.19	0.07	0.12	29.	*	2	JAN	1115	94	0.03	0.00	0.03	9.
1	JAN	2300	45	0.20	0.07	0.13	35.	*	2	JAN	1130	95	0.03	0.00	0.03	9.
1	JAN	2315	46	0.15	0.05	0.10	35.	*	2	JAN	1145	96	0.03	0.00	0.03	9.
1	JAN	2330	47	0.18	0.05	0.13	35.	*	2	JAN	1200	97	0.03	0.00	0.03	9.
1	JAN	2345	48	0.21	0.06	0.15	40.	*	2	JAN	1215	98	0.00	0.00	0.00	6.
2	JAN	0000	49	0.45	0.11	0.34	63.	*	2	JAN	1230	99	0.00	0.00	0.00	2.
2	JAN	0015	50	1.08	0.21	0.87	143.	*	2	JAN	1245	100	0.00	0.00	0.00	1.

***

TOTAL RAINFALL = 8.50, TOTAL LOSS = 2.76, TOTAL EXCESS = 5.73

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.75-HR
150.	12.50	(CFS)	48.	18.	17.	17.
		(INCHES)	3.857	5.731	5.731	5.731
		(AC-FT)	24.	36.	36.	36.

CUMULATIVE AREA = 0.12 SQ MI

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          ***************
          *             *
 13 KK    *    BASIN2   *
          *             *
          ***************
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BASIN NO. 2

SUBBASIN RUNOFF DATA

15 BA SUBBASIN CHARACTERISTICS

TAREA 0.96 SUBBASIN AREA

PRECIPITATION DATA

16 PH DEPTHS FOR 0-PERCENT HYPOTHETICAL STORM

..... HYDRO-35			.... TP-40					.... TP-49			
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
0.53	1.08	2.00	2.70	3.50	5.00	6.70	8.50	0.00	0.00	0.00	0.00

STORM AREA = 0.96

17 LS SCS LOSS RATE

STRTL 0.56 INITIAL ABSTRACTION

CRVNBR 78.00 CURVE NUMBER

RTIMP 0.00 PERCENT IMPERVIOUS AREA

18 UD SCS DIMENSIONLESS UNITGRAPH

TLAG 0.52 LAG

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

UNIT HYDROGRAPH

12 END-OF-PERIOD ORDINATES

210.	645.	684.	448.	225.	123.	65.	34.	19.	10.
6.	3.								

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HYDROGRAPH AT STATION BASIN2

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DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1	JAN	1200	1	0.00	0.00	0.00	0.	*	2	JAN	0030	51	0.26	0.04	0.22	978.
1	JAN	1215	2	0.03	0.03	0.00	0.	*	2	JAN	0045	52	0.20	0.03	0.17	1001.
1	JAN	1230	3	0.03	0.03	0.00	0.	*	2	JAN	0100	53	0.16	0.02	0.14	800.
1	JAN	1245	4	0.03	0.03	0.00	0.	*	2	JAN	0115	54	0.21	0.03	0.18	608.
1	JAN	1300	5	0.03	0.03	0.00	0.	*	2	JAN	0130	55	0.20	0.02	0.17	521.
1	JAN	1315	6	0.03	0.03	0.00	0.	*	2	JAN	0145	56	0.15	0.02	0.13	469.
1	JAN	1330	7	0.03	0.03	0.00	0.	*	2	JAN	0200	57	0.14	0.02	0.12	417.
1	JAN	1345	8	0.03	0.03	0.00	0.	*	2	JAN	0215	58	0.13	0.01	0.11	367.
1	JAN	1400	9	0.03	0.03	0.00	0.	*	2	JAN	0230	59	0.12	0.01	0.11	330.
1	JAN	1415	10	0.03	0.03	0.00	0.	*	2	JAN	0245	60	0.12	0.01	0.10	303.
1	JAN	1430	11	0.04	0.04	0.00	0.	*	2	JAN	0300	61	0.11	0.01	0.10	282.
1	JAN	1445	12	0.04	0.04	0.00	0.	*	2	JAN	0315	62	0.09	0.01	0.08	262.
1	JAN	1500	13	0.04	0.04	0.00	0.	*	2	JAN	0330	63	0.08	0.01	0.08	238.
1	JAN	1515	14	0.04	0.04	0.00	0.	*	2	JAN	0345	64	0.08	0.01	0.07	216.
1	JAN	1530	15	0.04	0.04	0.00	0.	*	2	JAN	0400	65	0.08	0.01	0.07	199.
1	JAN	1545	16	0.04	0.04	0.00	0.	*	2	JAN	0415	66	0.07	0.01	0.07	187.
1	JAN	1600	17	0.04	0.04	0.00	0.	*	2	JAN	0430	67	0.07	0.01	0.06	178.
1	JAN	1615	18	0.04	0.04	0.00	0.	*	2	JAN	0445	68	0.07	0.01	0.06	170.
1	JAN	1630	19	0.04	0.04	0.00	0.	*	2	JAN	0500	69	0.07	0.01	0.06	164.
1	JAN	1645	20	0.04	0.04	0.00	2.	*	2	JAN	0515	70	0.07	0.01	0.06	158.
1	JAN	1700	21	0.04	0.04	0.00	3.	*	2	JAN	0530	71	0.06	0.01	0.06	153.
1	JAN	1715	22	0.04	0.04	0.00	6.	*	2	JAN	0545	72	0.06	0.01	0.06	149.
1	JAN	1730	23	0.04	0.04	0.01	8.	*	2	JAN	0600	73	0.06	0.00	0.06	145.
1	JAN	1745	24	0.05	0.04	0.01	11.	*	2	JAN	0615	74	0.05	0.00	0.04	139.
1	JAN	1800	25	0.05	0.04	0.01	14.	*	2	JAN	0630	75	0.05	0.00	0.04	129.
1	JAN	1815	26	0.06	0.05	0.01	18.	*	2	JAN	0645	76	0.05	0.00	0.04	119.
1	JAN	1830	27	0.06	0.05	0.01	23.	*	2	JAN	0700	77	0.04	0.00	0.04	112.
1	JAN	1845	28	0.06	0.05	0.02	29.	*	2	JAN	0715	78	0.04	0.00	0.04	107.

1 JAN 1900	29	0.06	0.05	0.02	34.	*	2 JAN 0730	79	0.04	0.00	0.04	103.
1 JAN 1915	30	0.07	0.04	0.02	40.	*	2 JAN 0745	80	0.04	0.00	0.04	100.
1 JAN 1930	31	0.07	0.04	0.02	45.	*	2 JAN 0800	81	0.04	0.00	0.04	97.
1 JAN 1945	32	0.07	0.04	0.03	51.	*	2 JAN 0815	82	0.04	0.00	0.04	95.
1 JAN 2000	33	0.07	0.04	0.03	57.	*	2 JAN 0830	83	0.04	0.00	0.04	93.
1 JAN 2015	34	0.08	0.04	0.03	63.	*	2 JAN 0845	84	0.04	0.00	0.04	91.
1 JAN 2030	35	0.08	0.04	0.03	70.	*	2 JAN 0900	85	0.04	0.00	0.03	89.
1 JAN 2045	36	0.08	0.04	0.04	77.	*	2 JAN 0915	86	0.04	0.00	0.03	87.
1 JAN 2100	37	0.08	0.04	0.04	84.	*	2 JAN 0930	87	0.04	0.00	0.03	86.
1 JAN 2115	38	0.11	0.05	0.06	94.	*	2 JAN 0945	88	0.04	0.00	0.03	84.
1 JAN 2130	39	0.11	0.05	0.06	110.	*	2 JAN 1000	89	0.03	0.00	0.03	83.
1 JAN 2145	40	0.12	0.05	0.07	127.	*	2 JAN 1015	90	0.03	0.00	0.03	81.
1 JAN 2200	41	0.12	0.05	0.07	144.	*	2 JAN 1030	91	0.03	0.00	0.03	80.
1 JAN 2215	42	0.13	0.05	0.08	160.	*	2 JAN 1045	92	0.03	0.00	0.03	79.
1 JAN 2230	43	0.14	0.05	0.09	177.	*	2 JAN 1100	93	0.03	0.00	0.03	78.
1 JAN 2245	44	0.19	0.06	0.12	201.	*	2 JAN 1115	94	0.03	0.00	0.03	76.
1 JAN 2300	45	0.20	0.06	0.14	239.	*	2 JAN 1130	95	0.03	0.00	0.03	75.
1 JAN 2315	46	0.15	0.04	0.11	273.	*	2 JAN 1145	96	0.03	0.00	0.03	74.
1 JAN 2330	47	0.18	0.05	0.13	287.	*	2 JAN 1200	97	0.03	0.00	0.03	73.
1 JAN 2345	48	0.21	0.05	0.16	302.	*	2 JAN 1215	98	0.00	0.00	0.00	66.
2 JAN 0000	49	0.45	0.10	0.35	369.	*	2 JAN 1230	99	0.00	0.00	0.00	47.
2 JAN 0015	50	1.07	0.19	0.88	628.	*	2 JAN 1245	100	0.00	0.00	0.00	27.
						*						

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TOTAL RAINFALL = 8.49, TOTAL LOSS = 2.64, TOTAL EXCESS = 5.84

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.75-HR
1001.	12.75	(CFS)	402.	150.	145.	145.
		(INCHES)	3.907	5.827	5.827	5.827
		(AC-FT)	199.	297.	297.	297.

CUMULATIVE AREA = 0.96 SQ MI

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          *            *
19 KK     *   BASIN3   *
          *            *
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BASIN NO. 3

SUBBASIN RUNOFF DATA

21 BA SUBBASIN CHARACTERISTICS

TAREA 0.69 SUBBASIN AREA

PRECIPITATION DATA

22 PH DEPTHS FOR 0-PERCENT HYPOTHETICAL STORM

..... HYDRO-35			.... TP-40					.... TP-49			
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
0.66	1.35	2.50	3.25	4.00	5.50	7.25	9.00	0.00	0.00	0.00	0.00

STORM AREA = 0.69

23 LS SCS LOSS RATE

STRTL 0.50 INITIAL ABSTRACTION

CRVNBR 80.00 CURVE NUMBER

RTIMP 0.00 PERCENT IMPERVIOUS AREA

24 UD SCS DIMENSIONLESS UNITGRAPH

TLAG 0.30 LAG

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

UNIT HYDROGRAPH

8 END-OF-PERIOD ORDINATES

504.	746.	328.	127.	49.	19.	8.	2.

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HYDROGRAPH AT STATION BASIN3

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1	JAN	1200	1	0.00	0.00	0.00	0.	2	JAN	0030	51	0.32	0.04	0.29	1192.
1	JAN	1215	2	0.03	0.03	0.00	0.	2	JAN	0045	52	0.22	0.02	0.20	765.
1	JAN	1230	3	0.03	0.03	0.00	0.	2	JAN	0100	53	0.18	0.02	0.16	496.
1	JAN	1245	4	0.03	0.03	0.00	0.	2	JAN	0115	54	0.20	0.02	0.18	378.
1	JAN	1300	5	0.03	0.03	0.00	0.	2	JAN	0130	55	0.18	0.02	0.17	337.
1	JAN	1315	6	0.03	0.03	0.00	0.	2	JAN	0145	56	0.15	0.01	0.14	298.
1	JAN	1330	7	0.03	0.03	0.00	0.	2	JAN	0200	57	0.14	0.01	0.13	260.
1	JAN	1345	8	0.03	0.03	0.00	0.	2	JAN	0215	58	0.13	0.01	0.12	234.
1	JAN	1400	9	0.03	0.03	0.00	0.	2	JAN	0230	59	0.12	0.01	0.11	217.
1	JAN	1415	10	0.03	0.03	0.00	0.	2	JAN	0245	60	0.11	0.01	0.11	203.
1	JAN	1430	11	0.03	0.03	0.00	0.	2	JAN	0300	61	0.11	0.01	0.10	192.
1	JAN	1445	12	0.03	0.03	0.00	0.	2	JAN	0315	62	0.09	0.01	0.08	176.
1	JAN	1500	13	0.04	0.04	0.00	0.	2	JAN	0330	63	0.09	0.01	0.08	158.
1	JAN	1515	14	0.04	0.04	0.00	0.	2	JAN	0345	64	0.08	0.01	0.08	147.
1	JAN	1530	15	0.04	0.04	0.00	0.	2	JAN	0400	65	0.08	0.01	0.07	139.
1	JAN	1545	16	0.04	0.04	0.00	0.	2	JAN	0415	66	0.08	0.01	0.07	133.
1	JAN	1600	17	0.04	0.04	0.00	0.	2	JAN	0430	67	0.07	0.00	0.07	128.
1	JAN	1615	18	0.04	0.04	0.00	1.	2	JAN	0445	68	0.07	0.00	0.07	123.
1	JAN	1630	19	0.04	0.04	0.00	3.	2	JAN	0500	69	0.07	0.00	0.06	119.
1	JAN	1645	20	0.04	0.04	0.00	5.	2	JAN	0515	70	0.07	0.00	0.06	116.
1	JAN	1700	21	0.04	0.04	0.01	7.	2	JAN	0530	71	0.06	0.00	0.06	112.
1	JAN	1715	22	0.04	0.04	0.01	9.	2	JAN	0545	72	0.06	0.00	0.06	109.
1	JAN	1730	23	0.04	0.04	0.01	11.	2	JAN	0600	73	0.06	0.00	0.06	106.
1	JAN	1745	24	0.04	0.04	0.01	13.	2	JAN	0615	74	0.05	0.00	0.04	97.
1	JAN	1800	25	0.05	0.04	0.01	16.	2	JAN	0630	75	0.05	0.00	0.04	86.
1	JAN	1815	26	0.06	0.05	0.02	20.	2	JAN	0645	76	0.04	0.00	0.04	79.
1	JAN	1830	27	0.06	0.04	0.02	26.	2	JAN	0700	77	0.04	0.00	0.04	76.
1	JAN	1845	28	0.06	0.04	0.02	31.	2	JAN	0715	78	0.04	0.00	0.04	73.
1	JAN	1900	29	0.07	0.04	0.02	35.	2	JAN	0730	79	0.04	0.00	0.04	71.
1	JAN	1915	30	0.07	0.04	0.03	40.	2	JAN	0745	80	0.04	0.00	0.04	69.
1	JAN	1930	31	0.07	0.04	0.03	44.	2	JAN	0800	81	0.04	0.00	0.04	68.
1	JAN	1945	32	0.07	0.04	0.03	49.	2	JAN	0815	82	0.04	0.00	0.04	66.
1	JAN	2000	33	0.07	0.04	0.03	54.	2	JAN	0830	83	0.04	0.00	0.04	65.
1	JAN	2015	34	0.08	0.04	0.04	59.	2	JAN	0845	84	0.04	0.00	0.03	64.
1	JAN	2030	35	0.08	0.04	0.04	65.	2	JAN	0900	85	0.04	0.00	0.03	62.
1	JAN	2045	36	0.08	0.04	0.04	71.	2	JAN	0915	86	0.04	0.00	0.03	61.
1	JAN	2100	37	0.09	0.04	0.05	77.	2	JAN	0930	87	0.03	0.00	0.03	60.
1	JAN	2115	38	0.11	0.05	0.06	88.	2	JAN	0945	88	0.03	0.00	0.03	59.
1	JAN	2130	39	0.11	0.05	0.07	102.	2	JAN	1000	89	0.03	0.00	0.03	58.
1	JAN	2145	40	0.12	0.05	0.07	115.	2	JAN	1015	90	0.03	0.00	0.03	57.
1	JAN	2200	41	0.12	0.05	0.08	127.	2	JAN	1030	91	0.03	0.00	0.03	56.
1	JAN	2215	42	0.13	0.05	0.09	140.	2	JAN	1045	92	0.03	0.00	0.03	55.
1	JAN	2230	43	0.14	0.05	0.10	154.	2	JAN	1100	93	0.03	0.00	0.03	54.
1	JAN	2245	44	0.17	0.05	0.12	178.	2	JAN	1115	94	0.03	0.00	0.03	53.
1	JAN	2300	45	0.19	0.05	0.14	210.	2	JAN	1130	95	0.03	0.00	0.03	52.
1	JAN	2315	46	0.16	0.04	0.12	222.	2	JAN	1145	96	0.03	0.00	0.03	52.
1	JAN	2330	47	0.19	0.05	0.15	231.	2	JAN	1200	97	0.03	0.00	0.03	51.
1	JAN	2345	48	0.26	0.06	0.20	279.	2	JAN	1215	98	0.00	0.00	0.00	36.
2	JAN	0000	49	0.56	0.11	0.45	455.	2	JAN	1230	99	0.00	0.00	0.00	15.
2	JAN	0015	50	1.34	0.19	1.15	1016.	2	JAN	1245	100	0.00	0.00	0.00	6.

TOTAL RAINFALL = 8.99, TOTAL LOSS = 2.43, TOTAL EXCESS = 6.56

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.75-HR
1192.	12.50	(CFS)	337.	122.	118.	118.
		(INCHES)	4.529	6.557	6.557	6.557
		(AC-FT)	167.	242.	242.	242.

CUMULATIVE AREA = 0.69 SQ MI

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            *            *
  25 KK     *   BASIN4   *
            *            *
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BASIN NO. 4

SUBBASIN RUNOFF DATA

27 BA SUBBASIN CHARACTERISTICS
TAREA 1.75 SUBBASIN AREA

PRECIPITATION DATA

28 PH DEPTHS FOR 0-PERCENT HYPOTHETICAL STORM

..... HYDRO-35			.... TP-40					.... TP-49			
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
0.66	1.35	2.50	3.25	4.00	5.50	7.25	9.00	0.00	0.00	0.00	0.00

STORM AREA = 1.75

29 LS SCS LOSS RATE
STRTL 0.38 INITIAL ABSTRACTION
CRVNBR 84.00 CURVE NUMBER
RTIMP 0.00 PERCENT IMPERVIOUS AREA

30 UD SCS DIMENSIONLESS UNITGRAPH
TLAG 0.41 LAG

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

UNIT HYDROGRAPH
10 END-OF-PERIOD ORDINATES

651. 1569. 1243. 564. 271. 126. 59. 28. 14. 6.

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HYDROGRAPH AT STATION BASIN4

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DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1 JAN 1200	1	0.00	0.00	0.00	0.	*	2 JAN 0030	51	0.32	0.02	0.30	2889.
1 JAN 1215	2	0.03	0.03	0.00	0.	*	2 JAN 0045	52	0.22	0.01	0.21	2472.
1 JAN 1230	3	0.03	0.03	0.00	0.	*	2 JAN 0100	53	0.18	0.01	0.16	1658.
1 JAN 1245	4	0.03	0.03	0.00	0.	*	2 JAN 0115	54	0.20	0.01	0.19	1213.
1 JAN 1300	5	0.03	0.03	0.00	0.	*	2 JAN 0130	55	0.18	0.01	0.17	999.
1 JAN 1315	6	0.03	0.03	0.00	0.	*	2 JAN 0145	56	0.15	0.01	0.14	871.
1 JAN 1330	7	0.03	0.03	0.00	0.	*	2 JAN 0200	57	0.14	0.01	0.13	756.
1 JAN 1345	8	0.03	0.03	0.00	0.	*	2 JAN 0215	58	0.13	0.01	0.12	669.
1 JAN 1400	9	0.03	0.03	0.00	0.	*	2 JAN 0230	59	0.12	0.01	0.11	605.
1 JAN 1415	10	0.03	0.03	0.00	0.	*	2 JAN 0245	60	0.11	0.01	0.11	557.
1 JAN 1430	11	0.03	0.03	0.00	0.	*	2 JAN 0300	61	0.11	0.01	0.10	522.
1 JAN 1445	12	0.03	0.03	0.00	0.	*	2 JAN 0315	62	0.09	0.00	0.09	485.
1 JAN 1500	13	0.04	0.04	0.00	0.	*	2 JAN 0330	63	0.09	0.00	0.08	440.
1 JAN 1515	14	0.04	0.04	0.00	1.	*	2 JAN 0345	64	0.08	0.00	0.08	403.
1 JAN 1530	15	0.04	0.03	0.00	3.	*	2 JAN 0400	65	0.08	0.00	0.08	378.
1 JAN 1545	16	0.04	0.03	0.00	7.	*	2 JAN 0415	66	0.08	0.00	0.07	358.
1 JAN 1600	17	0.04	0.03	0.00	12.	*	2 JAN 0430	67	0.07	0.00	0.07	343.
1 JAN 1615	18	0.04	0.03	0.01	17.	*	2 JAN 0445	68	0.07	0.00	0.07	329.
1 JAN 1630	19	0.04	0.03	0.01	23.	*	2 JAN 0500	69	0.07	0.00	0.07	318.
1 JAN 1645	20	0.04	0.03	0.01	29.	*	2 JAN 0515	70	0.07	0.00	0.06	307.
1 JAN 1700	21	0.04	0.03	0.01	35.	*	2 JAN 0530	71	0.06	0.00	0.06	298.
1 JAN 1715	22	0.04	0.03	0.01	42.	*	2 JAN 0545	72	0.06	0.00	0.06	289.
1 JAN 1730	23	0.04	0.03	0.01	48.	*	2 JAN 0600	73	0.06	0.00	0.06	281.
1 JAN 1745	24	0.04	0.03	0.01	55.	*	2 JAN 0615	74	0.05	0.00	0.04	265.
1 JAN 1800	25	0.05	0.03	0.02	62.	*	2 JAN 0630	75	0.05	0.00	0.04	239.
1 JAN 1815	26	0.06	0.04	0.02	72.	*	2 JAN 0645	76	0.04	0.00	0.04	217.
1 JAN 1830	27	0.06	0.04	0.03	88.	*	2 JAN 0700	77	0.04	0.00	0.04	204.
1 JAN 1845	28	0.06	0.04	0.03	104.	*	2 JAN 0715	78	0.04	0.00	0.04	196.
1 JAN 1900	29	0.07	0.03	0.03	117.	*	2 JAN 0730	79	0.04	0.00	0.04	189.
1 JAN 1915	30	0.07	0.03	0.03	130.	*	2 JAN 0745	80	0.04	0.00	0.04	184.
1 JAN 1930	31	0.07	0.03	0.04	142.	*	2 JAN 0800	81	0.04	0.00	0.04	179.
1 JAN 1945	32	0.07	0.03	0.04	155.	*	2 JAN 0815	82	0.04	0.00	0.04	175.
1 JAN 2000	33	0.07	0.03	0.04	168.	*	2 JAN 0830	83	0.04	0.00	0.04	171.
1 JAN 2015	34	0.08	0.03	0.05	181.	*	2 JAN 0845	84	0.04	0.00	0.04	168.
1 JAN 2030	35	0.08	0.03	0.05	196.	*	2 JAN 0900	85	0.04	0.00	0.03	164.
1 JAN 2045	36	0.08	0.03	0.05	211.	*	2 JAN 0915	86	0.04	0.00	0.03	161.
1 JAN 2100	37	0.09	0.03	0.06	228.	*	2 JAN 0930	87	0.03	0.00	0.03	158.
1 JAN 2115	38	0.11	0.04	0.07	252.	*	2 JAN 0945	88	0.03	0.00	0.03	155.
1 JAN 2130	39	0.11	0.03	0.08	287.	*	2 JAN 1000	89	0.03	0.00	0.03	152.
1 JAN 2145	40	0.12	0.03	0.08	322.	*	2 JAN 1015	90	0.03	0.00	0.03	149.

```
        1 JAN 2200   41    0.12    0.03    0.09       354.      *      2 JAN 1030   91    0.03    0.00    0.03      147.
        1 JAN 2215   42    0.13    0.03    0.10       387.      *      2 JAN 1045   92    0.03    0.00    0.03      144.
        1 JAN 2230   43    0.14    0.03    0.11       424.      *      2 JAN 1100   93    0.03    0.00    0.03      142.
        1 JAN 2245   44    0.17    0.04    0.14       475.      *      2 JAN 1115   94    0.03    0.00    0.03      140.
        1 JAN 2300   45    0.19    0.04    0.15       549.      *      2 JAN 1130   95    0.03    0.00    0.03      137.
        1 JAN 2315   46    0.16    0.03    0.13       604.      *      2 JAN 1145   96    0.03    0.00    0.03      135.
        1 JAN 2330   47    0.19    0.03    0.16       629.      *      2 JAN 1200   97    0.03    0.00    0.03      133.
        1 JAN 2345   48    0.26    0.04    0.22       708.      *      2 JAN 1215   98    0.00    0.00    0.00      113.
        2 JAN 0000   49    0.56    0.07    0.48      1008.      *      2 JAN 1230   99    0.00    0.00    0.00       67.
        2 JAN 0015   50    1.33    0.13    1.21      1979.      *      2 JAN 1245  100    0.00    0.00    0.00       31.
                                                                *
*******************************************************************************************************************

   TOTAL RAINFALL =    8.98, TOTAL LOSS =    1.94, TOTAL EXCESS =    7.04

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
   (CFS)        (HR)                  6-HR        24-HR        72-HR       24.75-HR
   2889.       12.50        (CFS)     903.         332.         322.         322.
                          (INCHES)   4.784        7.029        7.029        7.029
                           (AC-FT)    448.         658.         658.         658.

                       CUMULATIVE AREA =     1.75 SQ MI


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


            **************
            *            *
  31 KK     *   BASIN5   *
            *            *
            **************
                                  BASIN NO. 5

               SUBBASIN RUNOFF DATA

  33 BA          SUBBASIN CHARACTERISTICS
                      TAREA        0.78  SUBBASIN AREA

                 PRECIPITATION DATA

  34 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                 ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                 5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR    2-DAY   4-DAY   7-DAY  10-DAY
                  0.66    1.35    2.50    3.25    4.00    5.50    7.25    9.00     0.00    0.00    0.00    0.00

                                                 STORM AREA =     0.78

  35 LS          SCS LOSS RATE
                      STRTL        0.94  INITIAL ABSTRACTION
                     CRVNBR       68.00  CURVE NUMBER
                      RTIMP        0.00  PERCENT IMPERVIOUS AREA

  36 UD          SCS DIMENSIONLESS UNITGRAPH
                       TLAG        0.32  LAG

                                                              ***

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

                                                         UNIT HYDROGRAPH
                                                    8 END-OF-PERIOD ORDINATES
            492.       836.       417.       169.       68.        27.        11.         5.
*******************************************************************************************************************

                                               HYDROGRAPH AT STATION    BASIN5

*******************************************************************************************************************
                                                              *
      DA MON HRMN  ORD     RAIN     LOSS   EXCESS      COMP Q     *    DA MON HRMN  ORD     RAIN     LOSS   EXCESS      COMP Q
                                                              *
       1 JAN 1200    1     0.00     0.00     0.00         0.      *     2 JAN 0030   51     0.32     0.08     0.24       1068.
       1 JAN 1215    2     0.03     0.03     0.00         0.      *     2 JAN 0045   52     0.22     0.05     0.17        740.
       1 JAN 1230    3     0.03     0.03     0.00         0.      *     2 JAN 0100   53     0.18     0.04     0.13        491.
       1 JAN 1245    4     0.03     0.03     0.00         0.      *     2 JAN 0115   54     0.20     0.05     0.16        374.
       1 JAN 1300    5     0.03     0.03     0.00         0.      *     2 JAN 0130   55     0.18     0.04     0.14        332.
       1 JAN 1315    6     0.03     0.03     0.00         0.      *     2 JAN 0145   56     0.15     0.03     0.12        296.
```

1 JAN 1330	7	0.03	0.03	0.00	0.	*	2 JAN 0200	57	0.14	0.03	0.11	260.
1 JAN 1345	8	0.03	0.03	0.00	0.	*	2 JAN 0215	58	0.13	0.03	0.10	234.
1 JAN 1400	9	0.03	0.03	0.00	0.	*	2 JAN 0230	59	0.12	0.02	0.10	217.
1 JAN 1415	10	0.03	0.03	0.00	0.	*	2 JAN 0245	60	0.11	0.02	0.09	203.
1 JAN 1430	11	0.03	0.03	0.00	0.	*	2 JAN 0300	61	0.11	0.02	0.09	193.
1 JAN 1445	12	0.03	0.03	0.00	0.	*	2 JAN 0315	62	0.09	0.02	0.07	178.
1 JAN 1500	13	0.04	0.04	0.00	0.	*	2 JAN 0330	63	0.09	0.02	0.07	160.
1 JAN 1515	14	0.04	0.04	0.00	0.	*	2 JAN 0345	64	0.08	0.01	0.07	149.
1 JAN 1530	15	0.04	0.04	0.00	0.	*	2 JAN 0400	65	0.08	0.01	0.07	141.
1 JAN 1545	16	0.04	0.04	0.00	0.	*	2 JAN 0415	66	0.08	0.01	0.06	135.
1 JAN 1600	17	0.04	0.04	0.00	0.	*	2 JAN 0430	67	0.07	0.01	0.06	130.
1 JAN 1615	18	0.04	0.04	0.00	0.	*	2 JAN 0445	68	0.07	0.01	0.06	125.
1 JAN 1630	19	0.04	0.04	0.00	0.	*	2 JAN 0500	69	0.07	0.01	0.06	121.
1 JAN 1645	20	0.04	0.04	0.00	0.	*	2 JAN 0515	70	0.07	0.01	0.06	118.
1 JAN 1700	21	0.04	0.04	0.00	0.	*	2 JAN 0530	71	0.06	0.01	0.05	114.
1 JAN 1715	22	0.04	0.04	0.00	0.	*	2 JAN 0545	72	0.06	0.01	0.05	111.
1 JAN 1730	23	0.04	0.04	0.00	0.	*	2 JAN 0600	73	0.06	0.01	0.05	108.
1 JAN 1745	24	0.04	0.04	0.00	0.	*	2 JAN 0615	74	0.05	0.01	0.04	100.
1 JAN 1800	25	0.05	0.05	0.00	0.	*	2 JAN 0630	75	0.05	0.01	0.04	89.
1 JAN 1815	26	0.06	0.06	0.00	0.	*	2 JAN 0645	76	0.04	0.01	0.04	82.
1 JAN 1830	27	0.06	0.06	0.00	0.	*	2 JAN 0700	77	0.04	0.01	0.04	78.
1 JAN 1845	28	0.06	0.06	0.00	2.	*	2 JAN 0715	78	0.04	0.01	0.04	75.
1 JAN 1900	29	0.07	0.06	0.00	4.	*	2 JAN 0730	79	0.04	0.01	0.03	73.
1 JAN 1915	30	0.07	0.06	0.01	7.	*	2 JAN 0745	80	0.04	0.01	0.03	71.
1 JAN 1930	31	0.07	0.06	0.01	11.	*	2 JAN 0800	81	0.04	0.01	0.03	70.
1 JAN 1945	32	0.07	0.06	0.01	15.	*	2 JAN 0815	82	0.04	0.01	0.03	68.
1 JAN 2000	33	0.07	0.06	0.01	19.	*	2 JAN 0830	83	0.04	0.01	0.03	67.
1 JAN 2015	34	0.08	0.06	0.01	23.	*	2 JAN 0845	84	0.04	0.01	0.03	66.
1 JAN 2030	35	0.08	0.06	0.02	28.	*	2 JAN 0900	85	0.04	0.01	0.03	64.
1 JAN 2045	36	0.08	0.06	0.02	33.	*	2 JAN 0915	86	0.04	0.01	0.03	63.
1 JAN 2100	37	0.09	0.07	0.02	38.	*	2 JAN 0930	87	0.03	0.01	0.03	62.
1 JAN 2115	38	0.11	0.08	0.03	46.	*	2 JAN 0945	88	0.03	0.00	0.03	61.
1 JAN 2130	39	0.11	0.08	0.03	57.	*	2 JAN 1000	89	0.03	0.00	0.03	60.
1 JAN 2145	40	0.12	0.08	0.04	67.	*	2 JAN 1015	90	0.03	0.00	0.03	59.
1 JAN 2200	41	0.12	0.08	0.05	77.	*	2 JAN 1030	91	0.03	0.00	0.03	58.
1 JAN 2215	42	0.13	0.08	0.05	89.	*	2 JAN 1045	92	0.03	0.00	0.03	57.
1 JAN 2230	43	0.14	0.08	0.06	102.	*	2 JAN 1100	93	0.03	0.00	0.03	56.
1 JAN 2245	44	0.17	0.10	0.08	122.	*	2 JAN 1115	94	0.03	0.00	0.03	55.
1 JAN 2300	45	0.19	0.10	0.09	149.	*	2 JAN 1130	95	0.03	0.00	0.03	54.
1 JAN 2315	46	0.16	0.08	0.08	164.	*	2 JAN 1145	96	0.03	0.00	0.03	53.
1 JAN 2330	47	0.19	0.09	0.10	176.	*	2 JAN 1200	97	0.03	0.00	0.03	53.
1 JAN 2345	48	0.26	0.12	0.15	215.	*	2 JAN 1215	98	0.00	0.00	0.00	40.
2 JAN 0000	49	0.56	0.22	0.34	356.	*	2 JAN 1230	99	0.00	0.00	0.00	18.
2 JAN 0015	50	1.34	0.42	0.92	826.	*	2 JAN 1245	100	0.00	0.00	0.00	7.
						*						

****

TOTAL RAINFALL = 8.99, TOTAL LOSS = 3.91, TOTAL EXCESS = 5.08

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.75-HR
1068.	12.50	(CFS)	304.	107.	104.	104.
		(INCHES)	3.610	5.076	5.076	5.076
		(AC-FT)	151.	212.	212.	212.

CUMULATIVE AREA = 0.78 SQ MI

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

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	BASIN1	150.	12.50	48.	18.	17.	0.12		
HYDROGRAPH AT	BASIN2	1001.	12.75	402.	150.	145.	0.96		
HYDROGRAPH AT	BASIN3	1192.	12.50	337.	122.	118.	0.69		
HYDROGRAPH AT	BASIN4	2889.	12.50	903.	332.	322.	1.75		
HYDROGRAPH AT	BASIN5	1068.	12.50	304.	107.	104.	0.78		

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

APPENDIX C-2
HYDROLOGIC INVESTIGATION AND ANALYSIS
EXISTING CONDITIONS
HEC-1 RUNOFF COMPUTATIONS
50-YEAR 24-HOUR STORM EVENT

50 YEAR (3)

```
HEC1 S/N: 1906360105        HMVersion: 6.31    Data File: KAELE50.hc1

*****************************************                                       ****************************************
*                                       *                                       *                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                       *    U.S. ARMY CORPS OF ENGINEERS      *
*              MAY   1991               *                                       *   HYDROLOGIC ENGINEERING CENTER      *
*            VERSION 4.0.1E             *                                       *         609 SECOND STREET            *
*                                       *                                       *      DAVIS, CALIFORNIA 95616         *
*  RUN DATE  04/21/1993  TIME  11:23:01 *                                       *         (916) 756-1104               *
*                                       *                                       *                                      *
*****************************************                                       ****************************************


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


                                    ::::::::::::::::::::::::::::::::::::::::::
                                    ::::::::::::::::::::::::::::::::::::::::::
                                    :::                                    :::
                                    :::  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 -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

  1            ID      KAELEPULU STREAM DRAINAGE STUDY
  2            ID      KAOPA DETENTION BASIN INFLOW HYDROGRAPH
  3            ID       50-YEAR 24-HOUR RUNOFF COMPUTATIONS
               *DIAGRAM
  4            IT      15  1JAN88    1200     100
  5            IO       1
  6            IN      60  1JAN88     100

  7            KK  BASIN1
  8            KM            BASIN NO. 1
  9            BA  .11614
 10            PH          .11614    0.79    1.62    3.00    4.00    5.00    7.00    9.50   12.00
 11            LS              77
 12            UD    .264

 13            KK  BASIN2
 14            KM            BASIN NO. 2
 15            BA  .95720
 16            PH         0.95720    0.79    1.62    3.00    4.00    5.00    7.00    9.50   12.00
 17            LS              78
 18            UD    .522

 19            KK  BASIN3
 20            KM            BASIN NO. 3
 21            BA  .69084
 22            PH          .69084    0.86    1.75    3.25    4.40    5.40    7.50   10.20   13.00
 23            LS              80
 24            UD   0.300

 25            KK  BASIN4
 26            KM            BASIN NO. 4
 27            BA  1.7548
 28            PH          1.7548    0.86    1.75    3.25    4.40    5.40    7.50   10.20   13.00
 29            LS              84
 30            UD    .414

 31            KK  BASIN5
 32            KM            BASIN NO. 5
 33            BA  .78416
 34            PH        .7841648    0.86    1.75    3.25    4.40    5.40    7.50   10.20   13.00
 35            LS              68
 36            UD    .324
 37            ZZ
```

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

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

   7       BASIN1
              .
              .
  13          .     BASIN2
              .        .
              .        .
  19          .        .     BASIN3
              .        .        .
              .        .        .
  25          .        .        .     BASIN4
              .        .        .        .
              .        .        .        .
  31          .        .        .        .     BASIN5

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

```
HEC1 S/N: 1906360105        HMVersion: 6.31    Data File: KAELE50.hc1

*****************************************                                   *****************************************
*                                       *                                   *                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                   *   U.S. ARMY CORPS OF ENGINEERS        *
*              MAY   1991               *                                   *   HYDROLOGIC ENGINEERING CENTER       *
*           VERSION 4.0.1E              *                                   *          609 SECOND STREET            *
*                                       *                                   *       DAVIS, CALIFORNIA 95616         *
*  RUN DATE  00/02/  56  TIME  00:23:05 *                                   *           (916) 756-1104              *
*                                       *                                   *                                       *
*****************************************                                   *****************************************



                              KAELEPULU STREAM DRAINAGE STUDY
                              KAOPA DETENTION BASIN INFLOW HYDROGRAPH
                               50-YEAR 24-HOUR RUNOFF COMPUTATIONS

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

    IT          HYDROGRAPH TIME DATA
                       NMIN          15  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1JAN88  STARTING DATE
                      ITIME        1200  STARTING TIME
                         NQ         100  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      2JAN88  ENDING DATE
                     NDTIME        1245  ENDING TIME
                      ICENT          19  CENTURY MARK

                 COMPUTATION INTERVAL    0.25 HOURS
                      TOTAL TIME BASE   24.75 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


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

          **************
          *            *
  7 KK    *   BASIN1   *
          *            *
          **************

                               BASIN NO. 1

            SUBBASIN RUNOFF DATA

  9 BA        SUBBASIN CHARACTERISTICS
                    TAREA        0.12  SUBBASIN AREA

              PRECIPITATION DATA

 10 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
              ..... HYDRO-35 ......  ............... TP-40 ..............   ........... TP-49 ...........
              5-MIN  15-MIN  60-MIN   2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
               0.79    1.62    3.00   4.00    5.00    7.00    9.50   12.00    0.00    0.00    0.00    0.00

                                                STORM AREA =     0.12

 11 LS        SCS LOSS RATE
                   STRTL         0.60  INITIAL ABSTRACTION
                  CRVNBR        77.00  CURVE NUMBER
                   RTIMP         0.00  PERCENT IMPERVIOUS AREA

 12 UD        SCS DIMENSIONLESS UNITGRAPH
                    TLAG         0.26  LAG
```

***

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

UNIT HYDROGRAPH
7 END-OF-PERIOD ORDINATES

105.	125.	45.	16.	6.	2.	1.

HYDROGRAPH AT STATION BASIN1

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1	JAN	1200	1	0.00	0.00	0.00	0.
1	JAN	1215	2	0.04	0.04	0.00	0.
1	JAN	1230	3	0.04	0.04	0.00	0.
1	JAN	1245	4	0.04	0.04	0.00	0.
1	JAN	1300	5	0.04	0.04	0.00	0.
1	JAN	1315	6	0.04	0.04	0.00	0.
1	JAN	1330	7	0.05	0.05	0.00	0.
1	JAN	1345	8	0.05	0.05	0.00	0.
1	JAN	1400	9	0.05	0.05	0.00	0.
1	JAN	1415	10	0.05	0.05	0.00	0.
1	JAN	1430	11	0.05	0.05	0.00	0.
1	JAN	1445	12	0.05	0.05	0.00	0.
1	JAN	1500	13	0.05	0.05	0.00	0.
1	JAN	1515	14	0.05	0.05	0.00	0.
1	JAN	1530	15	0.05	0.05	0.00	0.
1	JAN	1545	16	0.05	0.05	0.00	0.
1	JAN	1600	17	0.05	0.05	0.00	1.
1	JAN	1615	18	0.06	0.05	0.01	1.
1	JAN	1630	19	0.06	0.05	0.01	2.
1	JAN	1645	20	0.06	0.05	0.01	3.
1	JAN	1700	21	0.06	0.05	0.01	3.
1	JAN	1715	22	0.06	0.05	0.01	4.
1	JAN	1730	23	0.06	0.05	0.02	4.
1	JAN	1745	24	0.06	0.05	0.02	5.
1	JAN	1800	25	0.07	0.04	0.02	5.
1	JAN	1815	26	0.09	0.06	0.03	7.
1	JAN	1830	27	0.09	0.06	0.03	9.
1	JAN	1845	28	0.09	0.06	0.04	10.
1	JAN	1900	29	0.09	0.05	0.04	11.
1	JAN	1915	30	0.10	0.05	0.04	12.
1	JAN	1930	31	0.10	0.05	0.05	13.
1	JAN	1945	32	0.10	0.05	0.05	14.
1	JAN	2000	33	0.11	0.05	0.06	16.
1	JAN	2015	34	0.11	0.05	0.06	17.
1	JAN	2030	35	0.11	0.05	0.07	18.
1	JAN	2045	36	0.12	0.05	0.07	20.
1	JAN	2100	37	0.12	0.05	0.08	21.
1	JAN	2115	38	0.14	0.05	0.09	24.
1	JAN	2130	39	0.15	0.05	0.10	27.
1	JAN	2145	40	0.16	0.05	0.11	29.
1	JAN	2200	41	0.17	0.05	0.12	32.
1	JAN	2215	42	0.18	0.05	0.13	35.
1	JAN	2230	43	0.19	0.05	0.14	38.
1	JAN	2245	44	0.23	0.06	0.18	44.
1	JAN	2300	45	0.25	0.06	0.20	52.
1	JAN	2315	46	0.22	0.05	0.17	53.
1	JAN	2330	47	0.26	0.05	0.21	56.
1	JAN	2345	48	0.32	0.06	0.26	65.
2	JAN	0000	49	0.68	0.11	0.57	105.
2	JAN	0015	50	1.62	0.20	1.42	236.
2	JAN	0030	51	0.39	0.04	0.35	246.
2	JAN	0045	52	0.29	0.03	0.26	147.
2	JAN	0100	53	0.23	0.02	0.21	99.
2	JAN	0115	54	0.27	0.02	0.25	80.
2	JAN	0130	55	0.24	0.02	0.22	74.
2	JAN	0145	56	0.20	0.01	0.18	65.
2	JAN	0200	57	0.18	0.01	0.17	57.
2	JAN	0215	58	0.17	0.01	0.16	52.
2	JAN	0230	59	0.16	0.01	0.15	48.
2	JAN	0245	60	0.15	0.01	0.14	46.
2	JAN	0300	61	0.15	0.01	0.14	43.
2	JAN	0315	62	0.13	0.01	0.12	40.
2	JAN	0330	63	0.12	0.01	0.11	37.
2	JAN	0345	64	0.12	0.01	0.11	35.
2	JAN	0400	65	0.11	0.01	0.11	33.
2	JAN	0415	66	0.11	0.01	0.10	32.
2	JAN	0430	67	0.10	0.01	0.10	31.
2	JAN	0445	68	0.10	0.01	0.10	30.
2	JAN	0500	69	0.10	0.01	0.09	29.
2	JAN	0515	70	0.10	0.01	0.09	28.
2	JAN	0530	71	0.09	0.01	0.09	27.
2	JAN	0545	72	0.09	0.00	0.09	27.
2	JAN	0600	73	0.09	0.00	0.08	26.
2	JAN	0615	74	0.07	0.00	0.06	23.
2	JAN	0630	75	0.06	0.00	0.06	20.
2	JAN	0645	76	0.06	0.00	0.06	19.
2	JAN	0700	77	0.06	0.00	0.06	18.
2	JAN	0715	78	0.06	0.00	0.06	18.
2	JAN	0730	79	0.06	0.00	0.06	17.
2	JAN	0745	80	0.06	0.00	0.05	17.
2	JAN	0800	81	0.06	0.00	0.05	16.
2	JAN	0815	82	0.05	0.00	0.05	16.
2	JAN	0830	83	0.05	0.00	0.05	16.
2	JAN	0845	84	0.05	0.00	0.05	15.
2	JAN	0900	85	0.05	0.00	0.05	15.
2	JAN	0915	86	0.05	0.00	0.05	15.
2	JAN	0930	87	0.05	0.00	0.05	15.
2	JAN	0945	88	0.05	0.00	0.05	14.
2	JAN	1000	89	0.05	0.00	0.05	14.
2	JAN	1015	90	0.05	0.00	0.05	14.
2	JAN	1030	91	0.05	0.00	0.04	14.
2	JAN	1045	92	0.05	0.00	0.04	13.
2	JAN	1100	93	0.05	0.00	0.04	13.
2	JAN	1115	94	0.04	0.00	0.04	13.
2	JAN	1130	95	0.04	0.00	0.04	13.
2	JAN	1145	96	0.04	0.00	0.04	13.
2	JAN	1200	97	0.04	0.00	0.04	12.
2	JAN	1215	98	0.00	0.00	0.00	8.
2	JAN	1230	99	0.00	0.00	0.00	3.
2	JAN	1245	100	0.00	0.00	0.00	1.

TOTAL RAINFALL = 12.00, TOTAL LOSS = 2.96, TOTAL EXCESS = 9.03

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.75-HR
246.	12.50	(CFS)	74.	28.	27.	27.
		(INCHES)	5.957	9.031	9.031	9.031
		(AC-FT)	37.	56.	56.	56.

CUMULATIVE AREA = 0.12 SQ MI

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              *             *
   13 KK      *   BASIN2    *
              *             *
              ***************
                                    BASIN NO. 2

                SUBBASIN RUNOFF DATA

   15 BA          SUBBASIN CHARACTERISTICS
                        TAREA        0.96  SUBBASIN AREA

                  PRECIPITATION DATA

   16 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                   0.79    1.62    3.00    4.00    5.00    7.00    9.50   12.00    0.00    0.00    0.00    0.00

                                                   STORM AREA =     0.96

   17 LS          SCS LOSS RATE
                        STRTL        0.56  INITIAL ABSTRACTION
                       CRVNBR       78.00  CURVE NUMBER
                        RTIMP        0.00  PERCENT IMPERVIOUS AREA

   18 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG        0.52  LAG

                                                                  ***

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

                                                      UNIT HYDROGRAPH
                                                 12 END-OF-PERIOD ORDINATES
              210.       645.       684.       448.       225.       123.        65.        34.        19.        10.
                6.         3.

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                                                 HYDROGRAPH AT STATION   BASIN2

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DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1	JAN	1200	1	0.00	0.00	0.00	0.	*	2	JAN	0030	51	0.39	0.03	0.35	1597.
1	JAN	1215	2	0.04	0.04	0.00	0.	*	2	JAN	0045	52	0.29	0.02	0.27	1627.
1	JAN	1230	3	0.04	0.04	0.00	0.	*	2	JAN	0100	53	0.23	0.02	0.22	1287.
1	JAN	1245	4	0.04	0.04	0.00	0.	*	2	JAN	0115	54	0.27	0.02	0.25	955.
1	JAN	1300	5	0.04	0.04	0.00	0.	*	2	JAN	0130	55	0.24	0.02	0.23	784.
1	JAN	1315	6	0.04	0.04	0.00	0.	*	2	JAN	0145	56	0.20	0.01	0.18	676.
1	JAN	1330	7	0.05	0.05	0.00	0.	*	2	JAN	0200	57	0.18	0.01	0.17	589.
1	JAN	1345	8	0.05	0.05	0.00	0.	*	2	JAN	0215	58	0.17	0.01	0.16	518.
1	JAN	1400	9	0.05	0.05	0.00	0.	*	2	JAN	0230	59	0.16	0.01	0.15	464.
1	JAN	1415	10	0.05	0.05	0.00	0.	*	2	JAN	0245	60	0.15	0.01	0.14	426.
1	JAN	1430	11	0.05	0.05	0.00	0.	*	2	JAN	0300	61	0.15	0.01	0.14	395.
1	JAN	1445	12	0.05	0.05	0.00	0.	*	2	JAN	0315	62	0.13	0.01	0.12	367.
1	JAN	1500	13	0.05	0.05	0.00	0.	*	2	JAN	0330	63	0.12	0.01	0.11	340.
1	JAN	1515	14	0.05	0.05	0.00	0.	*	2	JAN	0345	64	0.12	0.01	0.11	316.
1	JAN	1530	15	0.05	0.05	0.00	1.	*	2	JAN	0400	65	0.11	0.01	0.11	297.
1	JAN	1545	16	0.05	0.05	0.00	3.	*	2	JAN	0415	66	0.11	0.01	0.10	282.
1	JAN	1600	17	0.05	0.05	0.01	6.	*	2	JAN	0430	67	0.10	0.01	0.10	270.
1	JAN	1615	18	0.06	0.05	0.01	10.	*	2	JAN	0445	68	0.10	0.01	0.10	259.
1	JAN	1630	19	0.06	0.05	0.01	14.	*	2	JAN	0500	69	0.10	0.00	0.09	250.
1	JAN	1645	20	0.06	0.05	0.01	18.	*	2	JAN	0515	70	0.10	0.00	0.09	242.
1	JAN	1700	21	0.06	0.05	0.01	23.	*	2	JAN	0530	71	0.09	0.00	0.09	235.
1	JAN	1715	22	0.06	0.04	0.02	28.	*	2	JAN	0545	72	0.09	0.00	0.09	228.
1	JAN	1730	23	0.06	0.04	0.02	32.	*	2	JAN	0600	73	0.09	0.00	0.08	222.
1	JAN	1745	24	0.06	0.04	0.02	37.	*	2	JAN	0615	74	0.07	0.00	0.06	212.
1	JAN	1800	25	0.07	0.04	0.02	42.	*	2	JAN	0630	75	0.06	0.00	0.06	195.
1	JAN	1815	26	0.09	0.06	0.03	49.	*	2	JAN	0645	76	0.06	0.00	0.06	177.
1	JAN	1830	27	0.09	0.05	0.04	60.	*	2	JAN	0700	77	0.06	0.00	0.06	163.
1	JAN	1845	28	0.09	0.05	0.04	72.	*	2	JAN	0715	78	0.06	0.00	0.06	155.

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        1 JAN 1900   29    0.09    0.05    0.04        83.     *     2 JAN 0730   79    0.06    0.00    0.06      149.
        1 JAN 1915   30    0.10    0.05    0.05        93.     *     2 JAN 0745   80    0.06    0.00    0.05      144.
        1 JAN 1930   31    0.10    0.05    0.05       102.     *     2 JAN 0800   81    0.06    0.00    0.05      140.
        1 JAN 1945   32    0.10    0.05    0.05       112.     *     2 JAN 0815   82    0.05    0.00    0.05      137.
        1 JAN 2000   33    0.11    0.05    0.06       122.     *     2 JAN 0830   83    0.05    0.00    0.05      134.
        1 JAN 2015   34    0.11    0.05    0.06       132.     *     2 JAN 0845   84    0.05    0.00    0.05      131.
        1 JAN 2030   35    0.11    0.05    0.07       143.     *     2 JAN 0900   85    0.05    0.00    0.05      128.
        1 JAN 2045   36    0.12    0.05    0.07       154.     *     2 JAN 0915   86    0.05    0.00    0.05      126.
        1 JAN 2100   37    0.12    0.05    0.08       165.     *     2 JAN 0930   87    0.05    0.00    0.05      123.
        1 JAN 2115   38    0.14    0.05    0.09       180.     *     2 JAN 0945   88    0.05    0.00    0.05      121.
        1 JAN 2130   39    0.15    0.05    0.10       199.     *     2 JAN 1000   89    0.05    0.00    0.05      119.
        1 JAN 2145   40    0.16    0.05    0.11       221.     *     2 JAN 1015   90    0.05    0.00    0.05      117.
        1 JAN 2200   41    0.17    0.05    0.12       242.     *     2 JAN 1030   91    0.05    0.00    0.04      115.
        1 JAN 2215   42    0.18    0.05    0.13       264.     *     2 JAN 1045   92    0.05    0.00    0.04      113.
        1 JAN 2230   43    0.19    0.05    0.14       288.     *     2 JAN 1100   93    0.05    0.00    0.04      111.
        1 JAN 2245   44    0.23    0.05    0.18       320.     *     2 JAN 1115   94    0.04    0.00    0.04      109.
        1 JAN 2300   45    0.25    0.05    0.20       366.     *     2 JAN 1130   95    0.04    0.00    0.04      108.
        1 JAN 2315   46    0.22    0.04    0.17       409.     *     2 JAN 1145   96    0.04    0.00    0.04      106.
        1 JAN 2330   47    0.26    0.05    0.21       436.     *     2 JAN 1200   97    0.04    0.00    0.04      105.
        1 JAN 2345   48    0.32    0.05    0.26       473.     *     2 JAN 1215   98    0.00    0.00    0.00       95.
        2 JAN 0000   49    0.67    0.10    0.57       596.     *     2 JAN 1230   99    0.00    0.00    0.00       67.
        2 JAN 0015   50    1.61    0.18    1.43      1028.     *     2 JAN 1245  100    0.00    0.00    0.00       39.
                                                               *
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    TOTAL RAINFALL =    11.98, TOTAL LOSS =    2.83, TOTAL EXCESS =    9.16

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
    (CFS)        (HR)                  6-HR          24-HR        72-HR        24.75-HR
     1627.      12.75      (CFS)       618.           235.         228.          228.
                        (INCHES)      6.000          9.134        9.134         9.134
                         (AC-FT)       306.           466.         466.          466.

                       CUMULATIVE AREA =     0.96 SQ MI


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             *            *
   19 KK     *   BASIN3   *
             *            *
             **************
                                      BASIN NO. 3

                SUBBASIN RUNOFF DATA

   21 BA          SUBBASIN CHARACTERISTICS
                       TAREA          0.69  SUBBASIN AREA

                  PRECIPITATION DATA

   22 PH                                   DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......    ............... TP-40 ...............    ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN     2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                   0.86    1.75    3.25     4.40    5.40    7.50   10.20   13.00    0.00    0.00    0.00    0.00

                                                   STORM AREA =     0.69

   23 LS          SCS LOSS RATE
                       STRTL          0.50  INITIAL ABSTRACTION
                      CRVNBR         80.00  CURVE NUMBER
                       RTIMP          0.00  PERCENT IMPERVIOUS AREA

   24 UD          SCS DIMENSIONLESS UNITGRAPH
                        TLAG          0.30  LAG

                                                            ***

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

                                                      UNIT HYDROGRAPH
                                                  8 END-OF-PERIOD ORDINATES
               504.       746.       328.       127.        49.        19.         8.         2.
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HYDROGRAPH AT STATION BASIN3

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1	JAN	1200	1	0.00	0.00	0.00	0.	2	JAN	0030	51	0.42	0.03	0.40	1662.
1	JAN	1215	2	0.05	0.05	0.00	0.	2	JAN	0045	52	0.33	0.02	0.31	1081.
1	JAN	1230	3	0.05	0.05	0.00	0.	2	JAN	0100	53	0.27	0.02	0.26	735.
1	JAN	1245	4	0.05	0.05	0.00	0.	2	JAN	0115	54	0.27	0.01	0.26	565.
1	JAN	1300	5	0.05	0.05	0.00	0.	2	JAN	0130	55	0.24	0.01	0.23	485.
1	JAN	1315	6	0.05	0.05	0.00	0.	2	JAN	0145	56	0.21	0.01	0.20	424.
1	JAN	1330	7	0.05	0.05	0.00	0.	2	JAN	0200	57	0.19	0.01	0.18	374.
1	JAN	1345	8	0.05	0.05	0.00	0.	2	JAN	0215	58	0.18	0.01	0.17	339.
1	JAN	1400	9	0.05	0.05	0.00	0.	2	JAN	0230	59	0.17	0.01	0.16	314.
1	JAN	1415	10	0.05	0.05	0.00	0.	2	JAN	0245	60	0.16	0.01	0.15	295.
1	JAN	1430	11	0.05	0.05	0.00	0.	2	JAN	0300	61	0.15	0.01	0.15	279.
1	JAN	1445	12	0.06	0.05	0.00	1.	2	JAN	0315	62	0.14	0.01	0.13	261.
1	JAN	1500	13	0.06	0.05	0.00	3.	2	JAN	0330	63	0.13	0.01	0.13	242.
1	JAN	1515	14	0.06	0.05	0.01	7.	2	JAN	0345	64	0.13	0.00	0.12	229.
1	JAN	1530	15	0.06	0.05	0.01	11.	2	JAN	0400	65	0.12	0.00	0.12	219.
1	JAN	1545	16	0.06	0.05	0.01	15.	2	JAN	0415	66	0.12	0.00	0.11	210.
1	JAN	1600	17	0.06	0.05	0.01	19.	2	JAN	0430	67	0.11	0.00	0.11	203.
1	JAN	1615	18	0.06	0.05	0.02	23.	2	JAN	0445	68	0.11	0.00	0.11	196.
1	JAN	1630	19	0.06	0.05	0.02	27.	2	JAN	0500	69	0.11	0.00	0.10	190.
1	JAN	1645	20	0.06	0.04	0.02	31.	2	JAN	0515	70	0.10	0.00	0.10	185.
1	JAN	1700	21	0.07	0.04	0.02	35.	2	JAN	0530	71	0.10	0.00	0.10	179.
1	JAN	1715	22	0.07	0.04	0.02	39.	2	JAN	0545	72	0.10	0.00	0.09	175.
1	JAN	1730	23	0.07	0.04	0.03	44.	2	JAN	0600	73	0.10	0.00	0.09	170.
1	JAN	1745	24	0.07	0.04	0.03	48.	2	JAN	0615	74	0.07	0.00	0.07	157.
1	JAN	1800	25	0.07	0.04	0.03	53.	2	JAN	0630	75	0.07	0.00	0.07	138.
1	JAN	1815	26	0.09	0.05	0.04	62.	2	JAN	0645	76	0.07	0.00	0.07	129.
1	JAN	1830	27	0.10	0.05	0.05	74.	2	JAN	0700	77	0.07	0.00	0.07	123.
1	JAN	1845	28	0.10	0.05	0.05	84.	2	JAN	0715	78	0.07	0.00	0.06	119.
1	JAN	1900	29	0.10	0.05	0.06	92.	2	JAN	0730	79	0.07	0.00	0.06	116.
1	JAN	1915	30	0.11	0.04	0.06	99.	2	JAN	0745	80	0.06	0.00	0.06	114.
1	JAN	1930	31	0.11	0.04	0.06	107.	2	JAN	0800	81	0.06	0.00	0.06	111.
1	JAN	1945	32	0.11	0.04	0.07	114.	2	JAN	0815	82	0.06	0.00	0.06	109.
1	JAN	2000	33	0.12	0.04	0.07	122.	2	JAN	0830	83	0.06	0.00	0.06	107.
1	JAN	2015	34	0.12	0.04	0.08	130.	2	JAN	0845	84	0.06	0.00	0.06	104.
1	JAN	2030	35	0.12	0.04	0.08	139.	2	JAN	0900	85	0.06	0.00	0.06	102.
1	JAN	2045	36	0.13	0.04	0.09	148.	2	JAN	0915	86	0.06	0.00	0.06	101.
1	JAN	2100	37	0.13	0.04	0.10	158.	2	JAN	0930	87	0.06	0.00	0.05	99.
1	JAN	2115	38	0.15	0.04	0.11	172.	2	JAN	0945	88	0.05	0.00	0.05	97.
1	JAN	2130	39	0.16	0.04	0.12	190.	2	JAN	1000	89	0.05	0.00	0.05	95.
1	JAN	2145	40	0.17	0.04	0.13	205.	2	JAN	1015	90	0.05	0.00	0.05	94.
1	JAN	2200	41	0.17	0.04	0.14	222.	2	JAN	1030	91	0.05	0.00	0.05	92.
1	JAN	2215	42	0.19	0.04	0.15	240.	2	JAN	1045	92	0.05	0.00	0.05	91.
1	JAN	2230	43	0.20	0.04	0.16	261.	2	JAN	1100	93	0.05	0.00	0.05	90.
1	JAN	2245	44	0.23	0.04	0.19	291.	2	JAN	1115	94	0.05	0.00	0.05	88.
1	JAN	2300	45	0.26	0.04	0.21	331.	2	JAN	1130	95	0.05	0.00	0.05	87.
1	JAN	2315	46	0.25	0.04	0.21	359.	2	JAN	1145	96	0.05	0.00	0.05	86.
1	JAN	2330	47	0.30	0.04	0.26	392.	2	JAN	1200	97	0.05	0.00	0.05	84.
1	JAN	2345	48	0.34	0.04	0.30	451.	2	JAN	1215	98	0.00	0.00	0.00	60.
2	JAN	0000	49	0.73	0.08	0.65	677.	2	JAN	1230	99	0.00	0.00	0.00	25.
2	JAN	0015	50	1.74	0.14	1.60	1437.	2	JAN	1245	100	0.00	0.00	0.00	10.

TOTAL RAINFALL = 12.99, TOTAL LOSS = 2.58, TOTAL EXCESS = 10.40

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.75-HR
1662.	12.50	(CFS)	498.	193.	187.	187.
		(INCHES)	6.697	10.399	10.399	10.399
		(AC-FT)	247.	383.	383.	383.

CUMULATIVE AREA = 0.69 SQ MI

*** ***

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          **************
          *            *
25 KK     *   BASIN4   *
          *            *
          **************
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BASIN NO. 4

SUBBASIN RUNOFF DATA

27 BA SUBBASIN CHARACTERISTICS

TAREA 1.75 SUBBASIN AREA

PRECIPITATION DATA

28 PH DEPTHS FOR 0-PERCENT HYPOTHETICAL STORM

..... HYDRO-35			.... TP-40					.... TP-49			
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
0.86	1.75	3.25	4.40	5.40	7.50	10.20	13.00	0.00	0.00	0.00	0.00

STORM AREA = 1.75

29 LS SCS LOSS RATE

STRTL 0.38 INITIAL ABSTRACTION

CRVNBR 84.00 CURVE NUMBER

RTIMP 0.00 PERCENT IMPERVIOUS AREA

30 UD SCS DIMENSIONLESS UNITGRAPH

TLAG 0.41 LAG

***

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

UNIT HYDROGRAPH

10 END-OF-PERIOD ORDINATES

651.	1569.	1243.	564.	271.	126.	59.	28.	14.	6.

****

HYDROGRAPH AT STATION BASIN4

****

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1	JAN	1200	1	0.00	0.00	0.00	0.	*	2	JAN	0030	51	0.42	0.02	0.41	3965.
1	JAN	1215	2	0.05	0.05	0.00	0.	*	2	JAN	0045	52	0.33	0.01	0.32	3398.
1	JAN	1230	3	0.05	0.05	0.00	0.	*	2	JAN	0100	53	0.27	0.01	0.26	2345.
1	JAN	1245	4	0.05	0.05	0.00	0.	*	2	JAN	0115	54	0.27	0.01	0.26	1762.
1	JAN	1300	5	0.05	0.05	0.00	0.	*	2	JAN	0130	55	0.24	0.01	0.23	1434.
1	JAN	1315	6	0.05	0.05	0.00	0.	*	2	JAN	0145	56	0.21	0.01	0.20	1229.
1	JAN	1330	7	0.05	0.05	0.00	0.	*	2	JAN	0200	57	0.19	0.01	0.19	1069.
1	JAN	1345	8	0.05	0.05	0.00	0.	*	2	JAN	0215	58	0.18	0.01	0.17	951.
1	JAN	1400	9	0.05	0.05	0.00	0.	*	2	JAN	0230	59	0.17	0.00	0.16	864.
1	JAN	1415	10	0.05	0.05	0.00	2.	*	2	JAN	0245	60	0.16	0.00	0.16	797.
1	JAN	1430	11	0.05	0.05	0.01	8.	*	2	JAN	0300	61	0.15	0.00	0.15	749.
1	JAN	1445	12	0.06	0.05	0.01	17.	*	2	JAN	0315	62	0.14	0.00	0.13	703.
1	JAN	1500	13	0.06	0.05	0.01	28.	*	2	JAN	0330	63	0.13	0.00	0.13	654.
1	JAN	1515	14	0.06	0.04	0.01	39.	*	2	JAN	0345	64	0.13	0.00	0.12	613.
1	JAN	1530	15	0.06	0.04	0.02	51.	*	2	JAN	0400	65	0.12	0.00	0.12	582.
1	JAN	1545	16	0.06	0.04	0.02	62.	*	2	JAN	0415	66	0.12	0.00	0.11	557.
1	JAN	1600	17	0.06	0.04	0.02	74.	*	2	JAN	0430	67	0.11	0.00	0.11	536.
1	JAN	1615	18	0.06	0.04	0.02	85.	*	2	JAN	0445	68	0.11	0.00	0.11	517.
1	JAN	1630	19	0.06	0.04	0.03	97.	*	2	JAN	0500	69	0.11	0.00	0.10	500.
1	JAN	1645	20	0.06	0.04	0.03	108.	*	2	JAN	0515	70	0.10	0.00	0.10	484.
1	JAN	1700	21	0.07	0.04	0.03	119.	*	2	JAN	0530	71	0.10	0.00	0.10	471.
1	JAN	1715	22	0.07	0.03	0.03	130.	*	2	JAN	0545	72	0.10	0.00	0.10	458.
1	JAN	1730	23	0.07	0.03	0.04	142.	*	2	JAN	0600	73	0.10	0.00	0.09	446.
1	JAN	1745	24	0.07	0.03	0.04	153.	*	2	JAN	0615	74	0.07	0.00	0.07	422.
1	JAN	1800	25	0.07	0.03	0.04	165.	*	2	JAN	0630	75	0.07	0.00	0.07	381.
1	JAN	1815	26	0.09	0.04	0.06	184.	*	2	JAN	0645	76	0.07	0.00	0.07	348.
1	JAN	1830	27	0.10	0.04	0.06	216.	*	2	JAN	0700	77	0.07	0.00	0.07	328.
1	JAN	1845	28	0.10	0.04	0.06	245.	*	2	JAN	0715	78	0.07	0.00	0.07	315.
1	JAN	1900	29	0.10	0.03	0.07	268.	*	2	JAN	0730	79	0.07	0.00	0.06	305.
1	JAN	1915	30	0.11	0.03	0.07	289.	*	2	JAN	0745	80	0.06	0.00	0.06	297.
1	JAN	1930	31	0.11	0.03	0.08	308.	*	2	JAN	0800	81	0.06	0.00	0.06	290.
1	JAN	1945	32	0.11	0.03	0.08	327.	*	2	JAN	0815	82	0.06	0.00	0.06	284.
1	JAN	2000	33	0.12	0.03	0.08	347.	*	2	JAN	0830	83	0.06	0.00	0.06	278.
1	JAN	2015	34	0.12	0.03	0.09	367.	*	2	JAN	0845	84	0.06	0.00	0.06	272.
1	JAN	2030	35	0.12	0.03	0.09	388.	*	2	JAN	0900	85	0.06	0.00	0.06	267.
1	JAN	2045	36	0.13	0.03	0.10	411.	*	2	JAN	0915	86	0.06	0.00	0.06	262.
1	JAN	2100	37	0.13	0.03	0.11	435.	*	2	JAN	0930	87	0.06	0.00	0.05	257.
1	JAN	2115	38	0.15	0.03	0.12	466.	*	2	JAN	0945	88	0.05	0.00	0.05	252.
1	JAN	2130	39	0.16	0.03	0.13	507.	*	2	JAN	1000	89	0.05	0.00	0.05	248.
1	JAN	2145	40	0.17	0.03	0.14	549.	*	2	JAN	1015	90	0.05	0.00	0.05	244.

1	JAN	2200	41	0.17	0.03	0.15	590.	*	2	JAN	1030	91	0.05	0.00	0.05	240.
1	JAN	2215	42	0.19	0.03	0.16	634.	*	2	JAN	1045	92	0.05	0.00	0.05	236.
1	JAN	2230	43	0.20	0.03	0.17	684.	*	2	JAN	1100	93	0.05	0.00	0.05	232.
1	JAN	2245	44	0.23	0.03	0.20	750.	*	2	JAN	1115	94	0.05	0.00	0.05	229.
1	JAN	2300	45	0.25	0.03	0.23	841.	*	2	JAN	1130	95	0.05	0.00	0.05	225.
1	JAN	2315	46	0.25	0.03	0.22	926.	*	2	JAN	1145	96	0.05	0.00	0.05	222.
1	JAN	2330	47	0.30	0.03	0.27	1003.	*	2	JAN	1200	97	0.05	0.00	0.05	219.
1	JAN	2345	48	0.34	0.03	0.31	1124.	*	2	JAN	1215	98	0.00	0.00	0.00	186.
2	JAN	0000	49	0.73	0.05	0.67	1495.	*	2	JAN	1230	99	0.00	0.00	0.00	110.
2	JAN	0015	50	1.73	0.09	1.64	2770.	*	2	JAN	1245	100	0.00	0.00	0.00	51.

****

TOTAL RAINFALL = 12.97, TOTAL LOSS = 2.04, TOTAL EXCESS = 10.93

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
(CFS)	(HR)		6-HR	24-HR	72-HR	24.75-HR
3965.	12.50	(CFS)	1306.	515.	500.	500.
		(INCHES)	6.920	10.919	10.919	10.919
		(AC-FT)	648.	1022.	1022.	1022.

CUMULATIVE AREA = 1.75 SQ MI

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          ***************
          *             *
 31 KK    *    BASIN5   *
          *             *
          ***************
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BASIN NO. 5

SUBBASIN RUNOFF DATA

33 BA SUBBASIN CHARACTERISTICS
TAREA 0.78 SUBBASIN AREA

PRECIPITATION DATA

34 PH DEPTHS FOR 0-PERCENT HYPOTHETICAL STORM

..... HYDRO-35			.... TP-40					.... TP-49			
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
0.86	1.75	3.25	4.40	5.40	7.50	10.20	13.00	0.00	0.00	0.00	0.00

STORM AREA = 0.78

35 LS SCS LOSS RATE
STRTL 0.94 INITIAL ABSTRACTION
CRVNBR 68.00 CURVE NUMBER
RTIMP 0.00 PERCENT IMPERVIOUS AREA

36 UD SCS DIMENSIONLESS UNITGRAPH
TLAG 0.32 LAG

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

UNIT HYDROGRAPH
8 END-OF-PERIOD ORDINATES

492. 836. 417. 169. 68. 27. 11. 5.

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HYDROGRAPH AT STATION BASIN5

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DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1	JAN	1200	1	0.00	0.00	0.00	0.	*	2	JAN	0030	51	0.42	0.07	0.35	1622.
1	JAN	1215	2	0.05	0.05	0.00	0.	*	2	JAN	0045	52	0.33	0.05	0.28	1128.
1	JAN	1230	3	0.05	0.05	0.00	0.	*	2	JAN	0100	53	0.27	0.04	0.23	777.
1	JAN	1245	4	0.05	0.05	0.00	0.	*	2	JAN	0115	54	0.27	0.04	0.23	596.
1	JAN	1300	5	0.05	0.05	0.00	0.	*	2	JAN	0130	55	0.24	0.03	0.21	510.
1	JAN	1315	6	0.05	0.05	0.00	0.	*	2	JAN	0145	56	0.21	0.03	0.18	447.

1 JAN 1330	7	0.05	0.05	0.00	0.	*	2 JAN 0200	57	0.19	0.02	0.17	395.
1 JAN 1345	8	0.05	0.05	0.00	0.	*	2 JAN 0215	58	0.18	0.02	0.16	356.
1 JAN 1400	9	0.05	0.05	0.00	0.	*	2 JAN 0230	59	0.17	0.02	0.15	331.
1 JAN 1415	10	0.05	0.05	0.00	0.	*	2 JAN 0245	60	0.16	0.02	0.14	311.
1 JAN 1430	11	0.05	0.05	0.00	0.	*	2 JAN 0300	61	0.15	0.02	0.14	294.
1 JAN 1445	12	0.06	0.06	0.00	0.	*	2 JAN 0315	62	0.14	0.02	0.12	276.
1 JAN 1500	13	0.06	0.06	0.00	0.	*	2 JAN 0330	63	0.13	0.01	0.12	257.
1 JAN 1515	14	0.06	0.06	0.00	0.	*	2 JAN 0345	64	0.13	0.01	0.11	243.
1 JAN 1530	15	0.06	0.06	0.00	0.	*	2 JAN 0400	65	0.12	0.01	0.11	232.
1 JAN 1545	16	0.06	0.06	0.00	0.	*	2 JAN 0415	66	0.12	0.01	0.10	223.
1 JAN 1600	17	0.06	0.06	0.00	0.	*	2 JAN 0430	67	0.11	0.01	0.10	215.
1 JAN 1615	18	0.06	0.06	0.00	0.	*	2 JAN 0445	68	0.11	0.01	0.10	208.
1 JAN 1630	19	0.06	0.06	0.00	0.	*	2 JAN 0500	69	0.11	0.01	0.10	202.
1 JAN 1645	20	0.06	0.06	0.00	1.	*	2 JAN 0515	70	0.10	0.01	0.09	196.
1 JAN 1700	21	0.07	0.06	0.00	4.	*	2 JAN 0530	71	0.10	0.01	0.09	191.
1 JAN 1715	22	0.07	0.06	0.01	7.	*	2 JAN 0545	72	0.10	0.01	0.09	186.
1 JAN 1730	23	0.07	0.06	0.01	10.	*	2 JAN 0600	73	0.10	0.01	0.09	182.
1 JAN 1745	24	0.07	0.06	0.01	14.	*	2 JAN 0615	74	0.07	0.01	0.07	169.
1 JAN 1800	25	0.07	0.06	0.01	18.	*	2 JAN 0630	75	0.07	0.01	0.07	150.
1 JAN 1815	26	0.09	0.08	0.02	24.	*	2 JAN 0645	76	0.07	0.01	0.06	139.
1 JAN 1830	27	0.10	0.08	0.02	32.	*	2 JAN 0700	77	0.07	0.01	0.06	132.
1 JAN 1845	28	0.10	0.08	0.02	39.	*	2 JAN 0715	78	0.07	0.01	0.06	128.
1 JAN 1900	29	0.10	0.07	0.03	46.	*	2 JAN 0730	79	0.07	0.01	0.06	125.
1 JAN 1915	30	0.11	0.07	0.03	53.	*	2 JAN 0745	80	0.06	0.01	0.06	122.
1 JAN 1930	31	0.11	0.07	0.03	61.	*	2 JAN 0800	81	0.06	0.01	0.06	119.
1 JAN 1945	32	0.11	0.07	0.04	68.	*	2 JAN 0815	82	0.06	0.01	0.06	117.
1 JAN 2000	33	0.12	0.07	0.04	76.	*	2 JAN 0830	83	0.06	0.01	0.05	114.
1 JAN 2015	34	0.12	0.07	0.05	84.	*	2 JAN 0845	84	0.06	0.01	0.05	112.
1 JAN 2030	35	0.12	0.07	0.05	93.	*	2 JAN 0900	85	0.06	0.00	0.05	110.
1 JAN 2045	36	0.13	0.07	0.06	102.	*	2 JAN 0915	86	0.06	0.00	0.05	108.
1 JAN 2100	37	0.13	0.07	0.06	112.	*	2 JAN 0930	87	0.06	0.00	0.05	106.
1 JAN 2115	38	0.15	0.08	0.07	125.	*	2 JAN 0945	88	0.05	0.00	0.05	104.
1 JAN 2130	39	0.16	0.08	0.08	141.	*	2 JAN 1000	89	0.05	0.00	0.05	103.
1 JAN 2145	40	0.17	0.08	0.09	157.	*	2 JAN 1015	90	0.05	0.00	0.05	101.
1 JAN 2200	41	0.17	0.08	0.10	174.	*	2 JAN 1030	91	0.05	0.00	0.05	99.
1 JAN 2215	42	0.19	0.08	0.11	192.	*	2 JAN 1045	92	0.05	0.00	0.05	98.
1 JAN 2230	43	0.20	0.08	0.12	213.	*	2 JAN 1100	93	0.05	0.00	0.05	96.
1 JAN 2245	44	0.23	0.09	0.14	242.	*	2 JAN 1115	94	0.05	0.00	0.05	95.
1 JAN 2300	45	0.26	0.09	0.16	280.	*	2 JAN 1130	95	0.05	0.00	0.05	94.
1 JAN 2315	46	0.25	0.08	0.17	311.	*	2 JAN 1145	96	0.05	0.00	0.04	92.
1 JAN 2330	47	0.30	0.09	0.20	345.	*	2 JAN 1200	97	0.05	0.00	0.04	91.
1 JAN 2345	48	0.34	0.10	0.24	402.	*	2 JAN 1215	98	0.00	0.00	0.00	68.
2 JAN 0000	49	0.73	0.19	0.54	600.	*	2 JAN 1230	99	0.00	0.00	0.00	31.
2 JAN 0015	50	1.74	0.35	1.39	1290.	*	2 JAN 1245	100	0.00	0.00	0.00	12.
						*						

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TOTAL RAINFALL = 12.99, TOTAL LOSS = 4.33, TOTAL EXCESS = 8.66

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.75-HR
1622.	12.50	(CFS)	487.	182.	177.	177.
		(INCHES)	5.771	8.654	8.654	8.654
		(AC-FT)	241.	362.	362.	362.

CUMULATIVE AREA = 0.78 SQ MI

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

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	BASIN1	246.	12.50	74.	28.	27.	0.12		
HYDROGRAPH AT	BASIN2	1627.	12.75	618.	235.	228.	0.96		
HYDROGRAPH AT	BASIN3	1662.	12.50	498.	193.	187.	0.69		
HYDROGRAPH AT	BASIN4	3965.	12.50	1306.	515.	500.	1.75		
HYDROGRAPH AT	BASIN5	1622.	12.50	487.	182.	177.	0.78		

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

APPENDIX C-3
HYDROLOGIC INVESTIGATION AND ANALYSIS
EXISTING CONDITIONS
HEC-1 RUNOFF COMPUTATIONS
100-YEAR 24-HOUR STORM EVENT

HEC1 S/N: 1906360105 HMVersion: 6.31 Data File: KAELE100.hc1

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*****************************************                       ****************************************
*                                       *                       *                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                       *   U.S. ARMY CORPS OF ENGINEERS       *
*              MAY    1991              *                       *   HYDROLOGIC ENGINEERING CENTER      *
*           VERSION 4.0.1E              *                       *        609 SECOND STREET             *
*                                       *                       *     DAVIS, CALIFORNIA 95616          *
*  RUN DATE  04/21/1993  TIME  11:07:55 *                       *        (916) 756-1104                *
*                                       *                       *                                      *
*****************************************                       ****************************************
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X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX         XXX
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:::::::::::::::::::::::::::::::::::::::::::
:::                                     :::
:::  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

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

  1           ID      KAELEPULU STREAM DRAINAGE STUDY
  2           ID      KAOPA DETENTION BASIN INFLOW HYDROGRAPH
  3           ID      100-YEAR 24-HOUR RUNOFF COMPUTATIONS
              *DIAGRAM
  4           IT      15  1JAN88    1200      100
  5           IO       1
  6           IN      60  1JAN88     100

  7           KK  BASIN1
  8           KM             BASIN NO. 1
  9           BA  .11614
 10           PH            .11614    0.86     1.75     3.25     4.20     5.30     7.50    10.20    13.00
 11           LS                77
 12           UD     .264

 13           KK  BASIN2
 14           KM             BASIN NO. 2
 15           BA  .95720
 16           PH          0.95720    0.86     1.75     3.25     4.20     5.30     7.50    10.20    13.00
 17           LS                78
 18           UD     .522

 19           KK  BASIN3
 20           KM             BASIN NO. 3
 21           BA  .69084
 22           PH            .69084    0.92     1.89     3.50     4.75     5.75     8.00    10.80    14.00
 23           LS                80
 24           UD   0.300

 25           KK  BASIN4
 26           KM             BASIN NO. 4
 27           BA  1.7548
 28           PH            1.7548    0.92     1.89     3.50     4.75     5.75     8.00    10.80    14.00
 29           LS                84
 30           UD     .414

 31           KK  BASIN5
 32           KM             BASIN NO. 5
 33           BA  .78416
 34           PH         .7841648    0.92     1.89     3.50     4.75     5.75     8.00    10.80    14.00
 35           LS                68
 36           UD     .324
 37           ZZ
```

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

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

    7     BASIN1
                .
                .
   13           .     BASIN2
                .          .
                .          .
   19           .          .     BASIN3
                .          .          .
                .          .          .
   25           .          .          .     BASIN4
                .          .          .          .
                .          .          .          .
   31           .          .          .          .     BASIN5

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

```
HEC1 S/N: 1906360105        HMVersion: 6.31    Data File: KAELE100.hc1

 *****************************************                         *****************************************
 *                                       *                         *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                         *   U.S. ARMY CORPS OF ENGINEERS        *
 *              MAY   1991               *                         *   HYDROLOGIC ENGINEERING CENTER       *
 *            VERSION 4.0.1E             *                         *        609 SECOND STREET              *
 *                                       *                         *     DAVIS, CALIFORNIA 95616           *
 *  RUN DATE  00/02/ 56  TIME  00:07:05  *                         *         (916) 756-1104                *
 *                                       *                         *                                       *
 *****************************************                         *****************************************




                              KAELEPULU STREAM DRAINAGE STUDY
                              KAOPA DETENTION BASIN INFLOW HYDROGRAPH
                              100-YEAR 24-HOUR RUNOFF COMPUTATIONS

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

     IT         HYDROGRAPH TIME DATA
                       NMIN          15  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1JAN88  STARTING DATE
                      ITIME        1200  STARTING TIME
                         NQ         100  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      2JAN88  ENDING DATE
                     NDTIME        1245  ENDING TIME
                      ICENT          19  CENTURY MARK

                 COMPUTATION INTERVAL    0.25 HOURS
                      TOTAL TIME BASE   24.75 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


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


           **************
           *            *
   7 KK    *   BASIN1   *
           *            *
           **************
                                   BASIN NO. 1

              SUBBASIN RUNOFF DATA

   9 BA         SUBBASIN CHARACTERISTICS
                      TAREA        0.12  SUBBASIN AREA

                PRECIPITATION DATA

  10 PH                                 DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                 0.86    1.75    3.25    4.20    5.30    7.50   10.20   13.00    0.00    0.00    0.00    0.00

                                                        STORM AREA =     0.12

  11 LS         SCS LOSS RATE
                      STRTL        0.60  INITIAL ABSTRACTION
                     CRVNBR       77.00  CURVE NUMBER
                      RTIMP        0.00  PERCENT IMPERVIOUS AREA

  12 UD         SCS DIMENSIONLESS UNITGRAPH
                       TLAG        0.26  LAG
```

***

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

UNIT HYDROGRAPH
7 END-OF-PERIOD ORDINATES

105.	125.	45.	16.	6.	2.	1.

****

HYDROGRAPH AT STATION BASIN1

****

DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1 JAN 1200	1	0.00	0.00	0.00	0.
1 JAN 1215	2	0.05	0.05	0.00	0.
1 JAN 1230	3	0.05	0.05	0.00	0.
1 JAN 1245	4	0.05	0.05	0.00	0.
1 JAN 1300	5	0.05	0.05	0.00	0.
1 JAN 1315	6	0.05	0.05	0.00	0.
1 JAN 1330	7	0.05	0.05	0.00	0.
1 JAN 1345	8	0.05	0.05	0.00	0.
1 JAN 1400	9	0.05	0.05	0.00	0.
1 JAN 1415	10	0.05	0.05	0.00	0.
1 JAN 1430	11	0.05	0.05	0.00	0.
1 JAN 1445	12	0.06	0.06	0.00	0.
1 JAN 1500	13	0.06	0.06	0.00	0.
1 JAN 1515	14	0.06	0.06	0.00	0.
1 JAN 1530	15	0.06	0.05	0.00	1.
1 JAN 1545	16	0.06	0.05	0.01	1.
1 JAN 1600	17	0.06	0.05	0.01	2.
1 JAN 1615	18	0.06	0.05	0.01	2.
1 JAN 1630	19	0.06	0.05	0.01	3.
1 JAN 1645	20	0.06	0.05	0.01	4.
1 JAN 1700	21	0.07	0.05	0.02	4.
1 JAN 1715	22	0.07	0.05	0.02	5.
1 JAN 1730	23	0.07	0.05	0.02	6.
1 JAN 1745	24	0.07	0.05	0.02	7.
1 JAN 1800	25	0.07	0.05	0.03	7.
1 JAN 1815	26	0.09	0.06	0.04	9.
1 JAN 1830	27	0.10	0.06	0.04	11.
1 JAN 1845	28	0.10	0.05	0.04	12.
1 JAN 1900	29	0.10	0.05	0.05	13.
1 JAN 1915	30	0.11	0.05	0.05	15.
1 JAN 1930	31	0.11	0.05	0.06	16.
1 JAN 1945	32	0.11	0.05	0.06	17.
1 JAN 2000	33	0.12	0.05	0.07	18.
1 JAN 2015	34	0.12	0.05	0.07	20.
1 JAN 2030	35	0.12	0.05	0.08	21.
1 JAN 2045	36	0.13	0.05	0.08	23.
1 JAN 2100	37	0.13	0.05	0.09	24.
1 JAN 2115	38	0.16	0.05	0.11	27.
1 JAN 2130	39	0.17	0.05	0.11	31.
1 JAN 2145	40	0.17	0.05	0.12	34.
1 JAN 2200	41	0.18	0.05	0.13	37.
1 JAN 2215	42	0.19	0.05	0.14	40.
1 JAN 2230	43	0.21	0.05	0.16	44.
1 JAN 2245	44	0.26	0.06	0.20	51.
1 JAN 2300	45	0.28	0.06	0.22	59.
1 JAN 2315	46	0.20	0.04	0.16	58.
1 JAN 2330	47	0.25	0.04	0.20	56.
1 JAN 2345	48	0.34	0.06	0.29	68.
2 JAN 0000	49	0.73	0.11	0.63	115.
2 JAN 0015	50	1.75	0.19	1.56	260.
2 JAN 0030	51	0.42	0.04	0.39	270.
2 JAN 0045	52	0.28	0.02	0.26	159.
2 JAN 0100	53	0.22	0.02	0.20	101.
2 JAN 0115	54	0.29	0.02	0.27	82.
2 JAN 0130	55	0.27	0.02	0.25	79.
2 JAN 0145	56	0.22	0.01	0.20	71.
2 JAN 0200	57	0.20	0.01	0.19	63.
2 JAN 0215	58	0.19	0.01	0.18	57.
2 JAN 0230	59	0.18	0.01	0.17	54.
2 JAN 0245	60	0.17	0.01	0.16	51.
2 JAN 0300	61	0.16	0.01	0.15	48.
2 JAN 0315	62	0.14	0.01	0.13	44.
2 JAN 0330	63	0.13	0.01	0.12	40.
2 JAN 0345	64	0.13	0.01	0.12	38.
2 JAN 0400	65	0.12	0.01	0.11	36.
2 JAN 0415	66	0.12	0.01	0.11	35.
2 JAN 0430	67	0.11	0.01	0.11	33.
2 JAN 0445	68	0.11	0.01	0.10	32.
2 JAN 0500	69	0.11	0.01	0.10	31.
2 JAN 0515	70	0.10	0.00	0.10	30.
2 JAN 0530	71	0.10	0.00	0.10	30.
2 JAN 0545	72	0.10	0.00	0.09	29.
2 JAN 0600	73	0.10	0.00	0.09	28.
2 JAN 0615	74	0.07	0.00	0.07	25.
2 JAN 0630	75	0.07	0.00	0.07	23.
2 JAN 0645	76	0.07	0.00	0.07	21.
2 JAN 0700	77	0.07	0.00	0.07	20.
2 JAN 0715	78	0.07	0.00	0.06	20.
2 JAN 0730	79	0.07	0.00	0.06	19.
2 JAN 0745	80	0.06	0.00	0.06	19.
2 JAN 0800	81	0.06	0.00	0.06	18.
2 JAN 0815	82	0.06	0.00	0.06	18.
2 JAN 0830	83	0.06	0.00	0.06	18.
2 JAN 0845	84	0.06	0.00	0.06	17.
2 JAN 0900	85	0.06	0.00	0.06	17.
2 JAN 0915	86	0.06	0.00	0.05	17.
2 JAN 0930	87	0.06	0.00	0.05	16.
2 JAN 0945	88	0.05	0.00	0.05	16.
2 JAN 1000	89	0.05	0.00	0.05	16.
2 JAN 1015	90	0.05	0.00	0.05	16.
2 JAN 1030	91	0.05	0.00	0.05	15.
2 JAN 1045	92	0.05	0.00	0.05	15.
2 JAN 1100	93	0.05	0.00	0.05	15.
2 JAN 1115	94	0.05	0.00	0.05	15.
2 JAN 1130	95	0.05	0.00	0.05	14.
2 JAN 1145	96	0.05	0.00	0.05	14.
2 JAN 1200	97	0.05	0.00	0.05	14.
2 JAN 1215	98	0.00	0.00	0.00	9.
2 JAN 1230	99	0.00	0.00	0.00	3.
2 JAN 1245	100	0.00	0.00	0.00	1.

****

TOTAL RAINFALL = 13.00, TOTAL LOSS = 3.00, TOTAL EXCESS = 9.99

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.75-HR
270.	12.50	(CFS)	81.	31.	30.	30.
		(INCHES)	6.486	9.990	9.990	9.990
		(AC-FT)	40.	62.	62.	62.

CUMULATIVE AREA = 0.12 SQ MI

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

          ***************
          *             *
  13 KK   *   BASIN2    *
          *             *
          ***************
                              BASIN NO. 2

            SUBBASIN RUNOFF DATA

  15 BA      SUBBASIN CHARACTERISTICS
                  TAREA        0.96  SUBBASIN AREA

             PRECIPITATION DATA

  16 PH                          DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
             ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
            5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
             0.86    1.75    3.25    4.20    5.30    7.50   10.20   13.00    0.00    0.00    0.00    0.00

                                             STORM AREA =     0.96

  17 LS      SCS LOSS RATE
                  STRTL        0.56  INITIAL ABSTRACTION
                 CRVNBR       78.00  CURVE NUMBER
                  RTIMP        0.00  PERCENT IMPERVIOUS AREA

  18 UD      SCS DIMENSIONLESS UNITGRAPH
                   TLAG        0.52  LAG

                                                        ***

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

                                                  UNIT HYDROGRAPH
                                              12 END-OF-PERIOD ORDINATES
          210.       645.       684.       448.       225.       123.        65.        34.        19.        10.
            6.         3.

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

                                            HYDROGRAPH AT STATION    BASIN2

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DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1	JAN	1200	1	0.00	0.00	0.00	0.	*	2	JAN	0030	51	0.42	0.03	0.39	1749.
1	JAN	1215	2	0.05	0.05	0.00	0.	*	2	JAN	0045	52	0.28	0.02	0.26	1776.
1	JAN	1230	3	0.05	0.05	0.00	0.	*	2	JAN	0100	53	0.22	0.02	0.21	1383.
1	JAN	1245	4	0.05	0.05	0.00	0.	*	2	JAN	0115	54	0.29	0.02	0.27	1005.
1	JAN	1300	5	0.05	0.05	0.00	0.	*	2	JAN	0130	55	0.27	0.02	0.25	825.
1	JAN	1315	6	0.05	0.05	0.00	0.	*	2	JAN	0145	56	0.22	0.01	0.20	724.
1	JAN	1330	7	0.05	0.05	0.00	0.	*	2	JAN	0200	57	0.20	0.01	0.19	639.
1	JAN	1345	8	0.05	0.05	0.00	0.	*	2	JAN	0215	58	0.19	0.01	0.18	566.
1	JAN	1400	9	0.05	0.05	0.00	0.	*	2	JAN	0230	59	0.18	0.01	0.17	510.
1	JAN	1415	10	0.05	0.05	0.00	0.	*	2	JAN	0245	60	0.17	0.01	0.16	470.
1	JAN	1430	11	0.05	0.05	0.00	0.	*	2	JAN	0300	61	0.16	0.01	0.15	436.
1	JAN	1445	12	0.06	0.06	0.00	0.	*	2	JAN	0315	62	0.14	0.01	0.13	406.
1	JAN	1500	13	0.06	0.06	0.00	0.	*	2	JAN	0330	63	0.13	0.01	0.12	375.
1	JAN	1515	14	0.06	0.05	0.00	1.	*	2	JAN	0345	64	0.13	0.01	0.12	346.
1	JAN	1530	15	0.06	0.05	0.01	4.	*	2	JAN	0400	65	0.12	0.01	0.12	324.
1	JAN	1545	16	0.06	0.05	0.01	8.	*	2	JAN	0415	66	0.12	0.01	0.11	307.
1	JAN	1600	17	0.06	0.05	0.01	13.	*	2	JAN	0430	67	0.11	0.01	0.11	293.
1	JAN	1615	18	0.06	0.05	0.01	18.	*	2	JAN	0445	68	0.11	0.00	0.10	282.
1	JAN	1630	19	0.06	0.05	0.01	23.	*	2	JAN	0500	69	0.11	0.00	0.10	272.
1	JAN	1645	20	0.06	0.05	0.02	28.	*	2	JAN	0515	70	0.10	0.00	0.10	263.
1	JAN	1700	21	0.07	0.05	0.02	34.	*	2	JAN	0530	71	0.10	0.00	0.10	255.
1	JAN	1715	22	0.07	0.05	0.02	39.	*	2	JAN	0545	72	0.10	0.00	0.09	248.
1	JAN	1730	23	0.07	0.05	0.02	45.	*	2	JAN	0600	73	0.10	0.00	0.09	242.
1	JAN	1745	24	0.07	0.05	0.03	50.	*	2	JAN	0615	74	0.07	0.00	0.07	231.
1	JAN	1800	25	0.07	0.04	0.03	56.	*	2	JAN	0630	75	0.07	0.00	0.07	213.
1	JAN	1815	26	0.09	0.06	0.04	64.	*	2	JAN	0645	76	0.07	0.00	0.07	195.
1	JAN	1830	27	0.10	0.05	0.04	76.	*	2	JAN	0700	77	0.07	0.00	0.07	182.
1	JAN	1845	28	0.10	0.05	0.05	89.	*	2	JAN	0715	78	0.07	0.00	0.06	173.

1 JAN 1900	29	0.10	0.05	0.05	101.	*	2 JAN 0730	79	0.07	0.00	0.06	167.
1 JAN 1915	30	0.11	0.05	0.06	112.	*	2 JAN 0745	80	0.06	0.00	0.06	162.
1 JAN 1930	31	0.11	0.05	0.06	123.	*	2 JAN 0800	81	0.06	0.00	0.06	158.
1 JAN 1945	32	0.11	0.05	0.06	133.	*	2 JAN 0815	82	0.06	0.00	0.06	154.
1 JAN 2000	33	0.12	0.05	0.07	143.	*	2 JAN 0830	83	0.06	0.00	0.06	150.
1 JAN 2015	34	0.12	0.05	0.07	154.	*	2 JAN 0845	84	0.06	0.00	0.06	147.
1 JAN 2030	35	0.12	0.05	0.08	166.	*	2 JAN 0900	85	0.06	0.00	0.06	144.
1 JAN 2045	36	0.13	0.04	0.08	178.	*	2 JAN 0915	86	0.06	0.00	0.05	142.
1 JAN 2100	37	0.13	0.04	0.09	190.	*	2 JAN 0930	87	0.06	0.00	0.05	139.
1 JAN 2115	38	0.16	0.05	0.11	207.	*	2 JAN 0945	88	0.05	0.00	0.05	136.
1 JAN 2130	39	0.17	0.05	0.12	230.	*	2 JAN 1000	89	0.05	0.00	0.05	134.
1 JAN 2145	40	0.17	0.05	0.13	255.	*	2 JAN 1015	90	0.05	0.00	0.05	132.
1 JAN 2200	41	0.18	0.05	0.14	280.	*	2 JAN 1030	91	0.05	0.00	0.05	130.
1 JAN 2215	42	0.19	0.05	0.15	304.	*	2 JAN 1045	92	0.05	0.00	0.05	127.
1 JAN 2230	43	0.21	0.05	0.16	330.	*	2 JAN 1100	93	0.05	0.00	0.05	125.
1 JAN 2245	44	0.26	0.05	0.20	366.	*	2 JAN 1115	94	0.05	0.00	0.05	124.
1 JAN 2300	45	0.28	0.05	0.23	417.	*	2 JAN 1130	95	0.05	0.00	0.05	122.
1 JAN 2315	46	0.20	0.04	0.17	459.	*	2 JAN 1145	96	0.05	0.00	0.05	120.
1 JAN 2330	47	0.25	0.04	0.21	469.	*	2 JAN 1200	97	0.05	0.00	0.05	118.
1 JAN 2345	48	0.34	0.05	0.29	494.	*	2 JAN 1215	98	0.00	0.00	0.00	107.
2 JAN 0000	49	0.73	0.10	0.63	633.	*	2 JAN 1230	99	0.00	0.00	0.00	76.
2 JAN 0015	50	1.74	0.17	1.57	1118.	*	2 JAN 1245	100	0.00	0.00	0.00	44.
						*						

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

   TOTAL RAINFALL =   12.98, TOTAL LOSS =    2.86, TOTAL EXCESS =   10.12

 PEAK FLOW      TIME                           MAXIMUM AVERAGE FLOW
   (CFS)        (HR)                   6-HR        24-HR       72-HR       24.75-HR
   1776.       12.75        (CFS)      672.         260.        252.         252.
                          (INCHES)    6.527       10.093      10.093       10.093
                           (AC-FT)     333.         515.        515.         515.

                        CUMULATIVE AREA =     0.96 SQ MI


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

            ***************
            *             *
  19 KK     *    BASIN3   *
            *             *
            ***************
                                  BASIN NO. 3

               SUBBASIN RUNOFF DATA

  21 BA          SUBBASIN CHARACTERISTICS
                      TAREA         0.69  SUBBASIN AREA

                 PRECIPITATION DATA

  22 PH                               DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                 ..... HYDRO-35 ......  ............... TP-40 ...............  ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                 0.92    1.89    3.50    4.75    5.75    8.00   10.80   14.00    0.00    0.00    0.00    0.00

                                              STORM AREA =     0.69

  23 LS          SCS LOSS RATE
                      STRTL         0.50  INITIAL ABSTRACTION
                     CRVNBR        80.00  CURVE NUMBER
                      RTIMP         0.00  PERCENT IMPERVIOUS AREA

  24 UD          SCS DIMENSIONLESS UNITGRAPH
                       TLAG         0.30  LAG

                                                         ***

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

                                                  UNIT HYDROGRAPH
                                              8 END-OF-PERIOD ORDINATES
           504.       746.       328.       127.        49.        19.         8.         2.
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HYDROGRAPH AT STATION BASIN3

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1	JAN	1200	1	0.00	0.00	0.00	0.
1	JAN	1215	2	0.05	0.05	0.00	0.
1	JAN	1230	3	0.06	0.06	0.00	0.
1	JAN	1245	4	0.06	0.06	0.00	0.
1	JAN	1300	5	0.06	0.06	0.00	0.
1	JAN	1315	6	0.06	0.06	0.00	0.
1	JAN	1330	7	0.06	0.06	0.00	0.
1	JAN	1345	8	0.06	0.06	0.00	0.
1	JAN	1400	9	0.06	0.06	0.00	0.
1	JAN	1415	10	0.06	0.06	0.00	0.
1	JAN	1430	11	0.06	0.06	0.00	1.
1	JAN	1445	12	0.06	0.06	0.01	5.
1	JAN	1500	13	0.06	0.06	0.01	9.
1	JAN	1515	14	0.07	0.05	0.01	14.
1	JAN	1530	15	0.07	0.05	0.01	19.
1	JAN	1545	16	0.07	0.05	0.02	24.
1	JAN	1600	17	0.07	0.05	0.02	29.
1	JAN	1615	18	0.07	0.05	0.02	34.
1	JAN	1630	19	0.07	0.05	0.02	39.
1	JAN	1645	20	0.07	0.05	0.03	43.
1	JAN	1700	21	0.08	0.04	0.03	48.
1	JAN	1715	22	0.08	0.04	0.03	53.
1	JAN	1730	23	0.08	0.04	0.04	58.
1	JAN	1745	24	0.08	0.04	0.04	63.
1	JAN	1800	25	0.08	0.04	0.04	68.
1	JAN	1815	26	0.10	0.05	0.05	77.
1	JAN	1830	27	0.10	0.04	0.06	88.
1	JAN	1845	28	0.10	0.04	0.06	97.
1	JAN	1900	29	0.11	0.04	0.06	104.
1	JAN	1915	30	0.11	0.04	0.07	112.
1	JAN	1930	31	0.11	0.04	0.07	119.
1	JAN	1945	32	0.12	0.04	0.08	127.
1	JAN	2000	33	0.12	0.04	0.08	134.
1	JAN	2015	34	0.12	0.04	0.09	143.
1	JAN	2030	35	0.13	0.04	0.09	152.
1	JAN	2045	36	0.13	0.04	0.10	161.
1	JAN	2100	37	0.14	0.04	0.10	171.
1	JAN	2115	38	0.16	0.04	0.12	188.
1	JAN	2130	39	0.17	0.04	0.13	209.
1	JAN	2145	40	0.18	0.04	0.14	227.
1	JAN	2200	41	0.19	0.04	0.15	245.
1	JAN	2215	42	0.20	0.04	0.16	264.
1	JAN	2230	43	0.21	0.04	0.18	287.
1	JAN	2245	44	0.23	0.04	0.19	312.
1	JAN	2300	45	0.26	0.04	0.22	344.
1	JAN	2315	46	0.27	0.04	0.23	378.
1	JAN	2330	47	0.32	0.04	0.28	426.
1	JAN	2345	48	0.37	0.04	0.33	493.
2	JAN	0000	49	0.78	0.08	0.71	737.
2	JAN	0015	50	1.88	0.14	1.74	1566.
2	JAN	0030	51	0.45	0.03	0.43	1810.
2	JAN	0045	52	0.36	0.02	0.34	1176.
2	JAN	0100	53	0.29	0.01	0.28	802.
2	JAN	0115	54	0.27	0.01	0.26	606.
2	JAN	0130	55	0.24	0.01	0.23	504.
2	JAN	0145	56	0.22	0.01	0.21	440.
2	JAN	0200	57	0.21	0.01	0.20	395.
2	JAN	0215	58	0.19	0.01	0.19	362.
2	JAN	0230	59	0.18	0.01	0.17	337.
2	JAN	0245	60	0.17	0.01	0.17	317.
2	JAN	0300	61	0.16	0.01	0.16	300.
2	JAN	0315	62	0.14	0.01	0.14	279.
2	JAN	0330	63	0.14	0.00	0.13	256.
2	JAN	0345	64	0.13	0.00	0.13	240.
2	JAN	0400	65	0.13	0.00	0.12	229.
2	JAN	0415	66	0.12	0.00	0.12	219.
2	JAN	0430	67	0.12	0.00	0.11	211.
2	JAN	0445	68	0.11	0.00	0.11	204.
2	JAN	0500	69	0.11	0.00	0.11	198.
2	JAN	0515	70	0.11	0.00	0.10	192.
2	JAN	0530	71	0.10	0.00	0.10	187.
2	JAN	0545	72	0.10	0.00	0.10	182.
2	JAN	0600	73	0.10	0.00	0.10	177.
2	JAN	0615	74	0.08	0.00	0.08	166.
2	JAN	0630	75	0.08	0.00	0.08	153.
2	JAN	0645	76	0.08	0.00	0.08	145.
2	JAN	0700	77	0.08	0.00	0.08	140.
2	JAN	0715	78	0.08	0.00	0.07	136.
2	JAN	0730	79	0.07	0.00	0.07	133.
2	JAN	0745	80	0.07	0.00	0.07	130.
2	JAN	0800	81	0.07	0.00	0.07	127.
2	JAN	0815	82	0.07	0.00	0.07	124.
2	JAN	0830	83	0.07	0.00	0.07	122.
2	JAN	0845	84	0.07	0.00	0.07	120.
2	JAN	0900	85	0.07	0.00	0.06	118.
2	JAN	0915	86	0.07	0.00	0.06	115.
2	JAN	0930	87	0.06	0.00	0.06	113.
2	JAN	0945	88	0.06	0.00	0.06	112.
2	JAN	1000	89	0.06	0.00	0.06	110.
2	JAN	1015	90	0.06	0.00	0.06	108.
2	JAN	1030	91	0.06	0.00	0.06	106.
2	JAN	1045	92	0.06	0.00	0.06	105.
2	JAN	1100	93	0.06	0.00	0.06	103.
2	JAN	1115	94	0.06	0.00	0.06	102.
2	JAN	1130	95	0.06	0.00	0.06	100.
2	JAN	1145	96	0.06	0.00	0.05	99.
2	JAN	1200	97	0.06	0.00	0.05	98.
2	JAN	1215	98	0.00	0.00	0.00	69.
2	JAN	1230	99	0.00	0.00	0.00	29.
2	JAN	1245	100	0.00	0.00	0.00	11.

TOTAL RAINFALL = 13.99, TOTAL LOSS = 2.61, TOTAL EXCESS = 11.38

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.75-HR
1810.	12.50	(CFS)	536.	211.	205.	205.
		(INCHES)	7.217	11.371	11.371	11.371
		(AC-FT)	266.	419.	419.	419.

CUMULATIVE AREA = 0.69 SQ MI

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          *            *
 25 KK    *   BASIN4   *
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BASIN NO. 4

SUBBASIN RUNOFF DATA

27 BA SUBBASIN CHARACTERISTICS
TAREA 1.75 SUBBASIN AREA

PRECIPITATION DATA

28 PH DEPTHS FOR 0-PERCENT HYPOTHETICAL STORM

..... HYDRO-35			.... TP-40					.... TP-49			
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
0.92	1.89	3.50	4.75	5.75	8.00	10.80	14.00	0.00	0.00	0.00	0.00

STORM AREA = 1.75

29 LS SCS LOSS RATE
STRTL 0.38 INITIAL ABSTRACTION
CRVNBR 84.00 CURVE NUMBER
RTIMP 0.00 PERCENT IMPERVIOUS AREA

30 UD SCS DIMENSIONLESS UNITGRAPH
TLAG 0.41 LAG

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

UNIT HYDROGRAPH
10 END-OF-PERIOD ORDINATES

651.	1569.	1243.	564.	271.	126.	59.	28.	14.	6.

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HYDROGRAPH AT STATION BASIN4

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DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1	JAN	1200	1	0.00	0.00	0.00	0.	*	2	JAN	0030	51	0.45	0.02	0.44	4303.
1	JAN	1215	2	0.05	0.05	0.00	0.	*	2	JAN	0045	52	0.36	0.01	0.35	3687.
1	JAN	1230	3	0.06	0.06	0.00	0.	*	2	JAN	0100	53	0.29	0.01	0.28	2547.
1	JAN	1245	4	0.06	0.06	0.00	0.	*	2	JAN	0115	54	0.27	0.01	0.26	1903.
1	JAN	1300	5	0.06	0.06	0.00	0.	*	2	JAN	0130	55	0.24	0.01	0.24	1516.
1	JAN	1315	6	0.06	0.06	0.00	0.	*	2	JAN	0145	56	0.22	0.01	0.22	1279.
1	JAN	1330	7	0.06	0.06	0.00	0.	*	2	JAN	0200	57	0.21	0.01	0.20	1120.
1	JAN	1345	8	0.06	0.06	0.00	0.	*	2	JAN	0215	58	0.19	0.00	0.19	1009.
1	JAN	1400	9	0.06	0.06	0.00	2.	*	2	JAN	0230	59	0.18	0.00	0.18	922.
1	JAN	1415	10	0.06	0.05	0.01	9.	*	2	JAN	0245	60	0.17	0.00	0.17	854.
1	JAN	1430	11	0.06	0.05	0.01	21.	*	2	JAN	0300	61	0.16	0.00	0.16	803.
1	JAN	1445	12	0.06	0.05	0.01	34.	*	2	JAN	0315	62	0.14	0.00	0.14	752.
1	JAN	1500	13	0.06	0.05	0.02	48.	*	2	JAN	0330	63	0.14	0.00	0.13	694.
1	JAN	1515	14	0.07	0.05	0.02	62.	*	2	JAN	0345	64	0.13	0.00	0.13	645.
1	JAN	1530	15	0.07	0.04	0.02	76.	*	2	JAN	0400	65	0.13	0.00	0.12	610.
1	JAN	1545	16	0.07	0.04	0.03	90.	*	2	JAN	0415	66	0.12	0.00	0.12	582.
1	JAN	1600	17	0.07	0.04	0.03	104.	*	2	JAN	0430	67	0.12	0.00	0.12	558.
1	JAN	1615	18	0.07	0.04	0.03	117.	*	2	JAN	0445	68	0.11	0.00	0.11	538.
1	JAN	1630	19	0.07	0.04	0.03	130.	*	2	JAN	0500	69	0.11	0.00	0.11	520.
1	JAN	1645	20	0.07	0.04	0.04	143.	*	2	JAN	0515	70	0.11	0.00	0.11	504.
1	JAN	1700	21	0.08	0.04	0.04	156.	*	2	JAN	0530	71	0.10	0.00	0.10	489.
1	JAN	1715	22	0.08	0.03	0.04	168.	*	2	JAN	0545	72	0.10	0.00	0.10	475.
1	JAN	1730	23	0.08	0.03	0.05	181.	*	2	JAN	0600	73	0.10	0.00	0.10	462.
1	JAN	1745	24	0.08	0.03	0.05	194.	*	2	JAN	0615	74	0.08	0.00	0.08	442.
1	JAN	1800	25	0.08	0.03	0.05	207.	*	2	JAN	0630	75	0.08	0.00	0.08	411.
1	JAN	1815	26	0.10	0.04	0.06	226.	*	2	JAN	0645	76	0.08	0.00	0.08	385.
1	JAN	1830	27	0.10	0.03	0.07	253.	*	2	JAN	0700	77	0.08	0.00	0.08	368.
1	JAN	1845	28	0.10	0.03	0.07	279.	*	2	JAN	0715	78	0.08	0.00	0.07	356.
1	JAN	1900	29	0.11	0.03	0.07	300.	*	2	JAN	0730	79	0.07	0.00	0.07	347.
1	JAN	1915	30	0.11	0.03	0.08	320.	*	2	JAN	0745	80	0.07	0.00	0.07	338.
1	JAN	1930	31	0.11	0.03	0.08	338.	*	2	JAN	0800	81	0.07	0.00	0.07	331.
1	JAN	1945	32	0.12	0.03	0.09	357.	*	2	JAN	0815	82	0.07	0.00	0.07	324.
1	JAN	2000	33	0.12	0.03	0.09	377.	*	2	JAN	0830	83	0.07	0.00	0.07	317.
1	JAN	2015	34	0.12	0.03	0.10	397.	*	2	JAN	0845	84	0.07	0.00	0.07	311.
1	JAN	2030	35	0.13	0.03	0.10	419.	*	2	JAN	0900	85	0.07	0.00	0.07	305.
1	JAN	2045	36	0.13	0.03	0.11	442.	*	2	JAN	0915	86	0.07	0.00	0.06	300.
1	JAN	2100	37	0.14	0.03	0.11	467.	*	2	JAN	0930	87	0.06	0.00	0.06	294.
1	JAN	2115	38	0.16	0.03	0.13	502.	*	2	JAN	0945	88	0.06	0.00	0.06	289.
1	JAN	2130	39	0.17	0.03	0.14	551.	*	2	JAN	1000	89	0.06	0.00	0.06	285.
1	JAN	2145	40	0.18	0.03	0.15	600.	*	2	JAN	1015	90	0.06	0.00	0.06	280.

1 JAN 2200	41	0.19	0.03	0.16	646.	*	2 JAN 1030	91	0.06	0.00	0.06	276.
1 JAN 2215	42	0.20	0.03	0.17	694.	*	2 JAN 1045	92	0.06	0.00	0.06	271.
1 JAN 2230	43	0.21	0.03	0.19	747.	*	2 JAN 1100	93	0.06	0.00	0.06	267.
1 JAN 2245	44	0.23	0.03	0.21	808.	*	2 JAN 1115	94	0.06	0.00	0.06	263.
1 JAN 2300	45	0.26	0.03	0.23	881.	*	2 JAN 1130	95	0.06	0.00	0.06	260.
1 JAN 2315	46	0.27	0.03	0.25	964.	*	2 JAN 1145	96	0.06	0.00	0.06	256.
1 JAN 2330	47	0.32	0.03	0.30	1069.	*	2 JAN 1200	97	0.06	0.00	0.05	252.
1 JAN 2345	48	0.37	0.03	0.34	1217.	*	2 JAN 1215	98	0.00	0.00	0.00	214.
2 JAN 0000	49	0.78	0.05	0.73	1621.	*	2 JAN 1230	99	0.00	0.00	0.00	127.
2 JAN 0015	50	1.87	0.09	1.78	3005.	*	2 JAN 1245	100	0.00	0.00	0.00	59.

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TOTAL RAINFALL = 13.97, TOTAL LOSS = 2.05, TOTAL EXCESS = 11.92

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.75-HR
4303.	12.50	(CFS)	1403.	561.	544.	544.
		(INCHES)	7.433	11.898	11.898	11.898
		(AC-FT)	696.	1114.	1114.	1114.

CUMULATIVE AREA = 1.75 SQ MI

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 31 KK    *   BASIN5   *
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BASIN NO. 5

SUBBASIN RUNOFF DATA

33 BA SUBBASIN CHARACTERISTICS
TAREA 0.78 SUBBASIN AREA

PRECIPITATION DATA

34 PH DEPTHS FOR 0-PERCENT HYPOTHETICAL STORM

..... HYDRO-35			.... TP-40					.... TP-49			
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
0.92	1.89	3.50	4.75	5.75	8.00	10.80	14.00	0.00	0.00	0.00	0.00

STORM AREA = 0.78

35 LS SCS LOSS RATE
STRTL 0.94 INITIAL ABSTRACTION
CRVNBR 68.00 CURVE NUMBER
RTIMP 0.00 PERCENT IMPERVIOUS AREA

36 UD SCS DIMENSIONLESS UNITGRAPH
TLAG 0.32 LAG

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

UNIT HYDROGRAPH
8 END-OF-PERIOD ORDINATES

492. 836. 417. 169. 68. 27. 11. 5.

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HYDROGRAPH AT STATION BASIN5

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DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1 JAN 1200	1	0.00	0.00	0.00	0.	*	2 JAN 0030	51	0.45	0.07	0.39	1791.
1 JAN 1215	2	0.05	0.05	0.00	0.	*	2 JAN 0045	52	0.36	0.05	0.31	1244.
1 JAN 1230	3	0.06	0.06	0.00	0.	*	2 JAN 0100	53	0.29	0.04	0.26	857.
1 JAN 1245	4	0.06	0.06	0.00	0.	*	2 JAN 0115	54	0.27	0.03	0.24	649.
1 JAN 1300	5	0.06	0.06	0.00	0.	*	2 JAN 0130	55	0.24	0.03	0.21	537.
1 JAN 1315	6	0.06	0.06	0.00	0.	*	2 JAN 0145	56	0.22	0.03	0.20	468.

1 JAN 1330	7	0.06	0.06	0.00	0.	*	2 JAN 0200	57	0.21	0.02	0.18	421.
1 JAN 1345	8	0.06	0.06	0.00	0.	*	2 JAN 0215	58	0.19	0.02	0.17	384.
1 JAN 1400	9	0.06	0.06	0.00	0.	*	2 JAN 0230	59	0.18	0.02	0.16	358.
1 JAN 1415	10	0.06	0.06	0.00	0.	*	2 JAN 0245	60	0.17	0.02	0.15	337.
1 JAN 1430	11	0.06	0.06	0.00	0.	*	2 JAN 0300	61	0.16	0.02	0.15	319.
1 JAN 1445	12	0.06	0.06	0.00	0.	*	2 JAN 0315	62	0.14	0.01	0.13	298.
1 JAN 1500	13	0.06	0.06	0.00	0.	*	2 JAN 0330	63	0.14	0.01	0.12	274.
1 JAN 1515	14	0.07	0.07	0.00	0.	*	2 JAN 0345	64	0.13	0.01	0.12	257.
1 JAN 1530	15	0.07	0.07	0.00	0.	*	2 JAN 0400	65	0.13	0.01	0.11	244.
1 JAN 1545	16	0.07	0.07	0.00	0.	*	2 JAN 0415	66	0.12	0.01	0.11	235.
1 JAN 1600	17	0.07	0.07	0.00	0.	*	2 JAN 0430	67	0.12	0.01	0.11	226.
1 JAN 1615	18	0.07	0.07	0.00	1.	*	2 JAN 0445	68	0.11	0.01	0.10	219.
1 JAN 1630	19	0.07	0.07	0.00	4.	*	2 JAN 0500	69	0.11	0.01	0.10	212.
1 JAN 1645	20	0.07	0.07	0.01	8.	*	2 JAN 0515	70	0.11	0.01	0.10	206.
1 JAN 1700	21	0.08	0.07	0.01	12.	*	2 JAN 0530	71	0.10	0.01	0.10	200.
1 JAN 1715	22	0.08	0.07	0.01	16.	*	2 JAN 0545	72	0.10	0.01	0.09	195.
1 JAN 1730	23	0.08	0.07	0.01	21.	*	2 JAN 0600	73	0.10	0.01	0.09	190.
1 JAN 1745	24	0.08	0.07	0.02	25.	*	2 JAN 0615	74	0.08	0.01	0.08	179.
1 JAN 1800	25	0.08	0.06	0.02	30.	*	2 JAN 0630	75	0.08	0.01	0.07	165.
1 JAN 1815	26	0.10	0.07	0.02	36.	*	2 JAN 0645	76	0.08	0.01	0.07	156.
1 JAN 1830	27	0.10	0.07	0.03	45.	*	2 JAN 0700	77	0.08	0.01	0.07	151.
1 JAN 1845	28	0.10	0.07	0.03	52.	*	2 JAN 0715	78	0.08	0.01	0.07	146.
1 JAN 1900	29	0.11	0.07	0.03	59.	*	2 JAN 0730	79	0.07	0.01	0.07	143.
1 JAN 1915	30	0.11	0.07	0.04	67.	*	2 JAN 0745	80	0.07	0.01	0.07	140.
1 JAN 1930	31	0.11	0.07	0.04	74.	*	2 JAN 0800	81	0.07	0.01	0.07	137.
1 JAN 1945	32	0.12	0.07	0.05	82.	*	2 JAN 0815	82	0.07	0.01	0.06	134.
1 JAN 2000	33	0.12	0.07	0.05	90.	*	2 JAN 0830	83	0.07	0.01	0.06	132.
1 JAN 2015	34	0.12	0.07	0.05	98.	*	2 JAN 0845	84	0.07	0.01	0.06	129.
1 JAN 2030	35	0.13	0.07	0.06	107.	*	2 JAN 0900	85	0.07	0.01	0.06	127.
1 JAN 2045	36	0.13	0.07	0.06	117.	*	2 JAN 0915	86	0.07	0.00	0.06	125.
1 JAN 2100	37	0.14	0.07	0.07	127.	*	2 JAN 0930	87	0.06	0.00	0.06	122.
1 JAN 2115	38	0.16	0.08	0.08	143.	*	2 JAN 0945	88	0.06	0.00	0.06	120.
1 JAN 2130	39	0.17	0.08	0.09	162.	*	2 JAN 1000	89	0.06	0.00	0.06	119.
1 JAN 2145	40	0.18	0.08	0.10	180.	*	2 JAN 1015	90	0.06	0.00	0.06	117.
1 JAN 2200	41	0.19	0.08	0.11	198.	*	2 JAN 1030	91	0.06	0.00	0.06	115.
1 JAN 2215	42	0.20	0.08	0.12	218.	*	2 JAN 1045	92	0.06	0.00	0.05	113.
1 JAN 2230	43	0.21	0.08	0.14	241.	*	2 JAN 1100	93	0.06	0.00	0.05	112.
1 JAN 2245	44	0.23	0.08	0.15	267.	*	2 JAN 1115	94	0.06	0.00	0.05	110.
1 JAN 2300	45	0.26	0.08	0.17	299.	*	2 JAN 1130	95	0.06	0.00	0.05	108.
1 JAN 2315	46	0.27	0.08	0.19	334.	*	2 JAN 1145	96	0.06	0.00	0.05	107.
1 JAN 2330	47	0.32	0.09	0.23	381.	*	2 JAN 1200	97	0.06	0.00	0.05	106.
1 JAN 2345	48	0.37	0.10	0.27	448.	*	2 JAN 1215	98	0.00	0.00	0.00	79.
2 JAN 0000	49	0.78	0.19	0.60	666.	*	2 JAN 1230	99	0.00	0.00	0.00	36.
2 JAN 0015	50	1.88	0.34	1.53	1427.	*	2 JAN 1245	100	0.00	0.00	0.00	14.
						*						

****

TOTAL RAINFALL = 13.99, TOTAL LOSS = 4.40, TOTAL EXCESS = 9.59

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.75-HR
(CFS)	(HR)					
1791.	12.50	(CFS)	530.	202.	196.	196.
		(INCHES)	6.287	9.578	9.578	9.578
		(AC-FT)	263.	401.	401.	401.

CUMULATIVE AREA = 0.78 SQ MI

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

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	BASIN1	270.	12.50	81.	31.	30.	0.12		
HYDROGRAPH AT	BASIN2	1776.	12.75	672.	260.	252.	0.96		
HYDROGRAPH AT	BASIN3	1810.	12.50	536.	211.	205.	0.69		
HYDROGRAPH AT	BASIN4	4303.	12.50	1403.	561.	544.	1.75		
HYDROGRAPH AT	BASIN5	1791.	12.50	530.	202.	196.	0.78		

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

1971 Flood Routing Analysis

Appendix D

```
***********************************************************
*                                                         *
*            KAELEPULU STREAM DRAINAGE STUDY              *
*   1971 "BASELINE ANALYSIS  - 100 YEAR (?), 6 HOUR STORM *
*     KAOPA DETENTION BASIN ("A")      AREA = 552 ACRES   *
*              "RESERVOIR" ROUTING ANALYSIS               *
*                                                         *
***********************************************************
```

Inflow Hydrograph: c:\pondpack\kaele\KAOPABL .HYD
Rating Table file: c:\pondpack\kaele\KAOPABL1.PND

----INITIAL CONDITIONS----
Elevation = 40.00 ft
Outflow = 0.00 cfs
Storage = 0.00 ac-ft

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (ac-ft)	2S/t (cfs)	2S/t + 0 (cfs)
40.00	0.0	0.000	0.0	0.0
41.00	12.0	11.300	2734.6	2746.6
42.00	37.0	22.800	5517.6	5554.6
43.00	70.0	34.700	8397.4	8467.4
44.00	100.0	46.800	11325.6	11425.6
45.00	120.0	59.300	14350.6	14470.6
46.00	140.0	72.000	17424.0	17564.0
47.00	156.0	85.100	20594.2	20750.2
48.00	170.0	98.400	23812.8	23982.8
49.00	184.0	112.100	27128.2	27312.2
50.00	200.0	126.500	30613.0	30813.0
50.20	220.0	129.500	31339.0	31559.0
50.40	257.0	132.400	32040.8	32297.8
50.60	307.0	135.400	32766.8	33073.8
50.80	374.0	138.400	33492.8	33866.8
51.00	461.0	141.400	34218.8	34679.8
51.20	547.0	144.400	34944.8	35491.8
51.40	642.0	147.500	35695.0	36337.0
51.60	743.0	150.500	36421.0	37164.0
51.80	851.0	153.600	37171.2	38022.2
52.00	968.0	156.600	37897.2	38865.2
52.50	1274.0	164.400	39784.8	41058.8
53.00	1609.0	172.300	41696.6	43305.6
53.50	1972.0	185.100	44794.2	46766.2
54.00	2362.0	188.300	45568.6	47930.6
54.50	2777.0	196.500	47553.0	50330.0
55.00	3215.0	204.800	49561.6	52776.6
55.50	3675.0	213.200	51594.4	55269.4

Time increment (t) = 0.100 hrs.

EXECUTED: 04-26-1993 14:42:13

Pond File: c:\pondpack\kaele\KAOPABL1.PND
Inflow Hydrograph: c:\pondpack\kaele\KAOPABL .HYD
Outflow Hydrograph: c:\pondpack\kaele\KAOPABLO.HYD

INFLOW HYDROGRAPH / ROUTING COMPUTATIONS

TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.000	0.00	-----	0.0	0.0	0.00	40.00
0.100	24.20	24.2	24.0	24.2	0.11	40.01
0.200	92.60	116.8	139.6	140.8	0.62	40.05
0.300	183.90	276.5	412.4	416.1	1.82	40.15
0.400	314.60	498.5	903.0	910.9	3.98	40.33
0.500	459.80	774.4	1662.7	1677.4	7.33	40.61
0.600	629.20	1089.0	2727.6	2751.7	12.05	41.00
0.700	871.20	1500.4	4177.6	4228.0	25.19	41.53
0.800	1161.60	2032.8	6121.6	6210.4	44.43	42.23
0.900	1452.00	2613.6	8589.7	8735.2	72.72	43.09
1.000	1936.00	3388.0	11770.5	11977.7	103.63	44.18
1.100	2516.80	4452.8	15960.6	16223.3	131.33	45.57
1.200	3194.40	5711.2	21351.8	21671.8	159.99	47.29
1.300	3581.60	6776.0	27752.4	28127.8	187.73	49.23
1.400	3678.40	7260.0	34019.9	35012.4	496.23	51.08
1.500	3557.40	7235.8	38649.0	41255.7	1303.36	52.54
1.600	3388.00	6945.4	41896.2	45594.4	1849.09	53.33
1.700	3194.40	6582.4	43565.1	48478.6	2456.79	54.11
1.800	2807.20	6001.6	44276.7	49566.7	2644.97	54.34
1.900	2371.60	5178.8	44204.0	49455.5	2625.75	54.32
2.000	2081.20	4452.8	43681.6	48656.8	2487.61	54.15
2.100	1839.20	3920.4	43098.1	47602.0	2251.94	53.86
2.200	1645.60	3484.8	42677.4	46582.9	1952.78	53.47
2.300	1500.40	3146.0	42077.2	45823.4	1873.10	53.36
2.400	1355.20	2855.6	41373.4	44932.8	1779.68	53.24
2.500	1258.40	2613.6	40626.1	43987.0	1680.48	53.10
2.600	1161.60	2420.0	39905.4	43046.1	1570.30	52.94
2.700	1064.80	2226.4	39263.9	42131.8	1433.99	52.74
2.800	992.20	2057.0	38694.7	41320.9	1313.07	52.56
2.900	919.60	1911.8	38184.7	40606.5	1210.91	52.40
3.000	871.20	1790.8	37729.7	39975.5	1122.88	52.25
3.100	822.80	1694.0	37331.9	39423.7	1045.91	52.13
3.200	774.40	1597.2	36975.3	38929.1	976.91	52.01
3.300	726.00	1500.4	36647.8	38475.7	913.94	51.91
3.400	677.60	1403.6	36341.3	38051.4	855.05	51.81
3.500	605.00	1282.6	36022.1	37623.9	800.88	51.71
3.600	556.60	1161.6	35692.8	37183.7	745.48	51.60
3.700	508.20	1064.8	35370.8	36757.6	693.36	51.50
3.800	484.00	992.2	35072.7	36363.0	645.18	51.41
3.900	435.60	919.6	34785.8	35992.3	603.25	51.32
4.000	411.40	847.0	34507.1	35632.8	562.85	51.23
4.100	387.20	798.6	34251.1	35305.7	527.29	51.15
4.200	353.30	740.5	34003.6	34991.6	494.02	51.08
4.300	319.40	672.7	33755.0	34676.3	460.62	51.00
4.400	290.40	609.8	33510.2	34364.8	427.29	50.92

Pond File: c:\pondpack\kaele\KAOPABL1.PND
Inflow Hydrograph: c:\pondpack\kaele\KAOPABL .HYD
Outflow Hydrograph: c:\pondpack\kaele\KAOPABLO.HYD

INFLOW HYDROGRAPH / ROUTING COMPUTATIONS

TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
4.500	266.20	556.6	33276.0	34066.8	395.41	50.85
4.600	242.00	508.2	33050.2	33784.2	367.02	50.78
4.700	217.80	459.8	32822.3	33510.0	343.85	50.71
4.800	193.60	411.4	32592.7	33233.7	320.51	50.64
4.900	169.40	363.0	32356.9	32955.7	299.39	50.57
5.000	145.20	314.6	32109.3	32671.5	281.08	50.50
5.100	130.70	275.9	31860.0	32385.2	262.63	50.42
5.200	111.30	242.0	31607.6	32102.0	247.19	50.35
5.300	96.80	208.1	31350.0	31815.7	232.85	50.27
5.400	87.10	183.9	31095.2	31533.9	219.33	50.19
5.500	72.60	159.7	30831.2	31254.9	211.85	50.12
5.600	58.10	130.7	30553.9	30961.9	203.99	50.04
5.700	48.40	106.5	30261.8	30660.4	199.30	49.96
5.800	24.20	72.6	29938.8	30334.4	197.81	49.86
5.900	9.70	33.9	29580.4	29972.7	196.16	49.76
6.000	0.00	9.7	29201.3	29590.1	194.41	49.65

****************** SUMMARY OF ROUTING COMPUTATIONS ******************

```
Pond File:           c:\pondpack\kaele\KAOPABL1.PND
Inflow Hydrograph:   c:\pondpack\kaele\KAOPABL .HYD
Outflow Hydrograph:  c:\pondpack\kaele\KAOPABLO.HYD

Starting Pond W.S. Elevation =    40.00 ft

         ***** Summary of Peak Outflow and Peak Elevation *****

                  Peak Inflow    =  3678.40 cfs
                  Peak Outflow   =  2644.97 cfs
                  Peak Elevation =    54.34 ft

          ***** Summary of Approximate Peak Storage *****

               Initial Storage          =     0.00 ac-ft
               Peak Storage From Storm  =   193.89 ac-ft
                                          ---------------
               Total Storage in Pond    =   193.89 ac-ft
```

Pond File: c:\pondpack\kaele\KAOPABL1.PND
Inflow Hydrograph: c:\pondpack\kaele\KAOPABL .HYD
Outflow Hydrograph: c:\pondpack\kaele\KAOPABLO.HYD

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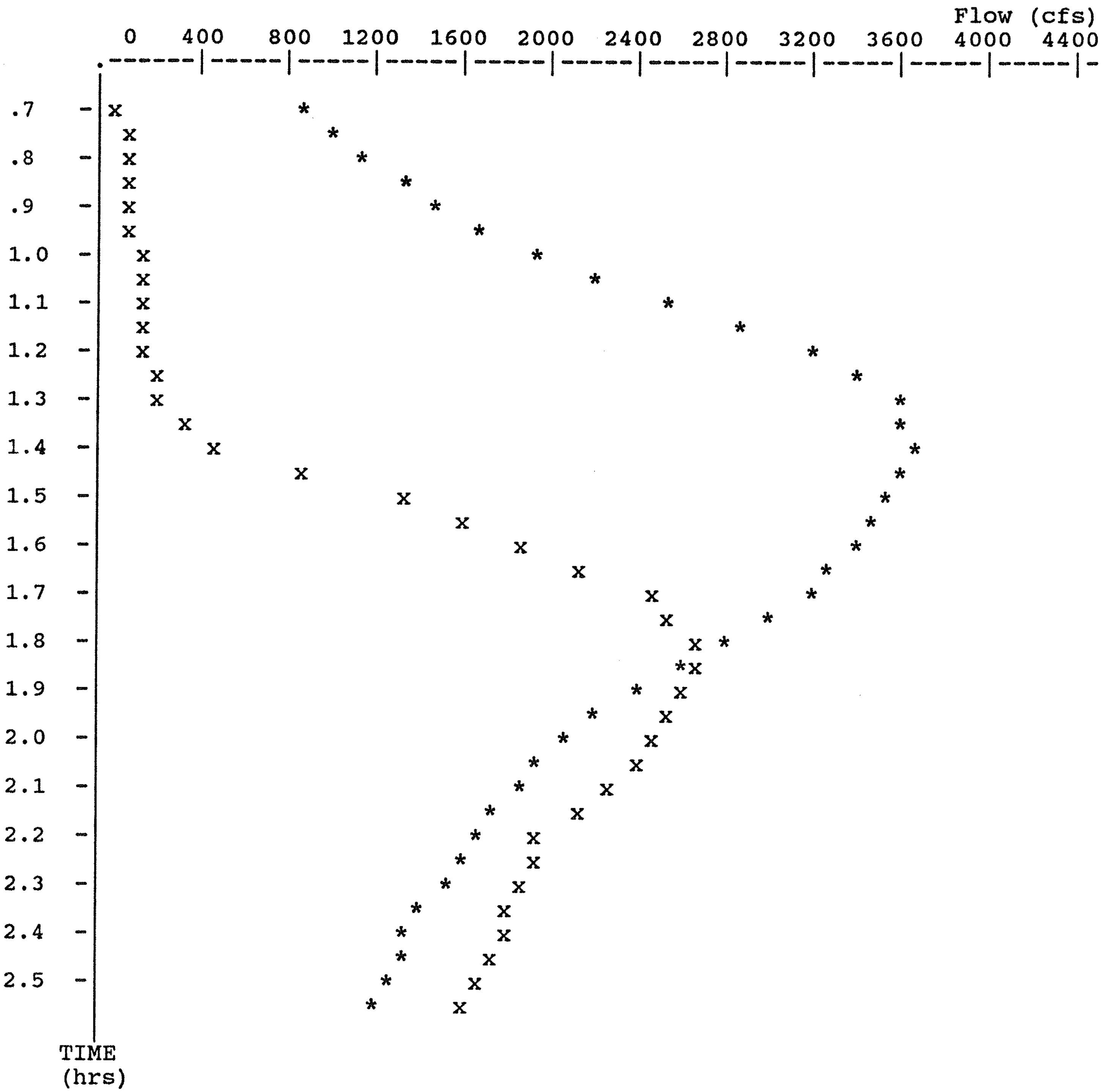
14:42:13

Peak Inflow = 3678.40 cfs
Peak Outflow = 2644.97 cfs
Peak Elevation = 54.34 ft



* File: c:\pondpack\kaele\KAOPABL .HYD Qmax = 3678.4 cfs
x File: c:\pondpack\kaele\KAOPABLO.HYD Qmax = 2645.0 cfs

Executed 04-23-1993 13:53:29

Data directory: c:\pondpack\kaele*.HYD

File Summary for Composite Hydrograph

Time (hrs)	KAOPABLO (cfs)	ELAKEBL1 (cfs)	ELAKEBL2 (Total)
0.00	0.0	0.0	0.0
0.10	0.1	96.8	96.9
0.20	0.6	242.0	242.6
0.30	1.8	387.2	389.0
0.40	4.0	580.8	584.8
0.50	7.3	871.2	878.5
0.60	12.1	1161.6	1173.7
0.70	25.2	1548.8	1574.0
0.80	44.4	2081.2	2125.6
0.90	72.7	2807.2	2879.9
1.00	103.6	3678.4	3782.0
1.10	131.3	5324.0	5455.3
1.20	160.0	7744.0	7904.0
1.30	187.7	8276.4	8464.1
1.40	496.2	8334.5	8830.7
1.50	1303.4	8155.4	9458.8
1.60	1849.1	7840.8	9689.9
1.70	2456.8	7163.2	9620.0
1.80	2645.0	5324.0	7969.0
1.90	2625.8	4259.2	6885.0
2.00	2487.6	3630.0	6117.6
2.10	2251.9	3194.4	5446.3
2.20	1952.8	2855.6	4808.4
2.30	1873.1	2565.2	4438.3
2.40	1779.7	2395.8	4175.5
2.50	1680.5	2226.4	3906.9
2.60	1570.3	2081.2	3651.5
2.70	1434.0	1936.0	3370.0
2.80	1313.1	1790.8	3103.9
2.90	1210.9	1694.0	2904.9
3.00	1122.9	1597.2	2720.1
3.10	1045.9	1500.4	2546.3
3.20	976.9	1403.6	2380.5
3.30	913.9	1331.0	2244.9
3.40	855.0	1258.4	2113.4
3.50	800.9	1185.8	1986.7
3.60	745.5	1113.2	1858.7
3.70	693.4	1064.8	1758.2
3.80	645.2	992.2	1637.4
3.90	603.3	919.6	1522.8

Executed 04-23-1993 13:53:29

Data directory: c:\pondpack\kaele*.HYD

File Summary for Composite Hydrograph

Time (hrs)	KAOPABLO (cfs)	ELAKEBL1 (cfs)	ELAKEBL2 (Total)
4.00	562.8	871.2	1434.1
4.10	527.3	822.8	1350.1
4.20	494.0	774.4	1268.4
4.30	460.6	726.0	1186.6
4.40	427.3	677.6	1104.9
4.50	395.4	605.0	1000.4
4.60	367.0	532.4	899.4
4.70	343.9	484.0	827.8
4.80	320.5	435.6	756.1
4.90	299.4	387.2	686.6
5.00	281.1	363.0	644.1
5.10	262.6	338.8	601.4
5.20	247.2	290.4	537.6
5.30	232.9	266.2	499.1
5.40	219.3	217.8	437.1
5.50	211.9	193.6	405.5
5.60	204.0	145.2	349.2
5.70	199.3	96.8	296.1
5.80	197.8	48.4	246.2
5.90	196.2	24.2	220.4
6.00	194.4	0.0	194.4

KAELEPULU STREAM DRAINAGE STUDY
1971 "BASELINE" ANALYSIS - 100 YEAR (?), 6 HOUR STORM
ENCHANTED LAKE RETENTION BASIN ("B") AREA = 1255 ACS.
"RESERVOIR" ROUTING ANALYSIS

Inflow Hydrograph: c:\pondpack\kaele\ELAKEBL2.HYD
Rating Table file: c:\pondpack\kaele\ELAKEBL1.PND

----INITIAL CONDITIONS----
Elevation = 2.60 ft
Outflow = 0.00 cfs
Storage = 0.00 ac-ft

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (ac-ft)	2S/t (cfs)	2S/t + 0 (cfs)
2.60	0.0	0.000	0.0	0.0
2.80	0.0	20.000	4840.0	4840.0
3.00	560.0	40.000	9680.0	10240.0
3.20	1380.0	60.000	14520.0	15900.0
3.40	2050.0	80.000	19360.0	21410.0
3.60	2600.0	100.000	24200.0	26800.0
3.80	3100.0	120.000	29040.0	32140.0
4.00	3550.0	140.000	33880.0	37430.0
4.20	3950.0	160.000	38720.0	42670.0
4.40	4340.0	180.000	43560.0	47900.0
4.60	4700.0	200.000	48400.0	53100.0
4.80	5080.0	220.000	53240.0	58320.0
5.00	5420.0	240.000	58080.0	63500.0
5.20	5770.0	260.000	62920.0	68690.0
5.40	6100.0	280.000	67760.0	73860.0
5.60	6450.0	300.000	72600.0	79050.0
5.80	6780.0	320.000	77440.0	84220.0
6.00	7120.0	340.000	82280.0	89400.0
6.20	7490.0	360.000	87120.0	94610.0
6.40	7810.0	380.000	91960.0	99770.0

Time increment (t) = 0.100 hrs.

Pond File: c:\pondpack\kaele\ELAKEBL1.PND
Inflow Hydrograph: c:\pondpack\kaele\ELAKEBL2.HYD
Outflow Hydrograph: c:\pondpack\kaele\ELAKEBLO.HYD

INFLOW HYDROGRAPH | ROUTING COMPUTATIONS

TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.000	0.00	-----	0.0	0.0	0.00	2.60
0.100	96.91	96.9	96.9	96.9	0.00	2.60
0.200	242.62	339.5	436.4	436.4	0.00	2.62
0.300	389.02	631.6	1068.1	1068.1	0.00	2.64
0.400	584.78	973.8	2041.9	2041.9	0.00	2.68
0.500	878.53	1463.3	3505.2	3505.2	0.00	2.74
0.600	1173.65	2052.2	5408.6	5557.4	74.39	2.83
0.700	1573.99	2747.6	7468.4	8156.2	343.90	2.92
0.800	2125.63	3699.6	9779.1	11168.0	694.45	3.03
0.900	2879.92	5005.6	12347.8	14784.7	1218.42	3.16
1.000	3782.03	6662.0	15493.5	19009.8	1758.14	3.31
1.100	5455.33	9237.4	19953.1	24730.9	2388.86	3.52
1.200	7903.99	13359.3	26913.0	33312.5	3199.74	3.84
1.300	8464.13	16368.1	35290.0	43281.1	3995.57	4.22
1.400	8830.73	17294.9	43256.2	52584.8	4664.33	4.58
1.500	9458.76	18289.5	50962.2	61545.7	5291.72	4.92
1.600	9689.89	19148.7	58389.5	70110.9	5860.69	5.25
1.700	9619.99	19309.9	64981.5	77699.4	6358.92	5.55
1.800	7968.97	17589.0	69221.1	82570.5	6674.71	5.74
1.900	6884.95	14853.9	70533.5	84075.0	6770.74	5.79
2.000	6117.61	13002.6	70063.4	83536.0	6736.34	5.77
2.100	5446.34	11564.0	68398.3	81627.3	6614.51	5.70
2.200	4808.38	10254.7	65806.6	78653.0	6423.23	5.58
2.300	4438.30	9246.7	62692.3	75053.2	6180.47	5.45
2.400	4175.48	8613.8	59432.1	71306.1	5936.98	5.30
2.500	3906.88	8082.4	56133.0	67514.5	5690.73	5.15
2.600	3651.50	7558.4	52825.6	63691.4	5432.91	5.01
2.700	3369.99	7021.5	49486.6	59847.1	5180.23	4.86
2.800	3103.87	6473.9	46144.0	55960.5	4908.23	4.71
2.900	2904.91	6008.8	42883.9	52152.8	4634.42	4.56
3.000	2720.08	5625.0	39744.6	48508.9	4382.16	4.42
3.100	2546.31	5266.4	36761.9	45011.0	4124.57	4.29
3.200	2380.51	4926.8	33938.5	41688.7	3875.09	4.16
3.300	2244.94	4625.5	31290.8	38564.0	3636.56	4.04
3.400	2113.45	4358.4	28852.2	35649.2	3398.52	3.93
3.500	1986.68	4100.1	26614.1	32952.3	3169.10	3.83
3.600	1858.68	3845.4	24574.2	30459.5	2942.65	3.74
3.700	1758.16	3616.8	22730.5	28191.0	2730.25	3.65
3.800	1637.38	3395.5	21063.6	26126.1	2531.23	3.57
3.900	1522.85	3160.2	19549.6	24223.8	2337.13	3.50
4.000	1434.05	2956.9	18182.7	22506.5	2161.89	3.44
4.100	1350.09	2784.1	16974.6	20966.9	1996.11	3.38
4.200	1268.42	2618.5	15935.0	19593.1	1829.07	3.33
4.300	1186.62	2455.0	15024.5	18390.0	1682.78	3.29
4.400	1104.89	2291.5	14211.6	17316.0	1552.18	3.25

Pond File: c:\pondpack\kaele\ELAKEBL1.PND
Inflow Hydrograph: c:\pondpack\kaele\ELAKEBL2.HYD
Outflow Hydrograph: c:\pondpack\kaele\ELAKEBLO.HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
4.500	1000.41	2105.3	13455.5	16316.9	1430.70	3.22
4.600	899.42	1899.8	12753.2	15355.4	1301.09	3.18
4.700	827.85	1727.3	12131.8	14480.4	1174.34	3.15
4.800	756.11	1584.0	11588.6	13715.7	1063.55	3.12
4.900	686.59	1442.7	11102.5	13031.3	964.40	3.10
5.000	644.08	1330.7	10677.7	12433.2	877.74	3.08
5.100	601.43	1245.5	10315.5	11923.2	803.86	3.06
5.200	537.59	1139.0	9982.6	11454.5	735.96	3.04
5.300	499.05	1036.6	9673.5	11019.3	672.90	3.03
5.400	437.13	936.2	9382.5	10609.6	613.55	3.01
5.500	405.45	842.6	9108.2	10225.1	558.46	3.00
5.600	349.19	754.6	8821.1	9862.8	520.89	2.99
5.700	296.10	645.3	8506.8	9466.4	479.77	2.97
5.800	246.21	542.3	8176.1	9049.1	436.50	2.96
5.900	220.36	466.6	7854.0	8642.7	394.35	2.94
6.000	194.41	414.8	7557.6	8268.8	355.57	2.93

****************** SUMMARY OF ROUTING COMPUTATIONS ******************

Pond File: c:\pondpack\kaele\ELAKEBL1.PND
Inflow Hydrograph: c:\pondpack\kaele\ELAKEBL2.HYD
Outflow Hydrograph: c:\pondpack\kaele\ELAKEBLO.HYD

Starting Pond W.S. Elevation = 2.60 ft

***** Summary of Peak Outflow and Peak Elevation *****

Peak Inflow	=	9689.89 cfs
Peak Outflow	=	6770.74 cfs
Peak Elevation	=	5.79 ft

***** Summary of Approximate Peak Storage *****

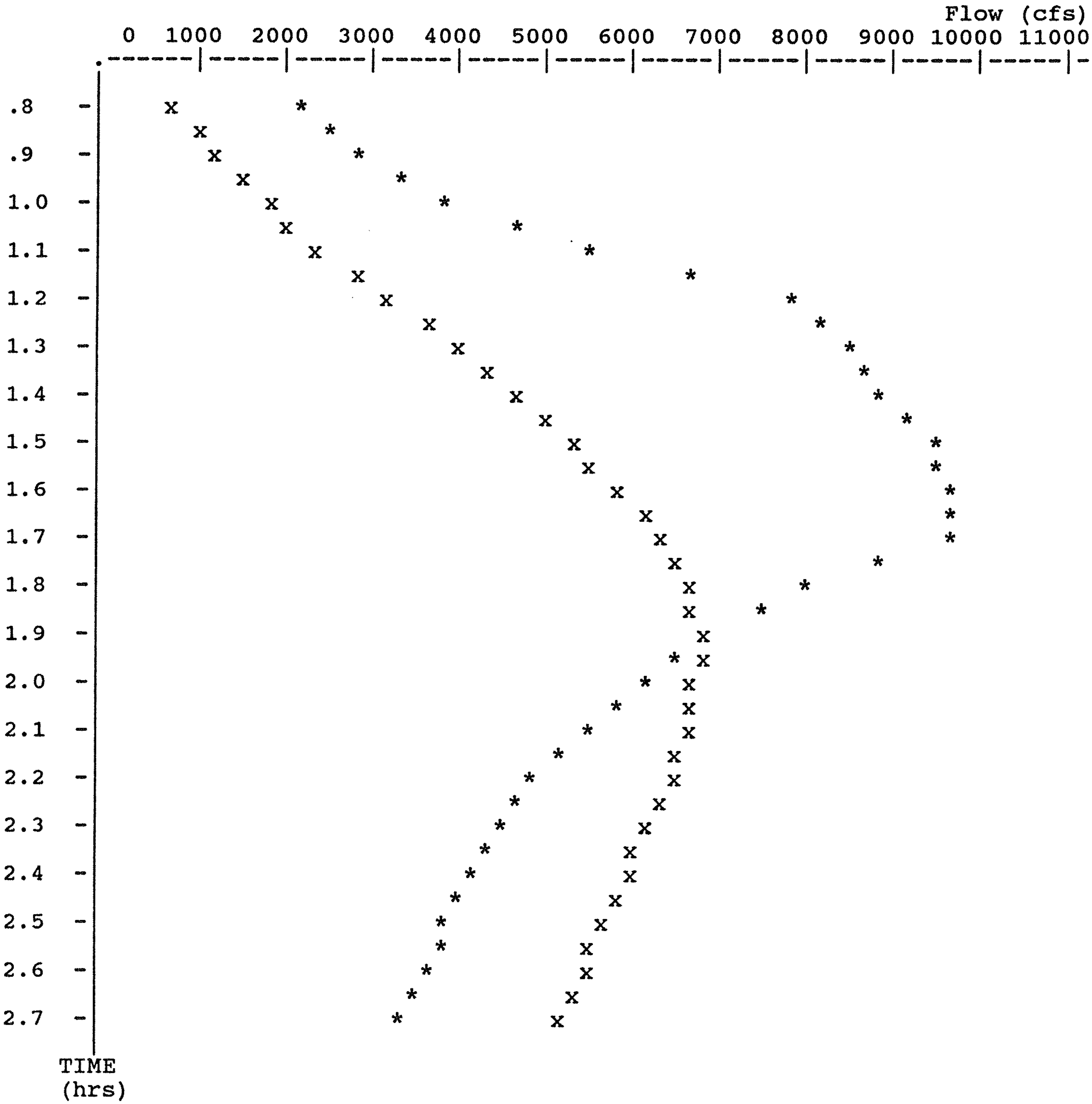
Initial Storage	=	0.00 ac-ft
Peak Storage From Storm	=	319.44 ac-ft
Total Storage in Pond	=	319.44 ac-ft

Warning: Inflow hydrograph truncated on right side.

Pond File: c:\pondpack\kaele\ELAKEBL1.PND
Inflow Hydrograph: c:\pondpack\kaele\ELAKEBL2.HYD
Outflow Hydrograph: c:\pondpack\kaele\ELAKEBLO.HYD

EXECUTED: 04-27-1993
14:20:18

Peak Inflow = 9689.89 cfs
Peak Outflow = 6770.74 cfs
Peak Elevation = 5.79 ft



* File: c:\pondpack\kaele\ELAKEBL2.HYD Qmax = 9689.9 cfs
x File: c:\pondpack\kaele\ELAKEBLO.HYD Qmax = 6770.7 cfs

Flood Routing Analysis - Existing Conditions

Appendix E

Kaelepulu Stream Drainage Study

APPENDIX E-1
FLOOD ROUTING ANALYSIS
EXISTING CONDITIONS
10-YEAR 24-HOUR STORM EVENT

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**************************************************
*                                                *
*        KAELEPULU STREAM DRAINAGE STUDY         *
* FLOOD ROUTING ANALYSIS,  10-YEAR 24-HOUR STORM *
*      DRAINAGE BASIN NO. 5,   AREA = 502 ACRES  *
*          "RESERVOIR" ROUTING ANALYSIS          *
*                                                *
**************************************************
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Inflow Hydrograph: c:\pondpack\kaele\B5-10 .HYD
Rating Table file: c:\pondpack\kaele\B5 .PND

----INITIAL CONDITIONS----
Elevation = 40.00 ft
Outflow = 0.00 cfs
Storage = 0.00 ac-ft

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (ac-ft)	2S/t (cfs)	2S/t + 0 (cfs)
40.00	0.0	0.000	0.0	0.0
41.00	12.0	11.300	2734.6	2746.6
42.00	37.0	22.800	5517.6	5554.6
43.00	70.0	34.700	8397.4	8467.4
44.00	100.0	46.800	11325.6	11425.6
45.00	120.0	59.300	14350.6	14470.6
46.00	140.0	72.000	17424.0	17564.0
47.00	156.0	85.100	20594.2	20750.2
48.00	170.0	98.400	23812.8	23982.8
49.00	184.0	112.100	27128.2	27312.2
50.00	200.0	126.500	30613.0	30813.0
50.20	220.0	129.500	31339.0	31559.0
50.40	257.0	132.400	32040.8	32297.8
50.60	307.0	135.400	32766.8	33073.8
50.80	374.0	138.400	33492.8	33866.8
51.00	461.0	141.400	34218.8	34679.8
51.20	547.0	144.400	34944.8	35491.8
51.40	642.0	147.500	35695.0	36337.0
51.60	743.0	150.500	36421.0	37164.0
51.80	851.0	153.600	37171.2	38022.2
52.00	968.0	156.600	37897.2	38865.2
52.50	1274.0	164.400	39784.8	41058.8
53.00	1609.0	172.300	41696.6	43305.6
53.50	1972.0	185.100	44794.2	46766.2
54.00	2362.0	188.300	45568.6	47930.6
54.50	2777.0	196.500	47553.0	50330.0
55.00	3215.0	204.800	49561.6	52776.6
55.50	3675.0	213.200	51594.4	55269.4

Time increment (t) = 0.100 hrs.

Pond File: c:\pondpack\kaele\B5 .PND
Inflow Hydrograph: c:\pondpack\kaele\B5-10 .HYD
Outflow Hydrograph: c:\pondpack\kaele\B5R-10 .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
9.000	85.00	-----	0.0	0.0	0.00	40.00
9.100	95.00	180.0	178.4	180.0	0.79	40.07
9.200	104.00	199.0	374.1	377.4	1.65	40.14
9.300	114.00	218.0	587.0	592.1	2.59	40.22
9.400	127.00	241.0	820.7	828.0	3.62	40.30
9.500	141.00	268.0	1079.2	1088.7	4.76	40.40
9.600	154.00	295.0	1362.2	1374.2	6.00	40.50
9.700	178.00	332.0	1679.4	1694.2	7.40	40.62
9.800	203.00	381.0	2042.4	2060.4	9.00	40.75
9.900	227.00	430.0	2450.8	2472.4	10.80	40.90
10.000	296.00	523.0	2945.7	2973.8	14.02	41.08
10.100	450.00	746.0	3650.9	3691.7	20.41	41.34
10.200	709.00	1159.0	4749.2	4809.9	30.37	41.73
10.300	1001.00	1710.0	6364.7	6459.2	47.25	42.31
10.400	1143.00	2144.0	8367.8	8508.7	70.42	43.01
10.500	1099.00	2242.0	10426.4	10609.8	91.73	43.72
10.600	928.00	2027.0	12239.9	12453.4	106.75	44.34
10.700	754.00	1682.0	13689.1	13921.9	116.40	44.82
10.800	616.00	1370.0	14811.5	15059.1	123.80	45.19
10.900	527.00	1143.0	15695.3	15954.5	129.59	45.48
11.000	438.00	965.0	16392.0	16660.3	134.16	45.71
11.100	390.00	828.0	16944.4	17220.0	137.78	45.89
11.200	341.00	731.0	17394.3	17675.4	140.56	46.03
11.300	314.00	655.0	17764.4	18049.3	142.44	46.15
11.400	288.00	602.0	18078.4	18366.4	144.03	46.25
11.500	272.00	560.0	18347.6	18638.4	145.40	46.34
11.600	255.00	527.0	18581.4	18874.6	146.58	46.41
11.700	245.00	500.0	18786.2	19081.4	147.62	46.48
11.800	235.00	480.0	18969.1	19266.2	148.55	46.53
11.900	229.00	464.0	19134.3	19433.1	149.39	46.59
12.000	223.00	452.0	19286.0	19586.3	150.16	46.63
12.100	218.00	441.0	19425.3	19727.0	150.86	46.68
12.200	212.00	430.0	19552.3	19855.3	151.51	46.72
12.300	207.00	419.0	19667.1	19971.3	152.09	46.76
12.400	202.00	409.0	19770.9	20076.1	152.61	46.79
12.500	196.00	398.0	19862.7	20168.9	153.08	46.82
12.600	191.00	387.0	19942.7	20249.7	153.49	46.84
12.700	188.00	379.0	20014.0	20321.7	153.85	46.87
12.800	184.00	372.0	20077.7	20386.0	154.17	46.89
12.900	181.00	365.0	20133.8	20442.7	154.46	46.90
13.000	178.00	359.0	20183.4	20492.8	154.71	46.92
13.100	175.00	353.0	20226.5	20536.4	154.93	46.93
13.200	172.00	347.0	20263.3	20573.5	155.11	46.94
13.300	168.00	340.0	20292.8	20603.3	155.26	46.95
13.400	165.00	333.0	20315.0	20625.8	155.38	46.96

Pond File: c:\pondpack\kaele\B5 .PND
Inflow Hydrograph: c:\pondpack\kaele\B5-10 .HYD
Outflow Hydrograph: c:\pondpack\kaele\B5R-10 .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
13.500	162.00	327.0	20331.1	20642.0	155.46	46.97
13.600	158.00	320.0	20340.1	20651.1	155.50	46.97
13.700	154.00	312.0	20341.1	20652.1	155.51	46.97
13.800	150.00	304.0	20334.1	20645.1	155.47	46.97
13.900	146.00	296.0	20319.3	20630.1	155.40	46.96
14.000	142.00	288.0	20296.8	20607.3	155.28	46.96
14.100	139.00	281.0	20267.5	20577.8	155.13	46.95
14.200	136.00	275.0	20232.6	20542.5	154.96	46.93
14.300	132.00	268.0	20191.1	20500.6	154.75	46.92
14.400	129.00	261.0	20143.1	20452.1	154.50	46.91
14.500	126.00	255.0	20089.6	20398.1	154.23	46.89
14.600	125.00	251.0	20032.7	20340.6	153.94	46.87
14.700	124.00	249.0	19974.4	20281.7	153.65	46.85
14.800	124.00	248.0	19915.7	20222.4	153.35	46.83
14.900	123.00	247.0	19856.6	20162.7	153.05	46.82
15.000	122.00	245.0	19796.2	20101.6	152.74	46.80
15.100	121.00	243.0	19734.3	20039.2	152.43	46.78
15.200	120.00	241.0	19671.1	19975.3	152.11	46.76
15.300	120.00	240.0	19607.5	19911.1	151.79	46.74
15.400	119.00	239.0	19543.6	19846.5	151.46	46.72
15.500	118.00	237.0	19478.3	19780.6	151.13	46.70
15.600	117.00	235.0	19411.7	19713.3	150.79	46.67
15.700	116.00	233.0	19343.8	19644.7	150.45	46.65
15.800	116.00	232.0	19275.6	19575.8	150.10	46.63
15.900	115.00	231.0	19207.1	19506.6	149.76	46.61
16.000	114.00	229.0	19137.3	19436.1	149.40	46.59
16.100	113.00	227.0	19066.2	19364.3	149.04	46.57
16.200	112.00	225.0	18993.9	19291.2	148.67	46.54
16.300	111.00	223.0	18920.3	19216.9	148.30	46.52
16.400	110.00	221.0	18845.5	19141.3	147.92	46.50
16.500	110.00	220.0	18770.4	19065.5	147.54	46.47
16.600	109.00	219.0	18695.1	18989.4	147.16	46.45
16.700	108.00	217.0	18618.5	18912.1	146.77	46.42
16.800	107.00	215.0	18540.8	18833.5	146.38	46.40
16.900	106.00	213.0	18461.8	18753.8	145.97	46.37
17.000	105.00	211.0	18381.7	18672.8	145.57	46.35
17.100	105.00	210.0	18301.4	18591.7	145.16	46.32
17.200	104.00	209.0	18220.9	18510.4	144.75	46.30
17.300	104.00	208.0	18140.2	18428.9	144.34	46.27
17.400	103.00	207.0	18059.3	18347.2	143.93	46.25
17.500	103.00	206.0	17978.3	18265.3	143.52	46.22
17.600	103.00	206.0	17898.0	18184.3	143.11	46.19
17.700	102.00	205.0	17817.6	18103.0	142.71	46.17
17.800	102.00	204.0	17737.0	18021.6	142.30	46.14
17.900	101.00	203.0	17656.2	17940.0	141.89	46.12
18.000	101.00	202.0	17575.3	17858.2	141.48	46.09

EXECUTED: 05-04-1993 12:29:18

Pond File: c:\pondpack\kaele\B5 .PND
Inflow Hydrograph: c:\pondpack\kaele\B5-10 .HYD
Outflow Hydrograph: c:\pondpack\kaele\B5R-10 .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
18.100	100.00	201.0	17494.2	17776.3	141.07	46.07
18.200	99.00	199.0	17411.9	17693.2	140.65	46.04
18.300	99.00	198.0	17329.4	17609.9	140.23	46.01
18.400	98.00	197.0	17246.9	17526.4	139.76	45.99
18.500	97.00	195.0	17163.5	17441.9	139.21	45.96
18.600	96.00	193.0	17079.2	17356.5	138.66	45.93
18.700	95.00	191.0	16994.0	17270.2	138.10	45.91
18.800	95.00	190.0	16908.9	17184.0	137.54	45.88
18.900	94.00	189.0	16823.9	17097.9	136.99	45.85
19.000	93.00	187.0	16738.0	17010.9	136.42	45.82
19.100	92.00	185.0	16651.3	16923.0	135.86	45.79
19.200	91.00	183.0	16563.8	16834.3	135.28	45.76
19.300	91.00	182.0	16476.3	16745.8	134.71	45.74
19.400	90.00	181.0	16389.1	16657.3	134.14	45.71
19.500	89.00	179.0	16300.9	16568.1	133.56	45.68
19.600	88.00	177.0	16212.0	16477.9	132.98	45.65
19.700	87.00	175.0	16122.2	16387.0	132.39	45.62
19.800	87.00	174.0	16032.6	16296.2	131.80	45.59
19.900	86.00	173.0	15943.2	16205.6	131.22	45.56
20.000	85.00	171.0	15852.9	16114.2	130.63	45.53
20.100	84.00	169.0	15761.9	16021.9	130.03	45.50
20.200	84.00	168.0	15671.0	15929.9	129.43	45.47
20.300	83.00	167.0	15580.3	15838.0	128.84	45.44
20.400	82.00	165.0	15488.8	15745.3	128.24	45.41
20.500	82.00	164.0	15397.5	15652.8	127.64	45.38
20.600	81.00	163.0	15306.4	15560.5	127.05	45.35
20.700	80.00	161.0	15214.6	15467.4	126.44	45.32
20.800	79.00	159.0	15121.9	15373.6	125.84	45.29
20.900	79.00	158.0	15029.4	15279.9	125.23	45.26
21.000	78.00	157.0	14937.2	15186.4	124.63	45.23
21.100	77.00	155.0	14844.1	15092.2	124.02	45.20
21.200	77.00	154.0	14751.3	14998.1	123.41	45.17
21.300	76.00	153.0	14658.7	14904.3	122.80	45.14
21.400	75.00	151.0	14565.3	14809.7	122.19	45.11
21.500	74.00	149.0	14471.2	14714.3	121.58	45.08
21.600	74.00	148.0	14377.2	14619.2	120.96	45.05
21.700	73.00	147.0	14283.5	14524.2	120.35	45.02
21.800	72.00	145.0	14189.1	14428.5	119.72	44.99
21.900	72.00	144.0	14094.9	14333.1	119.10	44.95
22.000	71.00	143.0	14001.0	14237.9	118.47	44.92
22.100	70.00	141.0	13906.3	14142.0	117.84	44.89
22.200	70.00	140.0	13811.8	14046.3	117.21	44.86
22.300	69.00	139.0	13717.7	13950.8	116.59	44.83
22.400	68.00	137.0	13622.8	13854.7	115.95	44.80
22.500	68.00	136.0	13528.1	13758.8	115.32	44.77
22.600	67.00	135.0	13433.7	13663.1	114.70	44.73

Pond File: c:\pondpack\kaele\B5 .PND
Inflow Hydrograph: c:\pondpack\kaele\B5-10 .HYD
Outflow Hydrograph: c:\pondpack\kaele\B5R-10 .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
22.700	66.00	133.0	13338.6	13566.7	114.06	44.70
22.800	65.00	131.0	13242.7	13469.6	113.43	44.67
22.900	65.00	130.0	13147.2	13372.7	112.79	44.64
23.000	64.00	129.0	13051.9	13276.2	112.15	44.61
23.100	63.00	127.0	12955.8	13178.9	111.52	44.58
23.200	63.00	126.0	12860.1	13081.8	110.88	44.54
23.300	62.00	125.0	12764.6	12985.1	110.24	44.51
23.400	61.00	123.0	12668.4	12887.6	109.60	44.48
23.500	60.00	121.0	12571.5	12789.4	108.96	44.45
23.600	60.00	120.0	12474.8	12691.5	108.31	44.42
23.700	59.00	119.0	12378.5	12593.8	107.67	44.38
23.800	58.00	117.0	12281.4	12495.5	107.03	44.35
23.900	58.00	116.0	12184.7	12397.4	106.38	44.32

****************** SUMMARY OF ROUTING COMPUTATIONS ******************

```
Pond File:           c:\pondpack\kaele\B5       .PND
Inflow Hydrograph:   c:\pondpack\kaele\B5-10    .HYD
Outflow Hydrograph:  c:\pondpack\kaele\B5R-10   .HYD
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Starting Pond W.S. Elevation = 40.00 ft

***** Summary of Peak Outflow and Peak Elevation *****

Peak Inflow	=	1143.00 cfs
Peak Outflow	=	155.51 cfs
Peak Elevation	=	46.97 ft

***** Summary of Approximate Peak Storage *****

Initial Storage	=	0.00 ac-ft
Peak Storage From Storm	=	84.70 ac-ft
Total Storage in Pond	=	84.70 ac-ft

Warning: Inflow hydrograph truncated on left side.
Warning: Inflow hydrograph truncated on right side.

```
Pond File:           c:\pondpack\kaele\B5       .PND
Inflow Hydrograph:   c:\pondpack\kaele\B5-10    .HYD
Outflow Hydrograph:  c:\pondpack\kaele\B5R-10   .HYD
                                                    EXECUTED: 05-04-1993
Peak Inflow     =  1143.00 cfs                                  12:29:18
Peak Outflow    =   155.51 cfs
Peak Elevation  =    46.97 ft
```

```
                                                                 Flow (cfs)
        0   150   300   450   600   750   900   1050  1200  1350  1500  1650
      .------|------|------|------|------|------|------|------|------|------|------|------|-
      |
 9.7 -|x      *
      |x       *
 9.8 -|x       *
      |x        *
 9.9 -|x        *
      |x         *
10.0 -| x          *
      | x             *
10.1 -| x                *
      | x                     *
10.2 -| x                          *
      |  x                               *
10.3 -|  x                                     *
      |  x                                        *
10.4 -|   x                                          *
      |   x                                         *
10.5 -|    x                                       *
      |    x                                    *
10.6 -|    x                                *
      |    x                             *
10.7 -|     x                        *
      |     x                     *
10.8 -|     x                   *
      |     x                 *
10.9 -|     x               *
      |     x             *
11.0 -|     x            *
      |     x           *
11.1 -|      x         *
      |      x        *
11.2 -|      x       *
      |      x      *
11.3 -|      x      *
      |      x     *
11.4 -|      x     *
      |      x    *
11.5 -|      x    *
      |      x    *
11.6 -|      x   *
      |
   TIME
   (hrs)
```

```
* File:  c:\pondpack\kaele\B5-10   .HYD   Qmax =  1143.0 cfs
x File:  c:\pondpack\kaele\B5R-10  .HYD   Qmax =   155.5 cfs
```

Executed 05-04-1993 12:38:43

Data directory: c:\pondpack\kaele*.HYD

File Summary for Composite Hydrograph

Time (hrs)	B5R-10 (cfs)	B4-10 (cfs)	B45R-10 (Total)
0.00	0.0	Missing	0.0
0.10	0.0	Missing	0.0
0.20	0.0	Missing	0.0
0.30	0.0	Missing	0.0
0.40	0.0	Missing	0.0
0.50	0.0	Missing	0.0
0.60	0.0	Missing	0.0
0.70	0.0	Missing	0.0
0.80	0.0	Missing	0.0
0.90	0.0	Missing	0.0
1.00	0.0	Missing	0.0
1.10	0.0	Missing	0.0
1.20	0.0	Missing	0.0
1.30	0.0	Missing	0.0
1.40	0.0	Missing	0.0
1.50	0.0	Missing	0.0
1.60	0.0	Missing	0.0
1.70	0.0	Missing	0.0
1.80	0.0	Missing	0.0
1.90	0.0	Missing	0.0
2.00	0.0	Missing	0.0
2.10	0.0	Missing	0.0
2.20	0.0	Missing	0.0
2.30	0.0	Missing	0.0
2.40	0.0	Missing	0.0
2.50	0.0	Missing	0.0
2.60	0.0	Missing	0.0
2.70	0.0	Missing	0.0
2.80	0.0	Missing	0.0
2.90	0.0	Missing	0.0
3.00	0.0	Missing	0.0
3.10	0.0	Missing	0.0
3.20	0.0	Missing	0.0
3.30	0.0	Missing	0.0
3.40	0.0	Missing	0.0
3.50	0.0	Missing	0.0
3.60	0.0	Missing	0.0
3.70	0.0	Missing	0.0
3.80	0.0	Missing	0.0
3.90	0.0	Missing	0.0

Executed 05-04-1993 12:38:43

Data directory: c:\pondpack\kaele*.HYD

File Summary for Composite Hydrograph

Time (hrs)	B5R-10 (cfs)	B4-10 (cfs)	B45R-10 (Total)
4.00	0.0	Missing	0.0
4.10	0.0	Missing	0.0
4.20	0.0	Missing	0.0
4.30	0.0	Missing	0.0
4.40	0.0	Missing	0.0
4.50	0.0	Missing	0.0
4.60	0.0	Missing	0.0
4.70	0.0	Missing	0.0
4.80	0.0	Missing	0.0
4.90	0.0	Missing	0.0
5.00	0.0	Missing	0.0
5.10	0.0	Missing	0.0
5.20	0.0	Missing	0.0
5.30	0.0	Missing	0.0
5.40	0.0	Missing	0.0
5.50	0.0	Missing	0.0
5.60	0.0	Missing	0.0
5.70	0.0	Missing	0.0
5.80	0.0	Missing	0.0
5.90	0.0	Missing	0.0
6.00	0.0	Missing	0.0
6.10	0.0	Missing	0.0
6.20	0.0	Missing	0.0
6.30	0.0	Missing	0.0
6.40	0.0	Missing	0.0
6.50	0.0	Missing	0.0
6.60	0.0	Missing	0.0
6.70	0.0	Missing	0.0
6.80	0.0	Missing	0.0
6.90	0.0	Missing	0.0
7.00	0.0	Missing	0.0
7.10	0.0	Missing	0.0
7.20	0.0	Missing	0.0
7.30	0.0	Missing	0.0
7.40	0.0	Missing	0.0
7.50	0.0	Missing	0.0
7.60	0.0	Missing	0.0
7.70	0.0	Missing	0.0
7.80	0.0	Missing	0.0
7.90	0.0	Missing	0.0
8.00	0.0	Missing	0.0

Executed 05-04-1993 12:38:43

Data directory: c:\pondpack\kaele*.HYD

File Summary for Composite Hydrograph

Time (hrs)	B5R-10 (cfs)	B4-10 (cfs)	B45R-10 (Total)
8.10	0.0	Missing	0.0
8.20	0.0	Missing	0.0
8.30	0.0	Missing	0.0
8.40	0.0	Missing	0.0
8.50	0.0	Missing	0.0
8.60	0.0	Missing	0.0
8.70	0.0	Missing	0.0
8.80	0.0	Missing	0.0
8.90	0.0	Missing	0.0
9.00	0.0	198.0	198.0
9.10	0.8	223.0	223.8
9.20	1.6	248.0	249.6
9.30	2.6	273.0	275.6
9.40	3.6	306.0	309.6
9.50	4.8	339.0	343.8
9.60	6.0	372.0	378.0
9.70	7.4	417.0	424.4
9.80	9.0	463.0	472.0
9.90	10.8	508.0	518.8
10.00	14.0	582.0	596.0
10.10	20.4	731.0	751.4
10.20	30.4	1016.0	1046.4
10.30	47.3	1474.0	1521.3
10.40	70.4	2069.0	2139.4
10.50	91.7	2589.0	2680.7
10.60	106.8	2837.0	2943.8
10.70	116.4	2887.0	3003.4
10.80	123.8	2627.0	2750.8
10.90	129.6	2311.0	2440.6
11.00	134.2	1995.0	2129.2
11.10	137.8	1753.0	1890.8
11.20	140.6	1511.0	1651.6
11.30	142.4	1356.0	1498.4
11.40	144.0	1202.0	1346.0
11.50	145.4	1096.0	1241.4
11.60	146.6	991.0	1137.6
11.70	147.6	923.0	1070.6
11.80	148.6	855.0	1003.5
11.90	149.4	811.0	960.4
12.00	150.2	768.0	918.2
12.10	150.9	743.0	893.9

Executed 05-04-1993 12:38:43

Data directory: c:\pondpack\kaele*.HYD

File Summary for Composite Hydrograph

Time (hrs)	B5R-10 (cfs)	B4-10 (cfs)	B45R-10 (Total)
12.20	151.5	719.0	870.5
12.30	152.1	694.0	846.1
12.40	152.6	673.0	825.6
12.50	153.1	653.0	806.1
12.60	153.5	632.0	785.5
12.70	153.9	616.0	769.8
12.80	154.2	601.0	755.2
12.90	154.5	585.0	739.5
13.00	154.7	570.0	724.7
13.10	154.9	560.0	714.9
13.20	155.1	550.0	705.1
13.30	155.3	540.0	695.3
13.40	155.4	530.0	685.4
13.50	155.5	520.0	675.5
13.60	155.5	510.0	665.5
13.70	155.5	500.0	655.5
13.80	155.5	491.0	646.5
13.90	155.4	481.0	636.4
14.00	155.3	471.0	626.3
14.10	155.1	459.0	614.1
14.20	155.0	446.0	601.0
14.30	154.8	434.0	588.8
14.40	154.5	421.0	575.5
14.50	154.2	409.0	563.2
14.60	153.9	404.0	557.9
14.70	153.6	399.0	552.7
14.80	153.4	394.0	547.3
14.90	153.1	389.0	542.0
15.00	152.7	384.0	536.7
15.10	152.4	379.0	531.4
15.20	152.1	374.0	526.1
15.30	151.8	369.0	520.8
15.40	151.5	364.0	515.5
15.50	151.1	359.0	510.1
15.60	150.8	357.0	507.8
15.70	150.4	354.0	504.5
15.80	150.1	352.0	502.1
15.90	149.8	349.0	498.8
16.00	149.4	347.0	496.4
16.10	149.0	346.0	495.0
16.20	148.7	345.0	493.7

Executed 05-04-1993 12:38:43

Data directory: c:\pondpack\kaele*.HYD

File Summary for Composite Hydrograph

Time (hrs)	B5R-10 (cfs)	B4-10 (cfs)	B45R-10 (Total)
16.30	148.3	343.0	491.3
16.40	147.9	342.0	489.9
16.50	147.5	341.0	488.5
16.60	147.2	340.0	487.2
16.70	146.8	339.0	485.8
16.80	146.4	337.0	483.4
16.90	146.0	336.0	482.0
17.00	145.6	335.0	480.6
17.10	145.2	332.0	477.2
17.20	144.8	330.0	474.8
17.30	144.3	328.0	472.3
17.40	143.9	325.0	468.9
17.50	143.5	322.0	465.5
17.60	143.1	320.0	463.1
17.70	142.7	318.0	460.7
17.80	142.3	315.0	457.3
17.90	141.9	312.0	453.9
18.00	141.5	310.0	451.5
18.10	141.1	308.0	449.1
18.20	140.6	306.0	446.6
18.30	140.2	304.0	444.2
18.40	139.8	303.0	442.8
18.50	139.2	301.0	440.2
18.60	138.7	299.0	437.7
18.70	138.1	297.0	435.1
18.80	137.5	295.0	432.5
18.90	137.0	293.0	430.0
19.00	136.4	292.0	428.4
19.10	135.9	290.0	425.9
19.20	135.3	288.0	423.3
19.30	134.7	286.0	420.7
19.40	134.1	284.0	418.1
19.50	133.6	282.0	415.6
19.60	133.0	280.0	413.0
19.70	132.4	279.0	411.4
19.80	131.8	277.0	408.8
19.90	131.2	275.0	406.2
20.00	130.6	273.0	403.6
20.10	130.0	270.0	400.0
20.20	129.4	268.0	397.4
20.30	128.8	266.0	394.8

Executed 05-04-1993 12:38:43

Data directory: c:\pondpack\kaele*.HYD

File Summary for Composite Hydrograph

Time (hrs)	B5R-10 (cfs)	B4-10 (cfs)	B45R-10 (Total)
20.40	128.2	263.0	391.2
20.50	127.6	260.0	387.6
20.60	127.1	258.0	385.0
20.70	126.4	256.0	382.4
20.80	125.8	253.0	378.8
20.90	125.2	250.0	375.2
21.00	124.6	248.0	372.6
21.10	124.0	246.0	370.0
21.20	123.4	243.0	366.4
21.30	122.8	240.0	362.8
21.40	122.2	238.0	360.2
21.50	121.6	236.0	357.6
21.60	121.0	233.0	354.0
21.70	120.3	230.0	350.4
21.80	119.7	228.0	347.7
21.90	119.1	226.0	345.1
22.00	118.5	223.0	341.5
22.10	117.8	220.0	337.8
22.20	117.2	218.0	335.2
22.30	116.6	216.0	332.6
22.40	115.9	213.0	329.0
22.50	115.3	210.0	325.3
22.60	114.7	208.0	322.7
22.70	114.1	206.0	320.1
22.80	113.4	203.0	316.4
22.90	112.8	200.0	312.8
23.00	112.2	198.0	310.1
23.10	111.5	196.0	307.5
23.20	110.9	193.0	303.9
23.30	110.2	190.0	300.2
23.40	109.6	188.0	297.6
23.50	109.0	186.0	295.0
23.60	108.3	183.0	291.3
23.70	107.7	180.0	287.7
23.80	107.0	178.0	285.0
23.90	106.4	176.0	282.4
24.00	Missing	Missing	0.0

```
*****************************************************************
*                                                               *
*             KAELEPULU STREAM DRAINAGE STUDY                   *
*   EXISTING CONDITIONS - 1993,  10-YEAR 24-HOUR DESIGN STORM   *
*         ENCHANTED LAKE RETENTION BASIN (AREA NO. 4)           *
*       UNIMPROVED CHANNEL "RESERVOIR" ROUTING ANALYSIS         *
*                                                               *
*****************************************************************
```

Inflow Hydrograph: c:\pondpack\kaele\B45R-10 .HYD
Rating Table file: c:\pondpack\kaele\B4B .PND

----INITIAL CONDITIONS----
Elevation = 1.80 ft
Outflow = 0.00 cfs
Storage = 0.00 ac-ft

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (ac-ft)	2S/t (cfs)	2S/t + 0 (cfs)
1.80	0.0	0.000	0.0	0.0
2.00	97.0	20.000	4840.0	4937.0
2.20	195.0	40.000	9680.0	9875.0
2.40	293.0	60.000	14520.0	14813.0
2.60	390.0	80.000	19360.0	19750.0
2.80	475.0	100.000	24200.0	24675.0
3.00	558.0	120.000	29040.0	29598.0
3.20	668.0	140.000	33880.0	34548.0
3.40	722.0	160.000	38720.0	39442.0
3.60	804.0	180.000	43560.0	44364.0
3.80	886.0	200.000	48400.0	49286.0
4.00	1033.0	220.000	53240.0	54273.0

Time increment (t) = 0.100 hrs.

Pond File: c:\pondpack\kaele\B4B .PND
Inflow Hydrograph: c:\pondpack\kaele\B45R-10 .HYD
Outflow Hydrograph: c:\pondpack\kaele\B4RB-10 .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.000	0.00	-----	0.0	0.0	0.00	1.80
0.100	0.00	0.0	0.0	0.0	0.00	1.80
0.200	0.00	0.0	0.0	0.0	0.00	1.80
0.300	0.00	0.0	0.0	0.0	0.00	1.80
0.400	0.00	0.0	0.0	0.0	0.00	1.80
0.500	0.00	0.0	0.0	0.0	0.00	1.80
0.600	0.00	0.0	0.0	0.0	0.00	1.80
0.700	0.00	0.0	0.0	0.0	0.00	1.80
0.800	0.00	0.0	0.0	0.0	0.00	1.80
0.900	0.00	0.0	0.0	0.0	0.00	1.80
1.000	0.00	0.0	0.0	0.0	0.00	1.80
1.100	0.00	0.0	0.0	0.0	0.00	1.80
1.200	0.00	0.0	0.0	0.0	0.00	1.80
1.300	0.00	0.0	0.0	0.0	0.00	1.80
1.400	0.00	0.0	0.0	0.0	0.00	1.80
1.500	0.00	0.0	0.0	0.0	0.00	1.80
1.600	0.00	0.0	0.0	0.0	0.00	1.80
1.700	0.00	0.0	0.0	0.0	0.00	1.80
1.800	0.00	0.0	0.0	0.0	0.00	1.80
1.900	0.00	0.0	0.0	0.0	0.00	1.80
2.000	0.00	0.0	0.0	0.0	0.00	1.80
2.100	0.00	0.0	0.0	0.0	0.00	1.80
2.200	0.00	0.0	0.0	0.0	0.00	1.80
2.300	0.00	0.0	0.0	0.0	0.00	1.80
2.400	0.00	0.0	0.0	0.0	0.00	1.80
2.500	0.00	0.0	0.0	0.0	0.00	1.80
2.600	0.00	0.0	0.0	0.0	0.00	1.80
2.700	0.00	0.0	0.0	0.0	0.00	1.80
2.800	0.00	0.0	0.0	0.0	0.00	1.80
2.900	0.00	0.0	0.0	0.0	0.00	1.80
3.000	0.00	0.0	0.0	0.0	0.00	1.80
3.100	0.00	0.0	0.0	0.0	0.00	1.80
3.200	0.00	0.0	0.0	0.0	0.00	1.80
3.300	0.00	0.0	0.0	0.0	0.00	1.80
3.400	0.00	0.0	0.0	0.0	0.00	1.80
3.500	0.00	0.0	0.0	0.0	0.00	1.80
3.600	0.00	0.0	0.0	0.0	0.00	1.80
3.700	0.00	0.0	0.0	0.0	0.00	1.80
3.800	0.00	0.0	0.0	0.0	0.00	1.80
3.900	0.00	0.0	0.0	0.0	0.00	1.80
4.000	0.00	0.0	0.0	0.0	0.00	1.80
4.100	0.00	0.0	0.0	0.0	0.00	1.80
4.200	0.00	0.0	0.0	0.0	0.00	1.80
4.300	0.00	0.0	0.0	0.0	0.00	1.80
4.400	0.00	0.0	0.0	0.0	0.00	1.80

Pond File: c:\pondpack\kaele\B4B .PND
Inflow Hydrograph: c:\pondpack\kaele\B45R-10 .HYD
Outflow Hydrograph: c:\pondpack\kaele\B4RB-10 .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
4.500	0.00	0.0	0.0	0.0	0.00	1.80
4.600	0.00	0.0	0.0	0.0	0.00	1.80
4.700	0.00	0.0	0.0	0.0	0.00	1.80
4.800	0.00	0.0	0.0	0.0	0.00	1.80
4.900	0.00	0.0	0.0	0.0	0.00	1.80
5.000	0.00	0.0	0.0	0.0	0.00	1.80
5.100	0.00	0.0	0.0	0.0	0.00	1.80
5.200	0.00	0.0	0.0	0.0	0.00	1.80
5.300	0.00	0.0	0.0	0.0	0.00	1.80
5.400	0.00	0.0	0.0	0.0	0.00	1.80
5.500	0.00	0.0	0.0	0.0	0.00	1.80
5.600	0.00	0.0	0.0	0.0	0.00	1.80
5.700	0.00	0.0	0.0	0.0	0.00	1.80
5.800	0.00	0.0	0.0	0.0	0.00	1.80
5.900	0.00	0.0	0.0	0.0	0.00	1.80
6.000	0.00	0.0	0.0	0.0	0.00	1.80
6.100	0.00	0.0	0.0	0.0	0.00	1.80
6.200	0.00	0.0	0.0	0.0	0.00	1.80
6.300	0.00	0.0	0.0	0.0	0.00	1.80
6.400	0.00	0.0	0.0	0.0	0.00	1.80
6.500	0.00	0.0	0.0	0.0	0.00	1.80
6.600	0.00	0.0	0.0	0.0	0.00	1.80
6.700	0.00	0.0	0.0	0.0	0.00	1.80
6.800	0.00	0.0	0.0	0.0	0.00	1.80
6.900	0.00	0.0	0.0	0.0	0.00	1.80
7.000	0.00	0.0	0.0	0.0	0.00	1.80
7.100	0.00	0.0	0.0	0.0	0.00	1.80
7.200	0.00	0.0	0.0	0.0	0.00	1.80
7.300	0.00	0.0	0.0	0.0	0.00	1.80
7.400	0.00	0.0	0.0	0.0	0.00	1.80
7.500	0.00	0.0	0.0	0.0	0.00	1.80
7.600	0.00	0.0	0.0	0.0	0.00	1.80
7.700	0.00	0.0	0.0	0.0	0.00	1.80
7.800	0.00	0.0	0.0	0.0	0.00	1.80
7.900	0.00	0.0	0.0	0.0	0.00	1.80
8.000	0.00	0.0	0.0	0.0	0.00	1.80
8.100	0.00	0.0	0.0	0.0	0.00	1.80
8.200	0.00	0.0	0.0	0.0	0.00	1.80
8.300	0.00	0.0	0.0	0.0	0.00	1.80
8.400	0.00	0.0	0.0	0.0	0.00	1.80
8.500	0.00	0.0	0.0	0.0	0.00	1.80
8.600	0.00	0.0	0.0	0.0	0.00	1.80
8.700	0.00	0.0	0.0	0.0	0.00	1.80
8.800	0.00	0.0	0.0	0.0	0.00	1.80
8.900	0.00	0.0	0.0	0.0	0.00	1.80
9.000	198.00	198.0	190.2	198.0	3.89	1.81

Pond File: c:\pondpack\kaele\B4B .PND
Inflow Hydrograph: c:\pondpack\kaele\B45R-10 .HYD
Outflow Hydrograph: c:\pondpack\kaele\B4RB-10 .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
9.100	223.79	421.8	588.0	612.0	12.02	1.82
9.200	249.65	473.4	1019.7	1061.4	20.85	1.84
9.300	275.59	525.2	1484.2	1544.9	30.35	1.86
9.400	309.62	585.2	1988.1	2069.4	40.66	1.88
9.500	343.76	653.4	2537.7	2641.5	51.90	1.91
9.600	378.00	721.8	3131.4	3259.5	64.04	1.93
9.700	424.40	802.4	3779.2	3933.8	77.29	1.96
9.800	472.00	896.4	4491.9	4675.6	91.86	1.99
9.900	518.80	990.8	5267.0	5482.7	107.83	2.02
10.000	596.02	1114.8	6130.5	6381.8	125.67	2.06
10.100	751.41	1347.4	7183.1	7477.9	147.43	2.10
10.200	1046.37	1797.8	8626.3	8980.8	177.25	2.16
10.300	1521.25	2567.6	10751.6	11194.0	221.18	2.25
10.400	2139.43	3660.7	13842.2	14412.3	285.05	2.38
10.500	2680.73	4820.2	17925.1	18662.3	368.63	2.56
10.600	2943.75	5624.5	22638.4	23549.6	455.58	2.75
10.700	3003.40	5947.2	27503.7	28585.6	540.93	2.96
10.800	2750.80	5754.2	31979.2	33257.9	639.33	3.15
10.900	2440.59	5191.4	35776.8	37170.6	696.94	3.31
11.000	2129.16	4569.8	38872.4	40346.5	737.07	3.44
11.100	1890.78	4019.9	41333.3	42892.3	779.48	3.54
11.200	1651.56	3542.3	43250.6	44875.7	812.52	3.62
11.300	1498.44	3150.0	44724.8	46400.6	837.93	3.68
11.400	1346.03	2844.5	45854.4	47569.2	857.40	3.73
11.500	1241.40	2587.4	46698.0	48441.9	871.94	3.77
11.600	1137.58	2379.0	47311.9	49077.0	882.52	3.79
11.700	1070.62	2208.2	47734.3	49520.1	892.90	3.81
11.800	1003.55	2074.2	48005.7	49808.5	901.40	3.82
11.900	960.39	1963.9	48157.3	49969.6	906.15	3.83
12.000	918.16	1878.6	48219.7	50035.9	908.10	3.83
12.100	893.86	1812.0	48215.7	50031.7	907.98	3.83
12.200	870.51	1764.4	48167.2	49980.1	906.46	3.83
12.300	846.09	1716.6	48076.6	49883.8	903.62	3.82
12.400	825.61	1671.7	47949.0	49748.3	899.63	3.82
12.500	806.08	1631.7	47791.3	49580.7	894.69	3.81
12.600	785.49	1591.6	47605.2	49382.9	888.86	3.80
12.700	769.85	1555.3	47392.7	49160.5	883.91	3.79
12.800	755.17	1525.0	47158.0	48917.7	879.86	3.79
12.900	739.46	1494.6	46901.7	48652.6	875.45	3.77
13.000	724.71	1464.2	46624.5	48365.9	870.67	3.76
13.100	714.93	1439.6	46332.9	48064.2	865.64	3.75
13.200	705.11	1420.0	46032.0	47752.9	860.46	3.74
13.300	695.26	1400.4	45722.2	47432.4	855.12	3.72
13.400	685.38	1380.6	45403.5	47102.8	849.63	3.71
13.500	675.46	1360.8	45076.4	46764.4	843.99	3.70
13.600	665.50	1341.0	44740.9	46417.4	838.21	3.68

POND-2 Version: 5.17 S/N:
EXECUTED: 10-14-1993 14:34:20

Pond File: c:\pondpack\kaele\B4B .PND
Inflow Hydrograph: c:\pondpack\kaele\B45R-10 .HYD
Outflow Hydrograph: c:\pondpack\kaele\B4RB-10 .HYD

INFLOW HYDROGRAPH / ROUTING COMPUTATIONS

TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
13.700	655.51	1321.0	44397.4	46061.9	832.29	3.67
13.800	646.47	1302.0	44046.9	45699.4	826.25	3.65
13.900	636.40	1282.9	43689.6	45329.7	820.09	3.64
14.000	626.28	1262.7	43324.6	44952.2	813.80	3.62
14.100	614.13	1240.4	42950.3	44565.0	807.35	3.61
14.200	600.96	1215.1	42564.1	44165.4	800.69	3.59
14.300	588.75	1189.7	42166.1	43753.8	793.83	3.58
14.400	575.50	1164.3	41756.8	43330.3	786.78	3.56
14.500	563.23	1138.7	41336.4	42895.5	779.54	3.54
14.600	557.94	1121.2	40913.1	42457.6	772.24	3.52
14.700	552.65	1110.6	40493.7	42023.7	765.01	3.50
14.800	547.35	1100.0	40078.0	41593.7	757.85	3.49
14.900	542.05	1089.4	39665.9	41167.4	750.75	3.47
15.000	536.74	1078.8	39257.3	40744.7	743.70	3.45
15.100	531.43	1068.2	38852.0	40325.5	736.72	3.44
15.200	526.11	1057.5	38450.0	39909.6	729.79	3.42
15.300	520.79	1046.9	38051.1	39496.9	722.91	3.40
15.400	515.46	1036.3	37651.1	39087.3	718.09	3.39
15.500	510.13	1025.6	37249.6	38676.7	713.56	3.37
15.600	507.79	1017.9	36849.5	38267.5	709.04	3.35
15.700	504.45	1012.2	36452.6	37861.7	704.56	3.34
15.800	502.10	1006.6	36058.9	37459.1	700.12	3.32
15.900	498.76	1000.9	35668.3	37059.7	695.71	3.30
16.000	496.40	995.2	35280.8	36663.5	691.34	3.29
16.100	495.04	991.4	34898.2	36272.2	687.02	3.27
16.200	493.67	988.7	34521.3	35886.9	682.77	3.25
16.300	491.30	985.0	34149.2	35506.3	678.57	3.24
16.400	489.92	981.2	33781.5	35130.4	674.43	3.22
16.500	488.54	978.5	33419.3	34760.0	670.34	3.21
16.600	487.16	975.7	33065.8	34395.0	664.60	3.19
16.700	485.77	972.9	32725.4	34038.7	656.68	3.18
16.800	483.38	969.2	32396.5	33694.5	649.03	3.17
16.900	481.97	965.4	32078.5	33361.8	641.64	3.15
17.000	480.57	962.5	31772.0	33041.1	634.51	3.14
17.100	477.16	957.7	31474.6	32729.8	627.59	3.13
17.200	474.75	951.9	31184.8	32426.5	620.86	3.11
17.300	472.34	947.1	30903.3	32131.9	614.31	3.10
17.400	468.93	941.3	30628.7	31844.5	607.92	3.09
17.500	465.52	934.5	30359.8	31563.1	601.67	3.08
17.600	463.11	928.6	30097.3	31288.4	595.56	3.07
17.700	460.71	923.8	29841.9	31021.1	589.62	3.06
17.800	457.30	918.0	29592.2	30759.9	583.82	3.05
17.900	453.89	911.2	29347.2	30503.4	578.12	3.04
18.000	451.48	905.4	29107.5	30252.6	572.55	3.03
18.100	449.07	900.6	28873.8	30008.0	567.11	3.02
18.200	446.65	895.7	28645.9	29769.5	561.81	3.01

Pond File: c:\pondpack\kaele\B4B .PND
Inflow Hydrograph: c:\pondpack\kaele\B45R-10 .HYD
Outflow Hydrograph: c:\pondpack\kaele\B4RB-10 .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
18.300	444.23	890.9	28422.8	29536.8	556.97	3.00
18.400	442.76	887.0	28203.5	29309.8	553.14	2.99
18.500	440.21	883.0	27987.8	29086.5	549.38	2.98
18.600	437.66	877.9	27774.3	28865.6	545.65	2.97
18.700	435.10	872.8	27563.1	28647.1	541.97	2.96
18.800	432.54	867.6	27354.1	28430.8	538.32	2.95
18.900	429.99	862.5	27147.2	28216.7	534.71	2.94
19.000	428.42	858.4	26943.4	28005.7	531.15	2.94
19.100	425.86	854.3	26742.3	27797.6	527.65	2.93
19.200	423.28	849.1	26543.1	27591.5	524.17	2.92
19.300	420.71	844.0	26345.7	27387.1	520.73	2.91
19.400	418.14	838.8	26149.9	27184.5	517.31	2.90
19.500	415.56	833.7	25955.8	26983.6	513.92	2.89
19.600	412.98	828.5	25763.2	26784.3	510.56	2.89
19.700	411.39	824.4	25573.1	26587.5	507.24	2.88
19.800	408.80	820.2	25385.3	26393.2	503.97	2.87
19.900	406.22	815.0	25198.9	26200.3	500.72	2.86
20.000	403.63	809.9	25013.8	26008.7	497.49	2.85
20.100	400.03	803.7	24828.9	25817.4	494.26	2.85
20.200	397.43	797.5	24644.3	25626.4	491.04	2.84
20.300	394.84	792.3	24460.9	25436.6	487.84	2.83
20.400	391.24	786.1	24277.7	25247.0	484.64	2.82
20.500	387.64	778.9	24093.7	25056.6	481.43	2.82
20.600	385.05	772.7	23909.9	24866.4	478.23	2.81
20.700	382.44	767.5	23727.3	24677.4	475.04	2.80
20.800	378.84	761.3	23545.1	24488.6	471.78	2.79
20.900	375.23	754.1	23362.1	24299.1	468.51	2.78
21.000	372.63	747.9	23179.5	24110.0	465.25	2.78
21.100	370.02	742.7	22998.1	23922.1	462.01	2.77
21.200	366.41	736.4	22817.0	23734.5	458.77	2.76
21.300	362.80	729.2	22635.2	23546.2	455.52	2.75
21.400	360.19	723.0	22453.6	23358.2	452.27	2.75
21.500	357.58	717.8	22273.3	23171.4	449.05	2.74
21.600	353.96	711.5	22093.2	22984.8	445.83	2.73
21.700	350.35	704.3	21912.3	22797.5	442.60	2.72
21.800	347.72	698.1	21731.6	22610.3	439.37	2.72
21.900	345.10	692.8	21552.1	22424.4	436.16	2.71
22.000	341.47	686.6	21372.8	22238.7	432.95	2.70
22.100	337.84	679.3	21192.6	22052.1	429.73	2.69
22.200	335.21	673.1	21012.7	21865.7	426.51	2.69
22.300	332.59	667.8	20833.8	21680.5	423.32	2.68
22.400	328.95	661.5	20655.1	21495.4	420.12	2.67
22.500	325.32	654.3	20475.6	21309.4	416.91	2.66
22.600	322.70	648.0	20296.2	21123.6	413.71	2.66
22.700	320.06	642.8	20117.9	20938.9	410.52	2.65
22.800	316.43	636.5	19939.7	20754.4	407.33	2.64

Pond File: c:\pondpack\kaele\B4B .PND
Inflow Hydrograph: c:\pondpack\kaele\B45R-10 .HYD
Outflow Hydrograph: c:\pondpack\kaele\B4RB-10 .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
22.900	312.79	629.2	19760.7	20568.9	404.13	2.63
23.000	310.15	622.9	19581.7	20383.6	400.94	2.63
23.100	307.52	617.7	19403.9	20199.4	397.76	2.62
23.200	303.88	611.4	19226.1	20015.3	394.58	2.61
23.300	300.24	604.1	19047.5	19830.2	391.39	2.60
23.400	297.60	597.8	18869.4	19645.3	387.94	2.60
23.500	294.96	592.6	18693.3	19462.0	384.34	2.59
23.600	291.31	586.3	18518.1	19279.6	380.76	2.58
23.700	287.67	579.0	18342.7	19097.0	377.17	2.57
23.800	285.03	572.7	18168.2	18915.4	373.60	2.57
23.900	282.38	567.4	17995.5	18735.6	370.07	2.56
24.000	0.00	282.4	17555.7	18277.8	361.08	2.54

```
****************** SUMMARY OF ROUTING COMPUTATIONS *****************

Pond File:           c:\pondpack\kaele\B4B     .PND
Inflow Hydrograph:   c:\pondpack\kaele\B45R-10 .HYD
Outflow Hydrograph:  c:\pondpack\kaele\B4RB-10 .HYD

Starting Pond W.S. Elevation =      1.80 ft

         ***** Summary of Peak Outflow and Peak Elevation *****

                      Peak Inflow    =  3003.40 cfs
                      Peak Outflow   =   908.10 cfs
                      Peak Elevation =     3.83 ft

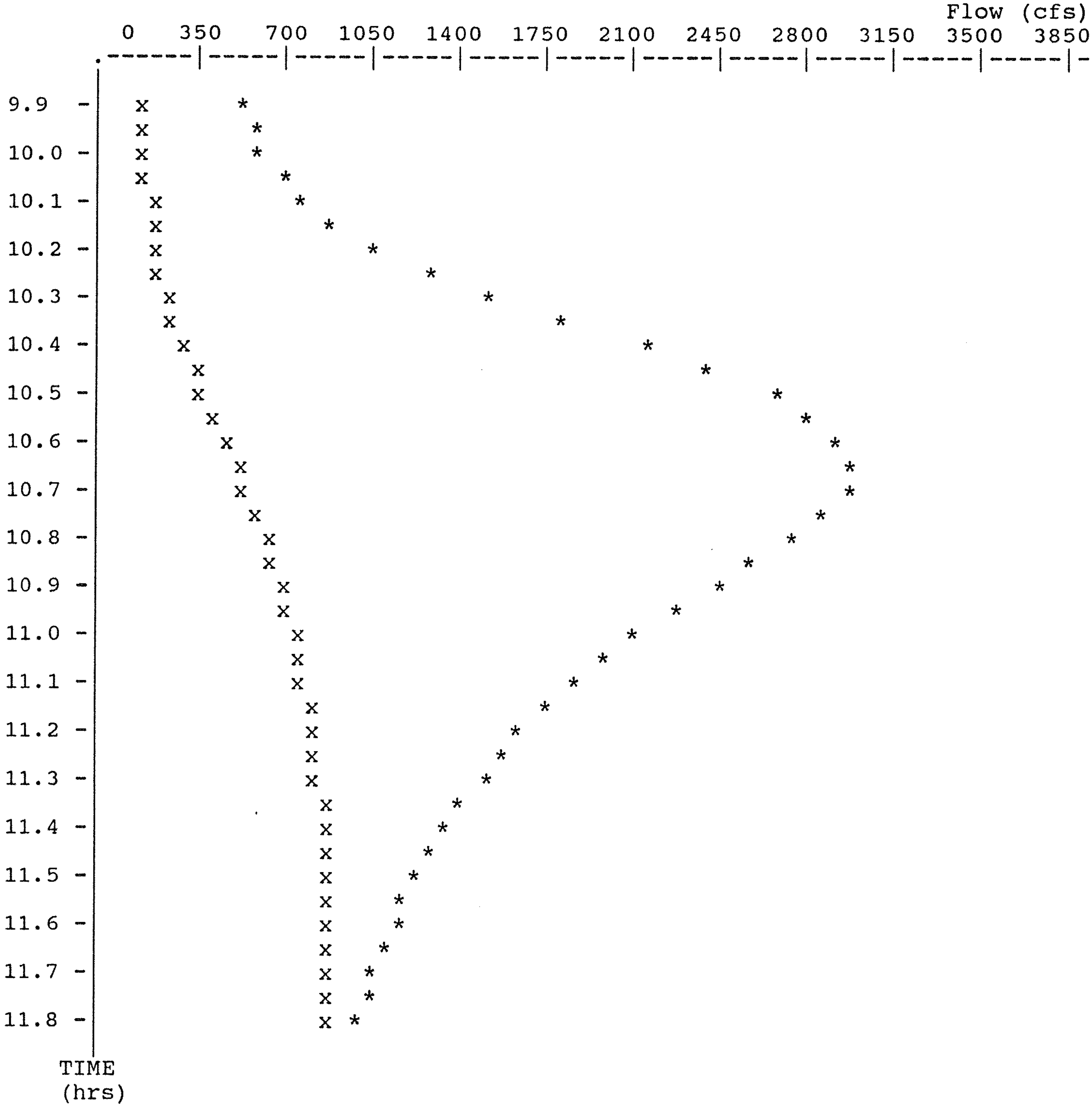
          ***** Summary of Approximate Peak Storage *****

                Initial Storage          =      0.00 ac-ft
                Peak Storage From Storm  =    203.01 ac-ft
                                            ---------------
                Total Storage in Pond    =    203.01 ac-ft
```

Pond File: c:\pondpack\kaele\B4B .PND
Inflow Hydrograph: c:\pondpack\kaele\B45R-10 .HYD
Outflow Hydrograph: c:\pondpack\kaele\B4RB-10 .HYD

EXECUTED: 10-14-1993
14:34:20

Peak Inflow = 3003.40 cfs
Peak Outflow = 908.10 cfs
Peak Elevation = 3.83 ft



* File: c:\pondpack\kaele\B45R-10 .HYD Qmax = 3003.4 cfs
x File: c:\pondpack\kaele\B4RB-10 .HYD Qmax = 908.1 cfs

THIS RUN EXECUTED 14OCT93 14:39:49

```
**************************************
 HEC-2 WATER SURFACE PROFILES

 Version  4.6.0;  February 1991
**************************************

T1      KAELEPULU STREAM ORIGINAL CHANNEL       FILE:  KKDORIG2.DAT
T2      STREAM HYDRAULICS, NOT OBSTRUCTED          DATE:10/14/93
T3      SUBCRITICAL FLOW    (STA. -800 TO STA. 69+50)

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

     -10                                     0                   .1      1527      1.76

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

     -1                  -1                                      -1

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

    150

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

    -10       -10
```

THIS RUN EXECUTED 14OCT93 14:40:09

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***************************************
 HEC-2 WATER SURFACE PROFILES

 Version   4.6.0;  February 1991
***************************************
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NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

SUBCRITICAL FLOW   (STA

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	800.000	.00	.00	.00	-6.00	1527.00	1.76	-3.64	1.79	.55	1.27	1199.39	2062.93
	750.000	50.00	.00	.00	-6.00	1527.00	1.76	-3.08	1.79	.59	1.24	1235.23	1996.43
	700.000	50.00	.00	.00	-4.00	1527.00	1.77	-2.70	1.79	.65	1.22	1246.85	1901.31
	650.000	50.00	.00	.00	-5.50	1527.00	1.78	-3.34	1.79	.46	1.05	1456.89	2248.12
	600.000	50.00	.00	.00	-4.00	1527.00	1.79	-3.07	1.80	.30	.85	1803.08	2780.88
*	550.000	50.00	.00	.00	-4.00	1527.00	1.78	-2.72	1.80	.65	1.15	1331.98	1891.58
	500.000	50.00	.00	.00	-4.00	1527.00	1.77	-2.52	1.81	1.26	1.69	902.93	1361.94
	450.000	50.00	.00	.00	-4.00	1527.00	1.77	-2.48	1.82	1.41	1.81	845.92	1288.20
	400.000	50.00	.00	.00	-4.00	1527.00	1.78	-2.47	1.83	1.43	1.82	839.57	1277.82
	350.000	50.00	.00	.00	-4.00	1527.00	1.78	-2.46	1.84	1.43	1.82	837.67	1276.23
	300.000	50.00	.00	.00	-4.00	1527.00	1.80	-2.50	1.84	1.28	1.72	889.61	1349.56
	250.000	50.00	.00	.00	-4.00	1527.00	1.79	-2.32	1.86	1.76	1.99	766.53	1151.06
	200.000	50.00	.00	.00	-4.00	1527.00	1.81	-2.47	1.87	1.40	1.81	844.99	1290.55
*	150.000	50.00	.00	.00	-4.00	1527.00	1.79	-1.78	1.89	4.54	2.64	577.69	717.05
*	100.000	50.00	.00	.00	-4.00	1527.00	1.87	-2.56	1.91	1.13	1.64	930.21	1438.15
	50.000	63.00	.00	.00	-4.00	1527.00	1.87	-2.44	1.92	1.37	1.75	870.43	1305.08
	36.000	14.00	.00	.00	-4.00	1527.00	1.86	-2.08	1.93	2.12	2.01	758.06	1049.96
	26.000	10.00	8.00	6.00	-4.00	1527.00	1.91	.00	1.96	1.24	1.69	901.81	1373.27
	8.000	34.00	8.00	6.00	-4.00	1527.00	1.94	.00	1.98	1.05	1.59	962.23	1488.07
*	18.000	10.00	.00	.00	-4.00	1527.00	1.93	-2.11	1.99	3.16	1.89	807.95	858.54
*	50.000	50.00	.00	.00	-2.00	1527.00	1.81	.30	2.11	29.92	4.38	348.69	279.14
*	100.000	50.00	.00	.00	-2.00	1527.00	2.09	-.02	2.22	11.15	2.88	552.34	457.22
	150.000	50.00	.00	.00	-2.00	1527.00	2.18	-.39	2.26	7.36	2.29	665.89	562.79
	200.000	50.00	.00	.00	-2.00	1527.00	2.22	-.37	2.30	8.03	2.32	657.81	538.88
	250.000	50.00	.00	.00	-2.00	1527.00	2.26	-.43	2.34	6.41	2.22	689.93	602.95
	300.000	50.00	.00	.00	-2.94	1527.00	2.31	-.86	2.37	4.34	1.96	777.78	732.81
	350.000	50.00	.00	.00	-2.76	1527.00	2.33	-.79	2.39	4.26	1.91	800.44	739.43
	400.000	50.00	.00	.00	-2.72	1527.00	2.35	-.77	2.41	4.56	2.00	763.20	714.77
	450.000	50.00	.00	.00	-5.61	1527.00	2.39	-1.88	2.43	2.86	1.72	888.06	902.38
	500.000	50.00	.00	.00	-4.54	1527.00	2.40	-1.94	2.45	2.45	1.64	929.19	976.11
*	550.000	50.00	.00	.00	-6.10	1527.00	2.43	-2.94	2.46	1.23	1.33	1151.38	1374.33
	600.000	50.00	.00	.00	-6.49	1527.00	2.44	-3.69	2.46	.91	1.21	1260.99	1600.67

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
650.000	50.00	.00	.00	-7.91	1527.00	2.45	-4.77	2.47	.59	1.06	1439.81	1983.20
700.000	50.00	.00	.00	-8.19	1527.00	2.45	-5.10	2.47	.47	.99	1545.65	2218.85
750.000	50.00	.00	.00	-7.12	1527.00	2.46	-5.10	2.47	.43	.95	1603.23	2328.25
* 800.000	50.00	.00	.00	-5.65	1527.00	2.45	-3.19	2.48	.95	1.22	1246.89	1563.31
850.000	50.00	.00	.00	-4.00	1527.00	2.46	-1.91	2.49	1.58	1.40	1093.30	1214.23
900.000	50.00	.00	.00	-5.00	1527.00	2.47	-2.80	2.49	.98	1.19	1283.05	1540.85
* 950.000	50.00	.00	.00	-7.71	1527.00	2.48	-4.84	2.50	.39	.89	1707.80	2439.55
1000.000	50.00	.00	.00	-6.80	1527.00	2.49	-5.08	2.50	.39	.91	1681.62	2430.03
1050.000	50.00	.00	.00	-9.34	1527.00	2.49	-5.75	2.50	.37	.91	1681.48	2502.72
1100.000	50.00	.00	.00	-9.83	1527.00	2.49	-5.95	2.50	.37	.89	1714.71	2519.35
1150.000	50.00	.00	.00	-9.31	1527.00	2.49	-6.29	2.50	.32	.87	1761.80	2702.65
1200.000	50.00	.00	.00	-8.72	1527.00	2.49	-5.70	2.51	.37	.92	1666.83	2498.37
1250.000	50.00	.00	.00	-8.42	1527.00	2.49	-5.53	2.51	.38	.92	1660.44	2488.52
1300.000	50.00	.00	.00	-7.71	1527.00	2.50	-5.34	2.51	.38	.92	1661.99	2461.77
1350.000	50.00	.00	.00	-7.81	1527.00	2.50	-5.46	2.51	.44	.97	1578.02	2296.37
1400.000	50.00	.00	.00	-8.93	1527.00	2.50	-5.44	2.51	.40	.94	1619.21	2420.05
1450.000	50.00	.00	.00	-8.93	1527.00	2.50	-5.62	2.52	.47	.99	1540.62	2235.23
1500.000	50.00	.00	.00	-8.87	1493.00	2.51	-5.91	2.52	.34	.89	1684.99	2553.83
1550.000	50.00	.00	.00	-9.23	1493.00	2.51	-6.03	2.52	.33	.87	1706.58	2599.31
1600.000	50.00	.00	.00	-9.27	1493.00	2.51	-6.12	2.52	.36	.89	1681.30	2487.82
1650.000	50.00	.00	.00	-8.57	1493.00	2.51	-5.96	2.52	.33	.87	1708.92	2608.96
1700.000	50.00	.00	.00	-8.46	1493.00	2.51	-5.84	2.53	.35	.90	1653.27	2519.85
1750.000	50.00	.00	.00	-8.59	1493.00	2.51	-5.48	2.53	.45	.97	1537.43	2227.40
1800.000	50.00	.00	.00	-8.41	1493.00	2.52	-5.66	2.53	.37	.92	1631.77	2470.99
1850.000	50.00	.00	.00	-8.87	1493.00	2.52	-6.07	2.53	.29	.83	1795.21	2776.36
1900.000	50.00	.00	.00	-8.71	1493.00	2.52	-5.41	2.54	.37	.88	1698.33	2439.48
1950.000	50.00	.00	.00	-8.17	1493.00	2.53	-5.22	2.54	.34	.85	1764.50	2569.97
2000.000	50.00	.00	.00	-8.20	1493.00	2.53	-5.15	2.54	.32	.81	1839.02	2649.81
2050.000	50.00	.00	.00	-8.30	1493.00	2.53	-5.28	2.54	.29	.78	1924.38	2791.96
2100.000	50.00	.00	.00	-7.54	1493.00	2.53	-5.00	2.54	.27	.74	2024.23	2895.24
2150.000	50.00	.00	.00	-7.09	1493.00	2.53	-4.56	2.54	.30	.75	1979.92	2744.68
2200.000	50.00	.00	.00	-6.81	1493.00	2.53	-4.48	2.55	.37	.85	1756.53	2440.32
2250.000	50.00	.00	.00	-6.58	1493.00	2.54	-4.44	2.55	.45	.92	1627.83	2221.44
2300.000	50.00	.00	.00	-6.24	1493.00	2.53	-4.13	2.55	.71	1.14	1315.73	1773.86
2350.000	50.00	.00	.00	-6.33	1493.00	2.54	-4.08	2.56	.69	1.14	1317.01	1791.91
2400.000	50.00	.00	.00	-6.53	1493.00	2.54	-4.19	2.56	.66	1.12	1334.71	1841.45
2450.000	50.00	.00	.00	-6.49	1493.00	2.54	-4.17	2.56	.67	1.11	1357.18	1830.10
2500.000	50.00	.00	.00	-6.45	1493.00	2.55	-3.85	2.57	.62	1.04	1517.87	1896.55
2550.000	50.00	.00	.00	-6.17	1493.00	2.56	-3.98	2.57	.47	.89	1687.67	2188.30
2600.000	50.00	.00	.00	-6.00	1493.00	2.56	-3.99	2.57	.58	1.03	1453.71	1968.27

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
2650.000	50.00	.00	.00	-6.26	1493.00	2.56	-4.05	2.58	.63	1.07	1401.77	1887.87
2700.000	50.00	.00	.00	-5.85	1493.00	2.56	-3.81	2.58	.71	1.12	1330.60	1766.04
2750.000	50.00	.00	.00	-5.88	1493.00	2.56	-3.75	2.59	.75	1.15	1300.02	1727.29
2800.000	50.00	.00	.00	-5.89	1493.00	2.57	-3.63	2.59	.85	1.19	1256.54	1618.75
2850.000	50.00	.00	.00	-5.94	1493.00	2.57	-3.57	2.59	.79	1.17	1278.26	1682.60
2900.000	50.00	.00	.00	-5.93	1493.00	2.58	-3.51	2.60	.89	1.21	1236.08	1579.56
2950.000	50.00	.00	.00	-5.41	1493.00	2.58	-3.21	2.60	.97	1.26	1192.74	1513.27
3000.000	50.00	.00	.00	-5.74	1493.00	2.58	-3.14	2.61	1.08	1.32	1139.23	1433.73
3050.000	50.00	.00	.00	-5.39	1493.00	2.59	-3.19	2.62	1.07	1.34	1113.57	1446.49
3100.000	50.00	.00	.00	-5.44	1493.00	2.60	-3.34	2.62	.83	1.10	1400.67	1639.04
3150.000	50.00	.00	.00	-5.23	1131.00	2.61	-3.50	2.62	.46	.90	1254.29	1664.50
* 3200.000	50.00	.00	.00	-4.82	1131.00	2.61	-2.49	2.63	1.23	1.33	861.98	1019.69
* 3250.000	50.00	.00	.00	-4.15	1131.00	2.57	-1.39	2.66	4.66	2.36	478.28	523.85
3300.000	50.00	.00	.00	-4.75	1131.00	2.60	-1.55	2.68	4.51	2.36	479.19	532.40
3350.000	50.00	.00	.00	-5.83	1131.00	2.63	-2.22	2.71	3.90	2.24	504.15	572.81
3400.000	50.00	.00	.00	-5.82	1131.00	2.66	-2.59	2.72	2.89	2.06	549.52	664.92
3450.000	50.00	.00	.00	-5.89	1131.00	2.66	-1.88	2.75	4.28	2.31	488.86	546.40
3500.000	50.00	.00	.00	-5.92	1131.00	2.69	-2.25	2.77	4.21	2.29	493.63	551.47
3550.000	50.00	.00	.00	-6.13	1131.00	2.72	-2.62	2.79	2.91	2.06	549.65	663.21
3600.000	50.00	.00	.00	-5.71	1131.00	2.73	-2.52	2.81	3.50	2.22	508.82	604.90
3650.000	50.00	.00	.00	-5.91	1131.00	2.75	-2.24	2.82	3.69	2.20	513.13	588.71
3700.000	50.00	.00	.00	-5.72	1131.00	2.76	-2.28	2.84	3.75	2.25	502.16	584.19
3750.000	50.00	.00	.00	-5.27	1131.00	2.78	-2.08	2.87	4.12	2.40	471.68	557.10
3800.000	50.00	.00	.00	-5.49	1131.00	2.82	-2.29	2.89	3.01	2.02	559.73	651.79
3850.000	50.00	.00	.00	-5.63	1131.00	2.83	-2.42	2.91	3.69	2.30	492.40	588.43
* 3900.000	50.00	.00	.00	-5.60	1131.00	2.82	-1.64	2.95	8.36	2.94	384.96	391.27
* 3950.000	50.00	.00	.00	-5.72	1131.00	2.90	-2.46	2.98	3.66	2.31	489.65	590.96
4000.000	50.00	.00	.00	-5.80	1131.00	2.92	-2.44	3.00	3.41	2.22	508.35	612.44
4050.000	50.00	.00	.00	-5.74	1131.00	2.95	-2.44	3.02	3.14	2.13	529.87	638.65
4100.000	50.00	.00	.00	-5.75	1131.00	2.96	-2.34	3.04	3.29	2.20	513.63	623.46
4150.000	50.00	.00	.00	-6.24	1131.00	2.97	-2.51	3.06	3.60	2.34	482.95	596.36
4200.000	50.00	.00	.00	-5.86	232.00	3.07	-4.11	3.07	.18	.50	466.63	547.87
4250.000	50.00	.00	.00	-6.05	232.00	3.07	-3.92	3.07	.19	.52	443.63	525.68
4300.000	50.00	.00	.00	-4.91	232.00	3.07	-3.24	3.07	.27	.56	420.21	447.70
* 4350.000	50.00	.00	.00	-5.23	232.00	3.07	-3.71	3.07	.10	.38	616.52	724.13
4400.000	50.00	.00	.00	-4.57	232.00	3.07	-3.10	3.08	.20	.52	454.34	513.83
4450.000	50.00	.00	.00	-3.71	232.00	3.07	-2.38	3.08	.24	.53	439.92	478.14
4500.000	50.00	.00	.00	-5.38	232.00	3.07	-3.66	3.08	.15	.47	495.75	589.57
4550.000	50.00	.00	.00	-5.59	232.00	3.07	-3.84	3.08	.15	.47	490.58	599.94
4600.000	50.00	.00	.00	-5.98	232.00	3.08	-4.20	3.08	.16	.48	488.27	584.56

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
4650.000	50.00	.00	.00	-5.60	232.00	3.08	-3.83	3.08	.16	.48	479.57	576.99
4700.000	50.00	.00	.00	-5.13	232.00	3.08	-3.71	3.08	.14	.45	516.22	630.83
4750.000	50.00	.00	.00	-5.59	232.00	3.08	-3.75	3.08	.17	.51	464.10	563.17
4800.000	50.00	.00	.00	-5.35	232.00	3.08	-3.93	3.08	.16	.47	495.82	589.18
4850.000	50.00	.00	.00	-5.44	232.00	3.08	-3.68	3.08	.17	.51	463.48	555.23
4900.000	50.00	.00	.00	-5.13	232.00	3.08	-3.01	3.09	.34	.63	370.30	398.68
4950.000	50.00	.00	.00	-5.18	232.00	3.08	-3.23	3.09	.38	.63	370.00	377.75
5000.000	50.00	.00	.00	-5.41	232.00	3.08	-3.22	3.09	.21	.52	447.20	509.65
5050.000	50.00	.00	.00	-5.99	232.00	3.09	-4.06	3.09	.14	.45	511.02	612.83
5100.000	50.00	.00	.00	-5.72	232.00	3.09	-3.95	3.09	.22	.55	424.69	500.12
5150.000	50.00	.00	.00	-5.84	232.00	3.09	-4.07	3.09	.20	.55	422.35	519.77
5200.000	50.00	.00	.00	-5.43	232.00	3.09	-3.27	3.09	.30	.57	406.86	420.20
5250.000	50.00	.00	.00	-5.38	232.00	3.09	-3.71	3.09	.18	.51	459.17	552.87
5300.000	50.00	.00	.00	-5.20	232.00	3.09	-3.74	3.10	.17	.50	467.19	556.55
5350.000	50.00	.00	.00	-5.08	232.00	3.09	-3.54	3.10	.19	.51	458.85	529.31
5400.000	50.00	.00	.00	-5.16	232.00	3.09	-3.37	3.10	.22	.55	422.05	489.30
5450.000	50.00	.00	.00	-5.49	232.00	3.09	-3.52	3.10	.20	.53	444.36	523.59
5500.000	50.00	.00	.00	-5.05	232.00	3.10	-3.64	3.10	.18	.52	454.78	546.96
5550.000	50.00	.00	.00	-5.21	232.00	3.10	-3.46	3.10	.18	.50	465.45	548.63
5600.000	50.00	.00	.00	-5.28	232.00	3.10	-3.70	3.10	.16	.46	499.40	571.50
5650.000	50.00	.00	.00	-5.05	232.00	3.10	-3.61	3.10	.14	.45	519.70	621.86
5700.000	50.00	.00	.00	-5.37	232.00	3.10	-3.69	3.10	.28	.58	404.67	436.45
* 5750.000	50.00	.00	.00	-4.06	232.00	3.10	-.45	3.11	1.87	.96	242.24	169.86
* 5800.000	50.00	.00	.00	-5.01	232.00	3.11	-3.41	3.11	.20	.51	454.68	521.58
5850.000	50.00	.00	.00	-5.78	232.00	3.11	-3.33	3.11	.34	.64	369.96	397.27
5900.000	50.00	.00	.00	-5.35	232.00	3.11	-3.76	3.12	.18	.48	486.56	546.23
5950.000	50.00	.00	.00	-5.53	232.00	3.11	-3.56	3.12	.21	.53	438.32	501.18
6000.000	50.00	.00	.00	-5.60	232.00	3.11	-3.73	3.12	.17	.49	473.65	569.30
6050.000	50.00	.00	.00	-5.70	232.00	3.12	-3.86	3.12	.15	.46	507.48	606.90
6100.000	50.00	.00	.00	-4.00	232.00	3.12	-2.49	3.12	.22	.52	449.25	493.44
6110.000	10.00	10.00	6.50	-4.00	232.00	3.12	.00	3.12	.16	.46	504.31	572.78
6191.000	81.00	10.00	6.50	-4.00	232.00	3.12	.00	3.12	.16	.46	504.30	572.77
6201.000	10.00	.00	.00	-5.00	232.00	3.12	-3.30	3.12	.18	.48	482.72	547.95
6250.000	49.00	.00	.00	-4.70	232.00	3.12	-3.15	3.12	.21	.50	460.41	503.19
6300.000	50.00	.00	.00	-4.90	232.00	3.12	-3.42	3.12	.15	.45	517.48	601.56
6350.000	50.00	.00	.00	-4.62	232.00	3.12	-3.03	3.12	.27	.56	410.68	448.78
6400.000	50.00	.00	.00	-4.34	232.00	3.12	-2.93	3.13	.19	.47	490.74	534.32
6450.000	50.00	.00	.00	-3.92	232.00	3.12	-2.60	3.13	.19	.47	498.07	534.31
6500.000	50.00	.00	.00	-4.01	232.00	3.12	-2.59	3.13	.19	.45	512.58	539.09
6550.000	50.00	.00	.00	-3.62	232.00	3.13	-2.50	3.13	.16	.45	526.42	588.40

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
6600.000	50.00	.00	.00	-3.60	232.00	3.13	-2.38	3.13	.09	.34	685.87	756.96
6650.000	50.00	.00	.00	-3.00	232.00	3.13	-2.18	3.13	.09	.32	721.94	795.15
6700.000	50.00	.00	.00	-3.10	232.00	3.13	-2.21	3.13	.08	.31	752.21	827.16
6750.000	50.00	.00	.00	-3.00	232.00	3.13	-1.96	3.13	.09	.32	733.13	777.56
6800.000	50.00	.00	.00	-2.00	232.00	3.13	-1.46	3.13	.10	.32	723.15	734.01
6850.000	50.00	.00	.00	-2.54	232.00	3.13	-1.55	3.13	.12	.36	653.16	671.08
6900.000	50.00	.00	.00	-2.44	232.00	3.13	-1.55	3.13	.12	.34	682.49	667.25
6950.000	50.00	.00	.00	-2.42	232.00	3.13	-1.61	3.13	.09	.31	764.61	789.06

SUBCRITICAL FLOW (STA

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	800.000	1527.00	1.76	.00	.00	.00	179.00	.00
	750.000	1527.00	1.76	.00	.00	.00	203.50	50.00
	700.000	1527.00	1.77	.00	.00	.00	226.50	50.00
	650.000	1527.00	1.78	.00	.01	.00	263.00	50.00
	600.000	1527.00	1.79	.00	.01	.00	327.69	50.00
*	550.000	1527.00	1.78	.00	.00	.00	272.82	50.00
	500.000	1527.00	1.77	.00	-.01	.00	164.68	50.00
	450.000	1527.00	1.77	.00	.00	.00	151.76	50.00
	400.000	1527.00	1.78	.00	.01	.00	150.44	50.00
	350.000	1527.00	1.78	.00	.01	.00	149.95	50.00
	300.000	1527.00	1.80	.00	.01	.00	162.21	50.00
	250.000	1527.00	1.79	.00	.00	.00	141.91	50.00
	200.000	1527.00	1.81	.00	.02	.00	150.16	50.00
*	150.000	1527.00	1.79	.00	-.03	.00	144.28	50.00
*	100.000	1527.00	1.87	.00	.08	.00	162.50	50.00
	50.000	1527.00	1.87	.00	.00	.00	160.97	63.00
	36.000	1527.00	1.86	.00	-.01	.00	160.69	14.00
	26.000	1527.00	1.91	.00	.05	.00	162.00	10.00
	8.000	1527.00	1.94	.00	.03	.00	168.64	34.00
*	18.000	1527.00	1.93	.00	-.01	.00	165.29	10.00
*	50.000	1527.00	1.81	.00	-.07	.00	108.59	50.00
*	100.000	1527.00	2.09	.00	.09	.00	178.83	50.00
	150.000	1527.00	2.18	.00	.09	.00	193.30	50.00
	200.000	1527.00	2.22	.00	.04	.00	200.21	50.00
	250.000	1527.00	2.26	.00	.04	.00	193.17	50.00
	300.000	1527.00	2.31	.00	.04	.00	193.98	50.00
	350.000	1527.00	2.33	.00	.03	.00	203.38	50.00
	400.000	1527.00	2.35	.00	.02	.00	189.90	50.00
	450.000	1527.00	2.39	.00	.04	.00	194.41	50.00
	500.000	1527.00	2.40	.00	.02	.00	193.65	50.00
*	550.000	1527.00	2.43	.00	.02	.00	197.18	50.00
	600.000	1527.00	2.44	.00	.01	.00	197.09	50.00
	650.000	1527.00	2.45	.00	.01	.00	199.37	50.00
	700.000	1527.00	2.45	.00	.01	.00	200.22	50.00
	750.000	1527.00	2.46	.00	.00	.00	204.51	50.00
*	800.000	1527.00	2.45	.00	.00	.00	198.74	50.00
	850.000	1527.00	2.46	.00	.00	.00	209.09	50.00

SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
900.000	1527.00	2.47	.00	.02	.00	218.63	50.00
* 950.000	1527.00	2.48	.00	.01	.00	222.90	50.00
1000.000	1527.00	2.49	.00	.00	.00	216.40	50.00
1050.000	1527.00	2.49	.00	.00	.00	206.11	50.00
1100.000	1527.00	2.49	.00	.00	.00	217.20	50.00
1150.000	1527.00	2.49	.00	.00	.00	207.00	50.00
1200.000	1527.00	2.49	.00	.00	.00	202.40	50.00
1250.000	1527.00	2.49	.00	.00	.00	201.40	50.00
1300.000	1527.00	2.50	.00	.00	.00	205.53	50.00
1350.000	1527.00	2.50	.00	.00	.00	206.40	50.00
1400.000	1527.00	2.50	.00	.00	.00	196.89	50.00
1450.000	1527.00	2.50	.00	.00	.00	196.46	50.00
1500.000	1493.00	2.51	.00	.01	.00	200.81	50.00
1550.000	1493.00	2.51	.00	.00	.00	202.47	50.00
1600.000	1493.00	2.51	.00	.00	.00	209.06	50.00
1650.000	1493.00	2.51	.00	.00	.00	202.71	50.00
1700.000	1493.00	2.51	.00	.00	.00	195.50	50.00
1750.000	1493.00	2.51	.00	.00	.00	197.45	50.00
1800.000	1493.00	2.52	.00	.00	.00	199.21	50.00
1850.000	1493.00	2.52	.00	.00	.00	207.39	50.00
1900.000	1493.00	2.52	.00	.00	.00	220.63	50.00
1950.000	1493.00	2.53	.00	.00	.00	224.12	50.00
2000.000	1493.00	2.53	.00	.00	.00	236.73	50.00
2050.000	1493.00	2.53	.00	.00	.00	245.70	50.00
2100.000	1493.00	2.53	.00	.00	.00	264.04	50.00
2150.000	1493.00	2.53	.00	.00	.00	270.76	50.00
2200.000	1493.00	2.53	.00	.00	.00	235.70	50.00
2250.000	1493.00	2.54	.00	.00	.00	225.16	50.00
2300.000	1493.00	2.53	.00	.00	.00	189.07	50.00
2350.000	1493.00	2.54	.00	.00	.00	193.92	50.00
2400.000	1493.00	2.54	.00	.00	.00	182.79	50.00
2450.000	1493.00	2.54	.00	.00	.00	196.71	50.00
2500.000	1493.00	2.55	.00	.01	.00	263.84	50.00
2550.000	1493.00	2.56	.00	.01	.00	261.87	50.00
2600.000	1493.00	2.56	.00	.00	.00	220.24	50.00
2650.000	1493.00	2.56	.00	.00	.00	201.01	50.00
2700.000	1493.00	2.56	.00	.00	.00	194.82	50.00
2750.000	1493.00	2.56	.00	.00	.00	198.47	50.00
2800.000	1493.00	2.57	.00	.00	.00	192.90	50.00

SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
2850.000	1493.00	2.57	.00	.00	.00	190.88	50.00
2900.000	1493.00	2.58	.00	.00	.00	203.97	50.00
2950.000	1493.00	2.58	.00	.00	.00	201.40	50.00
3000.000	1493.00	2.58	.00	.00	.00	197.67	50.00
3050.000	1493.00	2.59	.00	.00	.00	169.54	50.00
3100.000	1493.00	2.60	.00	.02	.00	259.21	50.00
3150.000	1131.00	2.61	.00	.01	.00	184.45	50.00
* 3200.000	1131.00	2.61	.00	-.01	.00	153.73	50.00
* 3250.000	1131.00	2.57	.00	-.03	.00	91.88	50.00
3300.000	1131.00	2.60	.00	.02	.00	89.54	50.00
3350.000	1131.00	2.63	.00	.03	.00	91.72	50.00
3400.000	1131.00	2.66	.00	.03	.00	90.57	50.00
3450.000	1131.00	2.66	.00	.01	.00	91.09	50.00
3500.000	1131.00	2.69	.00	.02	.00	92.28	50.00
3550.000	1131.00	2.72	.00	.03	.00	90.99	50.00
3600.000	1131.00	2.73	.00	.01	.00	86.12	50.00
3650.000	1131.00	2.75	.00	.02	.00	92.40	50.00
3700.000	1131.00	2.76	.00	.02	.00	88.27	50.00
3750.000	1131.00	2.78	.00	.01	.00	79.76	50.00
3800.000	1131.00	2.82	.00	.05	.00	98.22	50.00
3850.000	1131.00	2.83	.00	.00	.00	81.88	50.00
* 3900.000	1131.00	2.82	.00	-.01	.00	80.59	50.00
* 3950.000	1131.00	2.90	.00	.08	.00	80.67	50.00
4000.000	1131.00	2.92	.00	.02	.00	84.30	50.00
4050.000	1131.00	2.95	.00	.02	.00	87.97	50.00
4100.000	1131.00	2.96	.00	.01	.00	83.92	50.00
4150.000	1131.00	2.97	.00	.01	.00	75.78	50.00
4200.000	232.00	3.07	.00	.10	.00	80.06	50.00
4250.000	232.00	3.07	.00	.00	.00	75.05	50.00
4300.000	232.00	3.07	.00	.00	.00	88.77	50.00
* 4350.000	232.00	3.07	.00	.00	.00	106.78	50.00
4400.000	232.00	3.07	.00	.00	.00	85.86	50.00
4450.000	232.00	3.07	.00	.00	.00	85.08	50.00
4500.000	232.00	3.07	.00	.00	.00	83.58	50.00
4550.000	232.00	3.07	.00	.00	.00	78.87	50.00
4600.000	232.00	3.08	.00	.00	.00	87.05	50.00
4650.000	232.00	3.08	.00	.00	.00	78.58	50.00
4700.000	232.00	3.08	.00	.00	.00	84.56	50.00
4750.000	232.00	3.08	.00	.00	.00	81.26	50.00
4800.000	232.00	3.08	.00	.00	.00	83.66	50.00

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	4850.000	232.00	3.08	.00	.00	.00	80.44	50.00
	4900.000	232.00	3.08	.00	.00	.00	77.43	50.00
	4950.000	232.00	3.08	.00	.00	.00	77.59	50.00
	5000.000	232.00	3.08	.00	.00	.00	80.15	50.00
	5050.000	232.00	3.09	.00	.00	.00	83.56	50.00
	5100.000	232.00	3.09	.00	.00	.00	72.08	50.00
	5150.000	232.00	3.09	.00	.00	.00	65.37	50.00
	5200.000	232.00	3.09	.00	.00	.00	85.49	50.00
	5250.000	232.00	3.09	.00	.00	.00	74.89	50.00
	5300.000	232.00	3.09	.00	.00	.00	78.35	50.00
	5350.000	232.00	3.09	.00	.00	.00	81.09	50.00
	5400.000	232.00	3.09	.00	.00	.00	73.30	50.00
	5450.000	232.00	3.09	.00	.00	.00	80.16	50.00
	5500.000	232.00	3.10	.00	.00	.00	81.85	50.00
	5550.000	232.00	3.10	.00	.00	.00	79.34	50.00
	5600.000	232.00	3.10	.00	.00	.00	88.95	50.00
	5650.000	232.00	3.10	.00	.00	.00	87.10	50.00
	5700.000	232.00	3.10	.00	.00	.00	83.05	50.00
*	5750.000	232.00	3.10	.00	.00	.00	87.81	50.00
*	5800.000	232.00	3.11	.00	.01	.00	83.10	50.00
	5850.000	232.00	3.11	.00	.00	.00	76.84	50.00
	5900.000	232.00	3.11	.00	.00	.00	90.13	50.00
	5950.000	232.00	3.11	.00	.00	.00	78.34	50.00
	6000.000	232.00	3.11	.00	.00	.00	75.88	50.00
	6050.000	232.00	3.12	.00	.00	.00	84.41	50.00
	6100.000	232.00	3.12	.00	.00	.00	85.15	50.00
	6110.000	232.00	3.12	.00	.00	.00	88.48	10.00
	6191.000	232.00	3.12	.00	.00	.00	88.48	81.00
	6201.000	232.00	3.12	.00	.00	.00	87.20	10.00
	6250.000	232.00	3.12	.00	.00	.00	88.36	49.00
	6300.000	232.00	3.12	.00	.00	.00	88.30	50.00
	6350.000	232.00	3.12	.00	.00	.00	78.96	50.00
	6400.000	232.00	3.12	.00	.00	.00	95.98	50.00
	6450.000	232.00	3.12	.00	.00	.00	99.69	50.00
	6500.000	232.00	3.12	.00	.00	.00	106.15	50.00
	6550.000	232.00	3.13	.00	.00	.00	114.03	50.00
	6600.000	232.00	3.13	.00	.00	.00	127.00	50.00
	6650.000	232.00	3.13	.00	.00	.00	135.00	50.00
	6700.000	232.00	3.13	.00	.00	.00	142.00	50.00
	6750.000	232.00	3.13	.00	.00	.00	147.85	50.00

SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
6800.000	232.00	3.13	.00	.00	.00	156.45	50.00
6850.000	232.00	3.13	.00	.00	.00	139.96	50.00
6900.000	232.00	3.13	.00	.00	.00	162.62	50.00
6950.000	232.00	3.13	.00	.00	.00	171.42	50.00

SUMMARY OF ERRORS AND SPECIAL NOTES

WARNING SECNO= 550.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 150.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 100.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 18.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
CAUTION SECNO= 50.000 PROFILE= 1 INTERPOLATED X-SECTIONS USED
CAUTION SECNO= 100.000 PROFILE= 1 INTERPOLATED X-SECTIONS USED
WARNING SECNO= 550.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 800.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 950.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 3200.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 3250.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 3900.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 3950.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 4350.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 5750.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 5800.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

APPENDIX E-2
FLOOD ROUTING ANALYSIS
EXISTING CONDITIONS
100-YEAR 24-HOUR STORM EVENT

EXECUTED: 05-04-1993 13:49:57

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**********************************************************************
*                                                                    *
*               KAELEPULU STREAM DRAINAGE STUDY                      *
*                   KAILUA, OAHU, HAWAII                             *
* EXISTING RUNOFF CONDITIONS (1993) - 100 YEAR, 24 HOUR STORM        *
*      KAOPA DETENTION BASIN "RESERVOIR" ROUTING ANALYSIS            *
*                                                                    *
**********************************************************************
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Inflow Hydrograph: c:\pondpack\kaele\BASIN5 .HYD
Rating Table file: c:\pondpack\kaele\BASIN5 .PND

----INITIAL CONDITIONS----
Elevation = 40.00 ft
Outflow = 0.00 cfs
Storage = 0.00 ac-ft

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (ac-ft)	2S/t (cfs)	2S/t + 0 (cfs)
40.00	0.0	0.000	0.0	0.0
41.00	12.0	11.250	2722.5	2734.5
42.00	37.0	22.800	5517.6	5554.6
43.00	70.0	34.650	8385.3	8455.3
44.00	100.0	46.800	11325.6	11425.6
45.00	120.0	59.250	14338.5	14458.5
46.00	140.0	72.000	17424.0	17564.0
47.00	156.0	85.050	20582.1	20738.1
48.00	170.0	98.400	23812.8	23982.8
49.00	184.0	112.050	27116.1	27300.1
50.00	200.0	126.500	30613.0	30813.0
51.00	210.0	141.350	34206.7	34416.7
52.00	220.0	156.600	37897.2	38117.2
52.20	241.7	159.730	38654.7	38896.4
52.40	280.6	162.860	39412.1	39692.7
52.60	333.2	165.990	40169.6	40502.8
52.80	402.4	169.120	40927.0	41329.4
53.00	481.1	172.250	41684.5	42165.6
53.20	568.7	175.460	42461.3	43030.0
53.40	665.8	178.670	43238.1	43903.9
53.60	768.5	181.880	44015.0	44783.5
53.80	879.3	185.090	44791.8	45671.1
54.00	988.3	188.300	45568.6	46556.9
54.50	1293.8	196.530	47560.3	48854.1
55.00	1628.8	204.750	49549.5	51178.3
55.50	1992.2	213.180	51589.6	53581.8
56.00	2382.1	221.600	53627.2	56009.3

Time increment (t) = 0.100 hrs.

EXECUTED: 05-04-1993 13:49:57

Pond File: c:\pondpack\kaele\BASIN5 .PND
Inflow Hydrograph: c:\pondpack\kaele\BASIN5 .HYD
Outflow Hydrograph: c:\pondpack\kaele\BASIN5O .HYD

INFLOW HYDROGRAPH / ROUTING COMPUTATIONS

TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
9.000	173.00	-----	0.0	0.0	0.00	40.00
9.100	192.00	365.0	361.8	365.0	1.60	40.13
9.200	212.00	404.0	759.1	765.8	3.36	40.28
9.300	231.00	443.0	1191.5	1202.1	5.28	40.44
9.400	258.00	489.0	1665.8	1680.5	7.37	40.61
9.500	286.00	544.0	2190.4	2209.8	9.70	40.81
9.600	313.00	599.0	2764.4	2789.4	12.49	41.02
9.700	362.00	675.0	3402.9	3439.4	18.25	41.25
9.800	412.00	774.0	4127.3	4176.9	24.79	41.51
9.900	461.00	873.0	4936.2	5000.3	32.09	41.80
10.000	601.00	1062.0	5914.1	5998.2	42.05	42.15
10.100	914.00	1515.0	7312.4	7429.1	58.33	42.65
10.200	1441.00	2355.0	9502.9	9667.4	82.24	43.41
10.300	2034.00	3475.0	12757.5	12977.9	110.24	44.51
10.400	2322.00	4356.0	16839.3	17113.5	137.10	45.85
10.500	2231.00	4553.0	21074.6	21392.3	158.82	47.20
10.600	1886.00	4117.0	24841.4	25191.6	175.10	48.36
10.700	1531.00	3417.0	27881.7	28258.4	188.36	49.27
10.800	1252.00	2783.0	30266.0	30664.7	199.32	49.96
10.900	1070.00	2322.0	32178.2	32588.0	204.93	50.49
11.000	889.00	1959.0	33718.7	34137.2	209.22	50.92
11.100	790.00	1679.0	34972.4	35397.7	212.65	51.27
11.200	692.00	1482.0	36023.4	36454.4	215.51	51.55
11.300	638.00	1330.0	36917.6	37353.4	217.94	51.79
11.400	585.00	1223.0	37699.3	38140.6	220.65	52.01
11.500	552.00	1137.0	38356.2	38836.3	240.03	52.18
11.600	519.00	1071.0	38891.9	39427.2	267.63	52.33
11.700	498.00	1017.0	39319.7	39908.9	294.64	52.45
11.800	478.00	976.0	39656.2	40295.7	319.75	52.55
11.900	466.00	944.0	39917.5	40600.2	341.35	52.62
12.000	453.00	919.0	40114.2	40836.5	361.13	52.68
12.100	442.00	895.0	40258.0	41009.2	375.59	52.72
12.200	431.00	873.0	40359.4	41131.0	385.79	52.75
12.300	420.00	851.0	40425.6	41210.4	392.44	52.77
12.400	409.00	829.0	40462.3	41254.6	396.13	52.78
12.500	398.00	807.0	40474.6	41269.3	397.36	52.79
12.600	387.00	785.0	40466.5	41259.6	396.55	52.78
12.700	381.00	768.0	40445.6	41234.5	394.45	52.78
12.800	374.00	755.0	40417.3	41200.6	391.61	52.77
12.900	368.00	742.0	40383.0	41159.3	388.16	52.76
13.000	362.00	730.0	40344.5	41113.0	384.28	52.75
13.100	355.00	717.0	40301.5	41061.5	379.97	52.74
13.200	349.00	704.0	40254.9	41005.5	375.28	52.72
13.300	342.00	691.0	40205.4	40945.9	370.30	52.71
13.400	336.00	678.0	40153.2	40883.4	365.06	52.69

POND-2 Version: 5.17 S/N:
EXECUTED: 05-04-1993 13:49:57

Pond File: c:\pondpack\kaele\BASIN5 .PND
Inflow Hydrograph: c:\pondpack\kaele\BASIN5 .HYD
Outflow Hydrograph: c:\pondpack\kaele\BASIN5O .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
13.500	329.00	665.0	40099.0	40818.2	359.61	52.68
13.600	321.00	650.0	40041.4	40749.0	353.81	52.66
13.700	313.00	634.0	39980.1	40675.4	347.65	52.64
13.800	304.00	617.0	39914.9	40597.1	341.10	52.62
13.900	296.00	600.0	39846.5	40514.9	334.22	52.60
14.000	288.00	584.0	39773.5	40430.5	328.51	52.58
14.100	281.00	569.0	39696.9	40342.5	322.79	52.56
14.200	275.00	556.0	39618.9	40252.9	316.97	52.54
14.300	268.00	543.0	39539.8	40161.9	311.07	52.52
14.400	262.00	530.0	39459.6	40069.8	305.09	52.49
14.500	255.00	517.0	39378.6	39976.6	299.04	52.47
14.600	253.00	508.0	39300.2	39886.6	293.19	52.45
14.700	252.00	505.0	39229.4	39805.2	287.90	52.43
14.800	250.00	502.0	39165.2	39731.4	283.11	52.41
14.900	249.00	499.0	39105.8	39664.2	279.20	52.39
15.000	247.00	496.0	39049.4	39601.8	276.16	52.38
15.100	245.00	492.0	38995.0	39541.4	273.21	52.36
15.200	244.00	489.0	38943.2	39484.0	270.41	52.35
15.300	242.00	486.0	38893.8	39429.2	267.73	52.33
15.400	241.00	483.0	38846.4	39376.8	265.17	52.32
15.500	239.00	480.0	38801.0	39326.4	262.71	52.31
15.600	237.00	476.0	38756.4	39277.0	260.29	52.30
15.700	236.00	473.0	38713.5	39229.4	257.97	52.28
15.800	234.00	470.0	38672.0	39183.5	255.73	52.27
15.900	233.00	467.0	38631.9	39139.0	253.55	52.26
16.000	231.00	464.0	38593.0	39095.9	251.45	52.25
16.100	229.00	460.0	38554.3	39053.0	249.35	52.24
16.200	228.00	457.0	38516.7	39011.3	247.32	52.23
16.300	226.00	454.0	38480.0	38970.7	245.33	52.22
16.400	224.00	450.0	38443.3	38930.0	243.34	52.21
16.500	222.00	446.0	38406.3	38889.3	241.50	52.20
16.600	221.00	443.0	38368.5	38849.3	240.39	52.19
16.700	219.00	440.0	38330.0	38808.5	239.25	52.18
16.800	217.00	436.0	38289.9	38766.0	238.07	52.17
16.900	216.00	433.0	38249.2	38722.9	236.87	52.16
17.000	214.00	430.0	38207.9	38679.2	235.65	52.14
17.100	213.00	427.0	38166.0	38634.9	234.42	52.13
17.200	212.00	425.0	38124.6	38591.0	233.20	52.12
17.300	212.00	424.0	38084.6	38548.6	232.02	52.11
17.400	211.00	423.0	38045.9	38507.6	230.87	52.10
17.500	210.00	421.0	38007.4	38466.9	229.74	52.09
17.600	209.00	419.0	37969.2	38426.4	228.61	52.08
17.700	208.00	417.0	37931.2	38386.2	227.49	52.07
17.800	208.00	416.0	37894.4	38347.2	226.40	52.06
17.900	207.00	415.0	37858.7	38309.4	225.35	52.05
18.000	206.00	413.0	37823.1	38271.7	224.30	52.04

Pond File: c:\pondpack\kaele\BASIN5 .PND
Inflow Hydrograph: c:\pondpack\kaele\BASIN5 .HYD
Outflow Hydrograph: c:\pondpack\kaele\BASIN5O .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
18.100	204.00	410.0	37786.6	38233.1	223.23	52.03
18.200	203.00	407.0	37749.3	38193.6	222.13	52.02
18.300	201.00	404.0	37711.3	38153.3	221.01	52.01
18.400	199.00	400.0	37671.4	38111.3	219.98	52.00
18.500	198.00	397.0	37628.6	38068.4	219.87	51.99
18.600	196.00	394.0	37583.1	38022.6	219.74	51.97
18.700	194.00	390.0	37533.9	37973.1	219.61	51.96
18.800	193.00	387.0	37482.0	37920.9	219.47	51.95
18.900	191.00	384.0	37427.3	37866.0	219.32	51.93
19.000	190.00	381.0	37370.0	37808.3	219.17	51.92
19.100	188.00	378.0	37310.0	37748.0	219.00	51.90
19.200	186.00	374.0	37246.3	37684.0	218.83	51.88
19.300	185.00	371.0	37180.0	37617.3	218.65	51.86
19.400	183.00	368.0	37111.1	37548.0	218.46	51.85
19.500	181.00	364.0	37038.6	37475.1	218.26	51.83
19.600	180.00	361.0	36963.5	37399.6	218.06	51.81
19.700	178.00	358.0	36885.8	37321.5	217.85	51.78
19.800	176.00	354.0	36804.5	37239.8	217.63	51.76
19.900	175.00	351.0	36720.7	37155.5	217.40	51.74
20.000	173.00	348.0	36634.4	37068.7	217.17	51.72
20.100	172.00	345.0	36545.5	36979.4	216.93	51.69
20.200	170.00	342.0	36454.2	36887.5	216.68	51.67
20.300	169.00	339.0	36360.3	36793.2	216.42	51.64
20.400	167.00	336.0	36264.0	36696.3	216.16	51.62
20.500	166.00	333.0	36165.2	36597.0	215.89	51.59
20.600	164.00	330.0	36064.0	36495.2	215.62	51.56
20.700	163.00	327.0	35960.3	36391.0	215.34	51.53
20.800	161.00	324.0	35854.2	36284.3	215.05	51.50
20.900	160.00	321.0	35745.7	36175.2	214.75	51.48
21.000	158.00	318.0	35634.8	36063.7	214.45	51.45
21.100	157.00	315.0	35521.5	35949.8	214.14	51.41
21.200	156.00	313.0	35406.9	35834.5	213.83	51.38
21.300	154.00	310.0	35289.8	35716.9	213.51	51.35
21.400	153.00	307.0	35170.5	35596.8	213.19	51.32
21.500	151.00	304.0	35048.8	35474.5	212.86	51.29
21.600	150.00	301.0	34924.7	35349.8	212.52	51.25
21.700	148.00	298.0	34798.4	35222.7	212.18	51.22
21.800	147.00	295.0	34669.7	35093.4	211.83	51.18
21.900	145.00	292.0	34538.7	34961.7	211.47	51.15
22.000	144.00	289.0	34405.5	34827.7	211.11	51.11
22.100	143.00	287.0	34271.0	34692.5	210.75	51.07
22.200	141.00	284.0	34134.3	34555.0	210.37	51.04
22.300	140.00	281.0	33995.3	34415.3	210.00	51.00
22.400	138.00	278.0	33854.1	34273.3	209.60	50.96
22.500	137.00	275.0	33710.7	34129.1	209.20	50.92
22.600	135.00	272.0	33565.1	33982.7	208.80	50.88

Pond File: c:\pondpack\kaele\BASIN5 .PND
Inflow Hydrograph: c:\pondpack\kaele\BASIN5 .HYD
Outflow Hydrograph: c:\pondpack\kaele\BASIN5O .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
22.700	134.00	269.0	33417.3	33834.1	208.38	50.84
22.800	132.00	266.0	33267.4	33683.3	207.96	50.80
22.900	131.00	263.0	33115.3	33530.4	207.54	50.75
23.000	130.00	261.0	32962.1	33376.3	207.11	50.71
23.100	128.00	258.0	32806.7	33220.1	206.68	50.67
23.200	127.00	255.0	32649.3	33061.7	206.24	50.62
23.300	125.00	252.0	32489.7	32901.3	205.79	50.58
23.400	124.00	249.0	32328.0	32738.7	205.34	50.53
23.500	122.00	246.0	32164.2	32574.0	204.89	50.49
23.600	121.00	243.0	31998.4	32407.2	204.42	50.44
23.700	119.00	240.0	31830.4	32238.4	203.96	50.40
23.800	118.00	237.0	31660.5	32067.4	203.48	50.35
23.900	116.00	234.0	31488.5	31894.5	203.00	50.30

****************** SUMMARY OF ROUTING COMPUTATIONS ******************

```
Pond File:            c:\pondpack\kaele\BASIN5  .PND
Inflow Hydrograph:    c:\pondpack\kaele\BASIN5  .HYD
Outflow Hydrograph:   c:\pondpack\kaele\BASIN5O .HYD

Starting Pond W.S. Elevation =    40.00 ft

        ***** Summary of Peak Outflow and Peak Elevation *****

                    Peak Inflow    =  2322.00 cfs
                    Peak Outflow   =   397.36 cfs
                    Peak Elevation =    52.79 ft

          ***** Summary of Approximate Peak Storage *****

               Initial Storage          =     0.00 ac-ft
               Peak Storage From Storm  =   168.89 ac-ft
                                          ---------------
               Total Storage in Pond    =   168.89 ac-ft

        Warning: Inflow hydrograph truncated on left side.
        Warning: Inflow hydrograph truncated on right side.
```

POND-2 Version: 5.17 S/N: Page 7

Pond File: c:\pondpack\kaele\BASIN5 .PND
Inflow Hydrograph: c:\pondpack\kaele\BASIN5 .HYD
Outflow Hydrograph: c:\pondpack\kaele\BASIN5O .HYD

EXECUTED: 05-04-1993
13:49:57

Peak Inflow = 2322.00 cfs
Peak Outflow = 397.36 cfs
Peak Elevation = 52.79 ft

```
                                                                   Flow (cfs)
         0   250   500   750   1000  1250  1500  1750  2000  2250  2500  2750
       .------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-
       |
  9.7 -|x        *
       | x       *
  9.8 -| x        *
       | x        *
  9.9 -| x         *
       | x           *
 10.0 -| x            *
       | x                *
 10.1 -| x                    *
       |  x                         *
 10.2 -|  x                                *
       |  x                                       *
 10.3 -|   x                                             *
       |   x                                                *
 10.4 -|   x                                                    *
       |    x                                                  *
 10.5 -|    x                                                 *
       |    x                                            *
 10.6 -|    x                                        *
       |    x                                    *
 10.7 -|     x                               *
       |     x                           *
 10.8 -|     x                        *
       |     x                      *
 10.9 -|     x                    *
       |     x                  *
 11.0 -|     x               *
       |     x              *
 11.1 -|     x             *
       |     x            *
 11.2 -|     x           *
       |     x          *
 11.3 -|     x         *
       |     x         *
 11.4 -|     x        *
       |      x       *
 11.5 -|      x      *
       |      x      *
 11.6 -|      x     *
       |
  TIME
  (hrs)
```

* File: c:\pondpack\kaele\BASIN5 .HYD Qmax = 2322.0 cfs
x File: c:\pondpack\kaele\BASIN5O .HYD Qmax = 397.4 cfs

Executed 05-04-1993 14:22:14

Data directory: c:\pondpack\kaele*.HYD

File Summary for Composite Hydrograph

Time (hrs)	BASIN5O (cfs)	BASIN4 (cfs)	BASIN5O4 (Total)
9.00	0.0	334.0	334.0
9.10	1.6	376.0	377.6
9.20	3.4	417.0	420.4
9.30	5.3	459.0	464.3
9.40	7.4	515.0	522.4
9.50	9.7	570.0	579.7
9.60	12.5	626.0	638.5
9.70	18.3	703.0	721.3
9.80	24.8	779.0	803.8
9.90	32.1	856.0	888.1
10.00	42.0	981.0	1023.0
10.10	58.3	1232.0	1290.3
10.20	82.2	1712.0	1794.2
10.30	110.2	2485.0	2595.2
10.40	137.1	3487.0	3624.1
10.50	158.8	4364.0	4522.8
10.60	175.1	4782.0	4957.1
10.70	188.4	4866.0	5054.4
10.80	199.3	4427.0	4626.3
10.90	204.9	3894.0	4098.9
11.00	209.2	3362.0	3571.2
11.10	212.6	2955.0	3167.6
11.20	215.5	2548.0	2763.5
11.30	217.9	2287.0	2504.9
11.40	220.6	2026.0	2246.6
11.50	240.0	1849.0	2089.0
11.60	267.6	1671.0	1938.6
11.70	294.6	1556.0	1850.6
11.80	319.8	1441.0	1760.8
11.90	341.4	1368.0	1709.3
12.00	361.1	1295.0	1656.1
12.10	375.6	1253.0	1628.6
12.20	385.8	1211.0	1596.8
12.30	392.4	1169.0	1561.4
12.40	396.1	1134.0	1530.1
12.50	397.4	1100.0	1497.4
12.60	396.5	1065.0	1461.6
12.70	394.5	1039.0	1433.4
12.80	391.6	1013.0	1404.6
12.90	388.2	987.0	1375.2

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Data directory: c:\pondpack\kaele*.HYD

File Summary for Composite Hydrograph

Time (hrs)	BASIN5O (cfs)	BASIN4 (cfs)	BASIN5O4 (Total)
13.00	384.3	961.0	1345.3
13.10	380.0	944.0	1324.0
13.20	375.3	927.0	1302.3
13.30	370.3	911.0	1281.3
13.40	365.1	894.0	1259.1
13.50	359.6	877.0	1236.6
13.60	353.8	860.0	1213.8
13.70	347.6	844.0	1191.7
13.80	341.1	827.0	1168.1
13.90	334.2	811.0	1145.2
14.00	328.5	794.0	1122.5
14.10	322.8	773.0	1095.8
14.20	317.0	752.0	1069.0
14.30	311.1	731.0	1042.1
14.40	305.1	710.0	1015.1
14.50	299.0	689.0	988.0
14.60	293.2	681.0	974.2
14.70	287.9	672.0	959.9
14.80	283.1	664.0	947.1
14.90	279.2	655.0	934.2
15.00	276.2	647.0	923.2
15.10	273.2	639.0	912.2
15.20	270.4	631.0	901.4
15.30	267.7	622.0	889.7
15.40	265.2	614.0	879.2
15.50	262.7	606.0	868.7
15.60	260.3	602.0	862.3
15.70	258.0	598.0	856.0
15.80	255.7	593.0	848.7
15.90	253.6	589.0	842.5
16.00	251.4	585.0	836.5
16.10	249.4	583.0	832.3
16.20	247.3	581.0	828.3
16.30	245.3	579.0	824.3
16.40	243.3	577.0	820.3
16.50	241.5	574.0	815.5
16.60	240.4	572.0	812.4
16.70	239.3	570.0	809.3
16.80	238.1	568.0	806.1
16.90	236.9	566.0	802.9
17.00	235.6	564.0	799.7

Executed 05-04-1993 14:22:14

Data directory: c:\pondpack\kaele*.HYD

File Summary for Composite Hydrograph

Time (hrs)	BASIN50 (cfs)	BASIN4 (cfs)	BASIN504 (Total)
17.10	234.4	560.0	794.4
17.20	233.2	556.0	789.2
17.30	232.0	551.0	783.0
17.40	230.9	547.0	777.9
17.50	229.7	543.0	772.7
17.60	228.6	539.0	767.6
17.70	227.5	535.0	762.5
17.80	226.4	530.0	756.4
17.90	225.4	526.0	751.3
18.00	224.3	522.0	746.3
18.10	223.2	519.0	742.2
18.20	222.1	516.0	738.1
18.30	221.0	513.0	734.0
18.40	220.0	509.0	729.0
18.50	219.9	506.0	725.9
18.60	219.7	503.0	722.7
18.70	219.6	500.0	719.6
18.80	219.5	497.0	716.5
18.90	219.3	494.0	713.3
19.00	219.2	490.0	709.2
19.10	219.0	487.0	706.0
19.20	218.8	484.0	702.8
19.30	218.6	481.0	699.7
19.40	218.5	478.0	696.5
19.50	218.3	475.0	693.3
19.60	218.1	472.0	690.1
19.70	217.9	468.0	685.8
19.80	217.6	465.0	682.6
19.90	217.4	462.0	679.4
20.00	217.2	459.0	676.2
20.10	216.9	455.0	671.9
20.20	216.7	451.0	667.7
20.30	216.4	446.0	662.4
20.40	216.2	442.0	658.2
20.50	215.9	438.0	653.9
20.60	215.6	434.0	649.6
20.70	215.3	430.0	645.3
20.80	215.1	426.0	641.0
20.90	214.8	421.0	635.8
21.00	214.4	417.0	631.5
21.10	214.1	413.0	627.1

Executed 05-04-1993 14:22:14

Data directory: c:\pondpack\kaele*.HYD

File Summary for Composite Hydrograph

Time (hrs)	BASIN50 (cfs)	BASIN4 (cfs)	BASIN504 (Total)
21.20	213.8	409.0	622.8
21.30	213.5	405.0	618.5
21.40	213.2	401.0	614.2
21.50	212.9	396.0	608.9
21.60	212.5	392.0	604.5
21.70	212.2	388.0	600.2
21.80	211.8	384.0	595.8
21.90	211.5	380.0	591.5
22.00	211.1	376.0	587.1
22.10	210.8	371.0	581.8
22.20	210.4	367.0	577.4
22.30	210.0	363.0	573.0
22.40	209.6	359.0	568.6
22.50	209.2	355.0	564.2
22.60	208.8	350.0	558.8
22.70	208.4	346.0	554.4
22.80	208.0	342.0	550.0
22.90	207.5	338.0	545.5
23.00	207.1	334.0	541.1
23.10	206.7	330.0	536.7
23.20	206.2	325.0	531.2
23.30	205.8	321.0	526.8
23.40	205.3	317.0	522.3
23.50	204.9	313.0	517.9
23.60	204.4	309.0	513.4
23.70	204.0	305.0	509.0
23.80	203.5	300.0	503.5
23.90	203.0	296.0	499.0
24.00	Missing	Missing	0.0

```
*************************************************************
*                                                           *
*              KAELEPULU STREAM DRAINAGE STUDY              *
*  EXISTING CONDITIONS - 1993, 100-YEAR 24-HOUR DESIGN STORM *
*        ENCHANTED LAKE RETENTION BASIN (AREA NO. 4)        *
*      UNIMPROVED CHANNEL "RESERVOIR" ROUTING ANALYSIS      *
*                                                           *
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```

Inflow Hydrograph: c:\pondpack\kaele\B45R-100.HYD
Rating Table file: c:\pondpack\kaele\B4B-100 .PND

----INITIAL CONDITIONS----
Elevation = 1.80 ft
Outflow = 0.00 cfs
Storage = 0.00 ac-ft

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (ac-ft)	2S/t (cfs)	2S/t + 0 (cfs)
1.80	0.0	0.000	0.0	0.0
2.00	52.0	20.000	4840.0	4892.0
2.20	104.0	40.000	9680.0	9784.0
2.40	156.0	60.000	14520.0	14676.0
2.60	215.0	80.000	19360.0	19575.0
2.80	312.0	100.000	24200.0	24512.0
3.00	409.0	120.000	29040.0	29449.0
3.20	498.0	140.000	33880.0	34378.0
3.40	591.0	160.000	38720.0	39311.0
3.60	672.0	180.000	43560.0	44232.0
3.80	757.0	200.000	48400.0	49157.0
4.00	844.0	220.000	53240.0	54084.0
4.20	930.0	240.000	58080.0	59010.0
4.40	1018.0	260.000	62920.0	63938.0
4.60	1109.0	280.000	67760.0	68869.0
4.80	1200.0	300.000	72600.0	73800.0
5.00	1291.0	320.000	77440.0	78731.0
5.20	1382.0	340.000	82280.0	83662.0
5.40	1478.0	360.000	87120.0	88598.0
5.60	1576.0	380.000	91960.0	93536.0
5.80	1675.0	400.000	96800.0	98475.0
6.00	1775.0	420.000	101640.0	103415.0
6.20	1879.0	440.000	106480.0	108359.0
6.40	1984.0	460.000	111320.0	113304.0

Time increment (t) = 0.100 hrs.

POND-2 Version: 5.17 S/N:
EXECUTED: 10-14-1993 15:16:29

Pond File: c:\pondpack\kaele\B4B-100 .PND
Inflow Hydrograph: c:\pondpack\kaele\B45R-100.HYD
Outflow Hydrograph: c:\pondpack\kaele\B4RB-100.HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.000	0.00	-----	0.0	0.0	0.00	1.80
0.100	0.00	0.0	0.0	0.0	0.00	1.80
0.200	0.20	0.2	0.2	0.2	0.00	1.80
0.300	0.40	0.6	0.8	0.8	0.01	1.80
0.400	0.70	1.1	1.8	1.9	0.02	1.80
0.500	1.01	1.7	3.5	3.5	0.04	1.80
0.600	1.51	2.5	5.9	6.0	0.06	1.80
0.700	2.02	3.5	9.2	9.4	0.10	1.80
0.800	2.63	4.7	13.6	13.8	0.15	1.80
0.900	3.34	6.0	19.1	19.5	0.21	1.80
1.000	4.16	7.5	26.0	26.6	0.28	1.80
1.100	5.08	9.2	34.5	35.3	0.38	1.80
1.200	6.00	11.1	44.6	45.6	0.48	1.80
1.300	7.13	13.1	56.5	57.8	0.61	1.80
1.400	8.27	15.4	70.4	71.9	0.76	1.80
1.500	9.50	17.8	86.3	88.2	0.94	1.80
1.600	10.85	20.4	104.4	106.7	1.13	1.80
1.700	12.20	23.1	124.7	127.4	1.35	1.81
1.800	13.75	26.0	147.5	150.7	1.60	1.81
1.900	15.31	29.1	172.8	176.5	1.88	1.81
2.000	16.98	32.3	200.7	205.1	2.18	1.81
2.100	18.75	35.7	231.4	236.4	2.51	1.81
2.200	20.63	39.4	265.0	270.8	2.88	1.81
2.300	22.52	43.2	301.6	308.2	3.28	1.81
2.400	24.62	47.1	341.4	348.8	3.71	1.81
2.500	26.72	51.3	384.4	392.7	4.17	1.82
2.600	28.94	55.7	430.7	440.0	4.68	1.82
2.700	31.26	60.2	480.4	490.9	5.22	1.82
2.800	33.59	64.9	533.7	545.3	5.80	1.82
2.900	36.13	69.7	590.6	603.4	6.41	1.82
3.000	38.68	74.8	651.2	665.4	7.07	1.83
3.100	41.34	80.0	715.7	731.3	7.77	1.83
3.200	44.11	85.5	784.1	801.2	8.52	1.83
3.300	46.99	91.1	856.6	875.2	9.30	1.84
3.400	49.98	97.0	933.3	953.6	10.14	1.84
3.500	52.98	103.0	1014.3	1036.3	11.02	1.84
3.600	56.10	109.1	1099.5	1123.3	11.94	1.85
3.700	59.42	115.5	1189.1	1215.0	12.91	1.85
3.800	62.66	122.1	1283.3	1311.2	13.94	1.85
3.900	66.11	128.8	1382.1	1412.1	15.01	1.86
4.000	69.67	135.8	1485.6	1517.9	16.13	1.86
4.100	73.25	142.9	1593.9	1628.5	17.31	1.87
4.200	76.93	150.2	1707.0	1744.1	18.54	1.87
4.300	80.73	157.7	1825.0	1864.7	19.82	1.88
4.400	84.65	165.4	1948.1	1990.4	21.16	1.88

Pond File: c:\pondpack\kaele\B4B-100 .PND
Inflow Hydrograph: c:\pondpack\kaele\B45R-100.HYD
Outflow Hydrograph: c:\pondpack\kaele\B4RB-100.HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
4.500	88.67	173.3	2076.3	2121.4	22.55	1.89
4.600	92.81	181.5	2209.8	2257.8	24.00	1.89
4.700	96.97	189.8	2348.6	2399.6	25.51	1.90
4.800	101.24	198.2	2492.6	2546.8	27.07	1.90
4.900	105.62	206.9	2642.1	2699.5	28.69	1.91
5.000	110.12	215.7	2797.1	2857.8	30.38	1.92
5.100	114.74	224.9	2957.7	3021.9	32.12	1.92
5.200	119.37	234.1	3124.0	3191.8	33.93	1.93
5.300	124.12	243.5	3295.9	3367.4	35.79	1.94
5.400	128.98	253.1	3473.5	3549.0	37.72	1.95
5.500	133.95	262.9	3657.0	3736.4	39.72	1.95
5.600	139.05	273.0	3846.5	3930.0	41.77	1.96
5.700	144.26	283.3	4042.0	4129.8	43.90	1.97
5.800	149.49	293.8	4243.5	4335.7	46.09	1.98
5.900	154.83	304.3	4451.2	4547.9	48.34	1.99
6.000	160.29	315.1	4665.0	4766.3	50.66	1.99
6.100	166.36	326.7	4885.5	4991.6	53.06	2.00
6.200	172.67	339.0	5113.5	5224.5	55.53	2.01
6.300	179.10	351.8	5349.1	5465.2	58.09	2.02
6.400	185.56	364.7	5592.2	5713.7	60.73	2.03
6.500	192.15	377.7	5843.0	5970.0	63.46	2.04
6.600	198.86	391.0	6101.5	6234.0	66.27	2.05
6.700	205.70	404.6	6367.8	6506.1	69.16	2.07
6.800	212.67	418.4	6641.9	6786.1	72.13	2.08
6.900	219.66	432.3	6923.8	7074.2	75.20	2.09
7.000	226.78	446.4	7213.6	7370.2	78.34	2.10
7.100	234.13	460.9	7511.3	7674.5	81.58	2.11
7.200	241.51	475.6	7817.2	7987.0	84.90	2.13
7.300	248.91	490.4	8131.0	8307.6	88.31	2.14
7.400	256.55	505.5	8452.8	8636.4	91.80	2.15
7.500	264.21	520.8	8782.8	8973.6	95.39	2.17
7.600	272.10	536.3	9121.0	9319.1	99.06	2.18
7.700	280.03	552.1	9467.5	9673.1	102.82	2.20
7.800	288.13	568.2	9822.3	10035.6	106.67	2.21
7.900	296.66	584.8	10185.8	10407.1	110.62	2.23
8.000	305.43	602.1	10558.6	10787.9	114.67	2.24
8.100	314.23	619.7	10940.6	11178.3	118.82	2.26
8.200	323.25	637.5	11331.9	11578.1	123.07	2.27
8.300	332.30	655.6	11732.7	11987.5	127.42	2.29
8.400	341.48	673.8	12142.7	12406.4	131.88	2.31
8.500	350.69	692.2	12562.0	12834.9	136.43	2.32
8.600	360.14	710.8	12990.7	13272.8	141.08	2.34
8.700	369.61	729.8	13428.7	13720.4	145.84	2.36
8.800	379.21	748.8	13876.1	14177.5	150.70	2.38
8.900	388.95	768.2	14333.0	14644.3	155.66	2.40
9.000	398.81	787.8	14798.0	15120.7	161.36	2.42

Pond File: c:\pondpack\kaele\B4B-100 .PND
Inflow Hydrograph: c:\pondpack\kaele\B45R-100.HYD
Outflow Hydrograph: c:\pondpack\kaele\B4RB-100.HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
9.100	443.48	842.3	15305.1	15640.3	167.61	2.44
9.200	487.47	931.0	15886.5	16236.0	174.79	2.46
9.300	532.53	1020.0	16540.7	16906.5	182.86	2.49
9.400	592.00	1124.5	17281.3	17665.3	192.00	2.52
9.500	650.96	1243.0	18119.5	18524.2	202.35	2.56
9.600	711.39	1362.4	19054.1	19481.9	213.88	2.60
9.700	793.50	1504.9	20090.3	20559.0	234.33	2.64
9.800	875.52	1669.0	21243.5	21759.4	257.92	2.69
9.900	958.21	1833.7	22509.6	23077.3	283.81	2.74
10.000	1088.84	2047.1	23930.9	24556.7	312.88	2.80
10.100	1348.38	2437.2	25671.2	26368.2	348.47	2.88
10.200	1842.15	3190.5	28066.8	28861.7	397.46	2.98
10.300	2633.50	4475.7	31612.8	32542.5	464.86	3.13
10.400	3654.11	6287.6	36771.6	37900.4	564.41	3.34
10.500	4549.01	8203.1	43605.0	44974.7	684.82	3.63
10.600	4994.54	9543.5	51493.6	53148.6	827.48	3.96
10.700	5283.41	10278.0	59812.9	61771.6	979.31	4.31
10.800	5055.92	10339.3	67886.9	70152.3	1132.68	4.65
10.900	4652.20	9708.1	75055.0	77595.0	1270.04	4.95
11.000	4175.90	8828.1	81110.5	83883.1	1386.30	5.21
11.100	3775.34	7951.2	86087.3	89061.7	1487.20	5.42
11.200	3348.37	7123.7	90071.9	93211.0	1569.55	5.59
11.300	3053.30	6401.7	93203.8	96473.6	1634.88	5.72
11.400	2753.80	5807.1	95639.2	99010.9	1685.85	5.82
11.500	2537.89	5291.7	97481.5	100930.9	1724.71	5.90
11.600	2322.42	4860.3	98835.2	102341.8	1753.28	5.96
11.700	2174.54	4497.0	99785.5	103332.2	1773.32	6.00
11.800	2030.20	4204.7	100416.1	103990.3	1787.10	6.02
11.900	1930.85	3961.1	100786.7	104377.1	1795.24	6.04
12.000	1835.04	3765.9	100954.7	104552.5	1798.93	6.05
12.100	1773.44	3608.5	100964.9	104563.2	1799.15	6.05
12.200	1713.66	3487.1	100858.3	104452.0	1796.81	6.04
12.300	1655.32	3369.0	100643.1	104227.3	1792.09	6.03
12.400	1605.10	3260.4	100333.0	103903.6	1785.28	6.02
12.500	1556.74	3161.8	99941.5	103494.8	1776.68	6.00
12.600	1507.99	3064.7	99472.8	103006.2	1766.73	5.98
12.700	1469.37	2977.4	98939.2	102450.1	1755.47	5.96
12.800	1432.05	2901.4	98354.4	101840.6	1743.13	5.94
12.900	1395.77	2827.8	97722.6	101182.2	1729.80	5.91
13.000	1360.40	2756.2	97047.6	100478.7	1715.56	5.88
13.100	1334.65	2695.1	96341.3	99742.7	1700.66	5.85
13.200	1309.38	2644.0	95614.7	98985.4	1685.33	5.82
13.300	1285.48	2594.9	94870.2	98209.6	1669.68	5.79
13.400	1262.39	2547.9	94110.5	97418.1	1653.81	5.76
13.500	1239.32	2501.7	93336.8	96612.2	1637.66	5.72
13.600	1216.02	2455.3	92549.7	95792.2	1621.22	5.69

Pond File: c:\pondpack\kaele\B4B-100 .PND
Inflow Hydrograph: c:\pondpack\kaele\B45R-100.HYD
Outflow Hydrograph: c:\pondpack\kaele\B4RB-100.HYD

INFLOW HYDROGRAPH / ROUTING COMPUTATIONS

TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
13.700	1193.42	2409.4	91750.1	94959.2	1604.53	5.66
13.800	1169.51	2362.9	90937.9	94113.1	1587.57	5.62
13.900	1146.32	2315.8	90113.0	93253.7	1570.40	5.59
14.000	1122.00	2268.3	89275.1	92381.3	1553.08	5.55
14.100	1093.65	2215.7	88419.9	91490.8	1535.41	5.52
14.200	1065.45	2159.1	87544.4	90579.0	1517.32	5.48
14.300	1037.51	2103.0	86649.7	89647.4	1498.83	5.44
14.400	1011.16	2048.7	85738.4	88698.4	1479.99	5.40
14.500	984.66	1995.8	84811.8	87734.2	1461.20	5.37
14.600	971.29	1956.0	83883.0	86767.8	1442.40	5.33
14.700	957.42	1928.7	82964.1	85811.7	1423.81	5.29
14.800	944.99	1902.4	82055.6	84866.5	1405.43	5.25
14.900	931.93	1876.9	81158.0	83932.5	1387.26	5.21
15.000	920.20	1852.1	80270.2	83010.1	1369.97	5.17
15.100	908.70	1828.9	79392.8	82099.1	1353.16	5.14
15.200	897.45	1806.2	78525.8	81198.9	1336.54	5.10
15.300	885.43	1782.9	77668.5	80308.7	1320.12	5.06
15.400	874.60	1760.0	76820.8	79428.5	1303.87	5.03
15.500	863.95	1738.6	75983.7	78559.3	1287.83	4.99
15.600	857.74	1721.7	75161.2	77705.4	1272.07	4.96
15.700	851.81	1709.6	74357.4	76870.8	1256.67	4.92
15.800	844.93	1696.7	73571.0	76054.2	1241.60	4.89
15.900	839.08	1684.0	72801.3	75255.0	1226.85	4.86
16.000	833.27	1672.4	72048.8	74473.6	1212.43	4.83
16.100	829.44	1662.7	71314.7	73711.5	1198.37	4.80
16.200	825.64	1655.1	70600.5	72969.8	1184.68	4.77
16.300	821.88	1647.5	69905.3	72248.0	1171.36	4.74
16.400	818.09	1640.0	69228.4	71545.2	1158.39	4.71
16.500	813.27	1631.4	68568.3	70859.8	1145.74	4.68
16.600	809.49	1622.8	67924.3	70191.1	1133.40	4.65
16.700	805.74	1615.2	67296.8	69539.5	1121.37	4.63
16.800	801.96	1607.7	66685.2	68904.5	1109.65	4.60
16.900	798.22	1600.2	66088.9	68285.3	1098.23	4.58
17.000	794.49	1592.7	65507.4	67681.6	1087.09	4.55
17.100	788.79	1583.3	64938.3	67090.7	1076.18	4.53
17.200	783.16	1572.0	64379.3	66510.3	1065.47	4.50
17.300	776.64	1559.8	63829.3	65939.1	1054.93	4.48
17.400	771.22	1547.9	63288.0	65377.1	1044.56	4.46
17.500	765.85	1537.1	62756.4	64825.1	1034.37	4.44
17.600	760.51	1526.4	62234.0	64282.7	1024.36	4.41
17.700	755.21	1515.7	61720.4	63749.7	1014.64	4.39
17.800	749.46	1504.7	61214.6	63225.1	1005.27	4.37
17.900	744.82	1494.3	60716.7	62708.8	996.05	4.35
18.000	740.16	1485.0	60227.7	62201.7	987.00	4.33
18.100	736.45	1476.6	59748.1	61704.3	978.11	4.31
18.200	732.70	1469.2	59278.4	61217.3	969.42	4.29

Pond File: c:\pondpack\kaele\B4B-100 .PND
Inflow Hydrograph: c:\pondpack\kaele\B45R-100.HYD
Outflow Hydrograph: c:\pondpack\kaele\B4RB-100.HYD

INFLOW HYDROGRAPH — ROUTING COMPUTATIONS

TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
18.300	728.91	1461.6	58818.3	60740.0	960.89	4.27
18.400	724.06	1453.0	58366.2	60271.2	952.52	4.25
18.500	720.17	1444.2	57921.8	59810.4	944.29	4.23
18.600	716.25	1436.4	57485.8	59358.3	936.22	4.21
18.700	712.27	1428.5	57057.7	58914.3	928.33	4.20
18.800	708.27	1420.5	56636.8	58478.2	920.72	4.18
18.900	704.23	1412.5	56222.8	58049.3	913.23	4.16
19.000	699.18	1403.4	55814.6	57626.2	905.84	4.14
19.100	695.09	1394.3	55411.7	57208.8	898.55	4.13
19.200	690.96	1386.1	55015.0	56797.8	891.38	4.11
19.300	686.81	1377.8	54624.2	56392.8	884.31	4.09
19.400	682.64	1369.5	54238.9	55993.6	877.34	4.08
19.500	678.43	1361.1	53859.1	55600.0	870.47	4.06
19.600	674.20	1352.6	53484.3	55211.7	863.69	4.05
19.700	668.95	1343.2	53113.5	54827.5	856.98	4.03
19.800	664.94	1333.9	52746.7	54447.4	850.34	4.01
19.900	661.72	1326.7	52385.8	54073.4	843.81	4.00
20.000	658.49	1320.2	52031.3	53706.0	837.32	3.98
20.100	654.24	1312.7	51682.2	53344.0	830.93	3.97
20.200	649.98	1304.2	51337.2	52986.4	824.62	3.96
20.300	644.71	1294.7	50995.1	52631.8	818.36	3.94
20.400	640.43	1285.1	50656.0	52280.3	812.15	3.93
20.500	636.14	1276.6	50320.5	51932.5	806.01	3.91
20.600	631.84	1268.0	49988.6	51588.5	799.93	3.90
20.700	627.52	1259.4	49660.1	51248.0	793.92	3.88
20.800	623.20	1250.7	49334.9	50910.9	787.97	3.87
20.900	617.86	1241.1	49011.9	50576.0	782.06	3.86
21.000	613.52	1231.4	48690.9	50243.3	776.18	3.84
21.100	609.16	1222.7	48372.9	49913.6	770.36	3.83
21.200	604.80	1214.0	48057.6	49586.8	764.59	3.82
21.300	600.42	1205.2	47745.1	49262.9	758.87	3.80
21.400	596.04	1196.5	47435.0	48941.6	753.28	3.79
21.500	590.65	1186.7	47126.2	48621.7	747.76	3.78
21.600	586.24	1176.9	46818.5	48303.1	742.26	3.77
21.700	581.83	1168.1	46513.0	47986.6	736.80	3.75
21.800	577.41	1159.2	46209.5	47672.3	731.37	3.74
21.900	572.97	1150.4	45907.9	47359.9	725.98	3.73
22.000	568.53	1141.5	45608.2	47049.4	720.63	3.71
22.100	563.08	1131.6	45309.2	46739.8	715.28	3.70
22.200	558.62	1121.7	45011.0	46430.9	709.95	3.69
22.300	554.16	1112.8	44714.5	46123.8	704.65	3.68
22.400	549.68	1103.8	44419.6	45818.3	699.38	3.66
22.500	545.19	1094.9	44126.2	45514.4	694.13	3.65
22.600	539.70	1084.9	43833.3	45211.1	688.90	3.64
22.700	535.19	1074.9	43540.8	44908.2	683.67	3.63
22.800	530.68	1065.9	43249.8	44606.7	678.47	3.62

Pond File: c:\pondpack\kaele\B4B-100 .PND
Inflow Hydrograph: c:\pondpack\kaele\B45R-100.HYD
Outflow Hydrograph: c:\pondpack\kaele\B4RB-100.HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
22.900	526.16	1056.8	42960.0	44306.6	673.29	3.60
23.000	521.63	1047.8	42671.2	44007.8	668.31	3.59
23.100	517.09	1038.7	42383.1	43709.9	663.41	3.58
23.200	511.55	1028.6	42094.7	43411.7	658.50	3.57
23.300	507.00	1018.6	41806.1	43113.3	653.59	3.55
23.400	502.43	1009.4	41518.2	42815.6	648.69	3.54
23.500	497.86	1000.3	41230.9	42518.5	643.80	3.53
23.600	493.28	991.1	40944.2	42222.0	638.92	3.52
23.700	488.72	982.0	40658.1	41926.2	634.05	3.51
23.800	483.17	971.9	40371.6	41630.0	629.17	3.49
23.900	478.62	961.8	40084.9	41333.4	624.29	3.48
24.000	474.05	952.7	39798.7	41037.5	619.42	3.47

****************** SUMMARY OF ROUTING COMPUTATIONS ******************

Pond File: c:\pondpack\kaele\B4B-100 .PND
Inflow Hydrograph: c:\pondpack\kaele\B45R-100.HYD
Outflow Hydrograph: c:\pondpack\kaele\B4RB-100.HYD

Starting Pond W.S. Elevation = 1.80 ft

***** Summary of Peak Outflow and Peak Elevation *****

Peak Inflow = 5283.41 cfs
Peak Outflow = 1799.15 cfs
Peak Elevation = 6.05 ft

***** Summary of Approximate Peak Storage *****

Initial Storage	=	0.00 ac-ft
Peak Storage From Storm	=	424.64 ac-ft
Total Storage in Pond	=	424.64 ac-ft

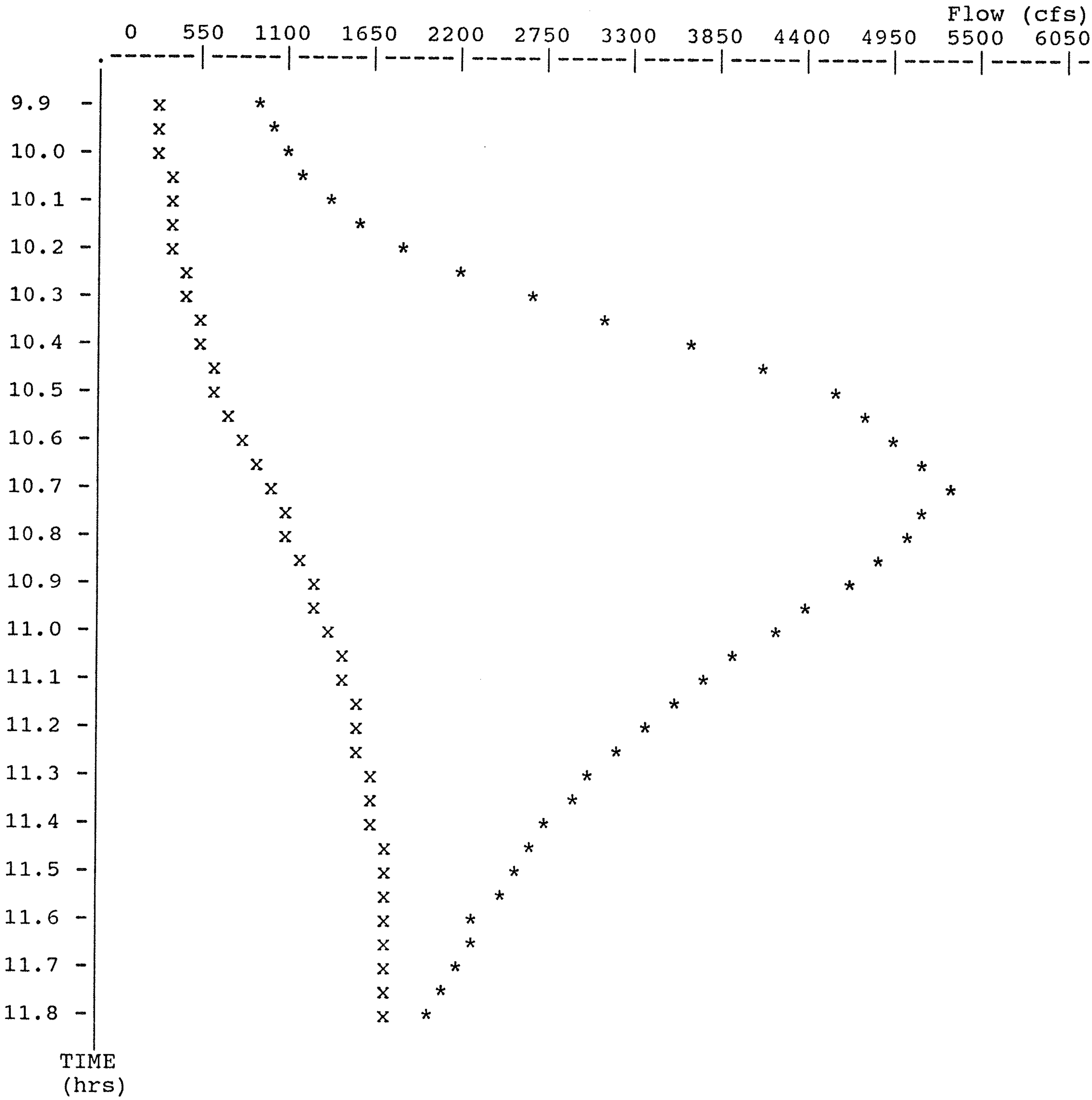
Warning: Inflow hydrograph truncated on right side.

POND-2 Version: 5.17 S/N:

Pond File: c:\pondpack\kaele\B4B-100 .PND
Inflow Hydrograph: c:\pondpack\kaele\B45R-100.HYD
Outflow Hydrograph: c:\pondpack\kaele\B4RB-100.HYD

EXECUTED: 10-14-1993
15:16:29

Peak Inflow = 5283.41 cfs
Peak Outflow = 1799.15 cfs
Peak Elevation = 6.05 ft



* File: c:\pondpack\kaele\B45R-100.HYD Qmax = 5283.4 cfs
x File: c:\pondpack\kaele\B4RB-100.HYD Qmax = 1799.2 cfs

```
T1      KAELEPULU STREAM ORIGINAL CHANNEL       FILE:  KKDORIG2.DAT
T2      STREAM HYDRAULICS, NOT OBSTRUCTED          DATE:10/14/93
T3      SUBCRITICAL FLOW    (STA. -800 TO STA. 69+50)
J1     -10                                   0              .1    2835    1.76
J2      -1                -1                                -1
J3     150
J5     -10     -10

NC     .04     .04     .03     0.1     0.3
X1     800       6       0     179
GR    -4.6       0    -4.8      40    -4.9     108      -5     147      -5     152
GR      -6     179

X1     750       7       0   203.5      50      50      50
GR    -4.3       0      -4      31    -3.8    54.5      -4    81.5    -4.1   131.5
GR      -5     181      -6   203.5

X1     700       4       0   226.5      50      50      50
GR   -2.53       0   -2.54      31      -4    51.2      -4   226.5

X1     650       5       0     263      50      50      50
GR       0       0     -.5    30.5      -4      63      -5   251.5    -5.5     263

X1     600       3       0     340      50      50      50
GR       4       0      -4    44.5      -4     340

X1     550       6      36     324      50      50      50
GR      11       0      10      19       5      36      -4    78.5      -4     257
GR       1     324

X1     500      10    59.5     253      50      50      50
GR      13       0      12      16      11    31.5      10    46.7       5    59.5
GR      -4    62.5      -4   210.5       5   233.5     5.4     253     5.1     277

X1     450      13    47.5   246.5      50      50      50
GR      13       0      12      12      11      24      10      36       9    47.5
GR     8.2      56       5    64.5      -4    72.5      -4     214       5     222
GR    10.6   246.5      11     256    11.9     299

X1     400      15      58   241.5      50      50      50
GR    11.5       0      11       7      10      20       9      33       8      45
GR       7      58     6.9      60       5      65      -4    70.5      -4     211
GR       5     221      10   241.5      11     253      12   270.5      13     289

X1     350      11    48.5     214      50      50      50
GR       8       0       7    23.5       6      37       5    48.5      -4      55
GR      -4     195       5     204    9.19     214      10     236      11   252.5
GR      12   268.5

X1     300       9      30     198      50      50      50
GR    2.19       0     2.6      18     3.1      30      -4      44      -4     189
GR       5     198    8.52     209       9     219      10     257

X1     250       9    46.5   210.5      50      50      50
GR       4       0       4    25.5     3.2    46.5     1.8      50      -4      62
GR      -4   184.5       5     196    9.03   210.5    8.08     254

X1     200      10    37.5     205      50      50      50
GR    3.63       0     4.6       6     3.9      23     3.5    37.5      -4      41
GR      -4     182       5     192       9     205    7.33     228    7.49     266

X1     150      16      24   203.7      50      50      50
GR    4.57       0     4.7       2    5.39    4.01       5    10.5    3.95      24
GR     1.9      29       1      45      -4    62.5      -4     139       1     159
GR     1.9   177.7       5   185.5      10   199.5    11.4   203.7      10     211
GR    7.46     223

X1     100      11      32     198      50      50      50
GR       5       0    4.53    18.5       5      22     3.9      32      -4    37.5
GR      -4     192       5     198      10   210.5   11.98     215      10     227
GR    7.46     236

X1      50       9       7   199.5   145.5      98      63    .886
GR       5       0     4.6       7      -4      12      -4   164.5    1.44     189
GR       5   199.5    8.82   209.5    9.54   221.5    8.15   232.5


X1      36       6       0     206      14      14      14    .886
X3      10
GR     4.7       0     1.5       4      -4      59      -4     166     1.6     184
GR     8.3     206
```

NC	.04	.04	.03	.1	.3					
SB	1.05	1.56	2.6	0	180	68	1220	1	0	0
X1	26	6	0	206	10	10	10	.886		
X2			1	6	8	0	0	0	.886	
X3	10									
BT	-39	0	8	5	0	8	6	21	8	6
BT		21	8	-4	23.5	8	-4	23.5	8	6
BT		48	8	6	48	8	-4	51	8	-4
BT		51	8	6	53	8	6	53	8	-4
BT		57	8	-4	57	8	5	80	8	5
BT		80	8	-4	84	8	-4	84	8	5
BT		106	8	5	106	8	-4	110	8	-4
BT		110	8	5	133	8	5	133	8	-4
BT		137	8	-4	137	8	5	160	8	5
BT		160	8	-4	164	8	-4	164	8	5
BT		167	8	6	167	8	-4	169	8	-4
BT		169	8	6	180	8	6	180	8	-4
BT		183	8	-4	183	8	6	206	8	6
GR	6	0	1.5	4	-4	21	-4	183	1.6	185
GR	6	206								

SB	1.05	1.56	2.6	0	180	68	1220	1	0	0
X1	08	7	0	202	34	34	34	.886		
X2			1	6	8	0	0	0	.886	
X3	10									
BT	-39	0	8	5	0	8	6	21	8	6
BT		21	8	-4	23	8	-4	23	8	6
BT		35	8	6	35	8	-4	38	8	-4
BT		38	8	6	41	8	6	41	8	-4
BT		45	8	-4	45	8	5	67	8	5
BT		67	8	-4	71	8	-4	71	8	5
BT		93	8	5	93	8	-4	97	8	-4
BT		97	8	5	120	8	5	120	8	-4
BT		124	8	-4	124	8	5	146	8	5
BT		146	8	-4	150	8	-4	150	8	5
BT		153	8	6	153	8	-4	155	8	-4
BT		155	8	6	179	8	6	179	8	-4
BT		182	8	-4	182	8	6	206	8	6
GR	6	0	-0.4	5	-4	21	-4	191	3.1	194
GR	3.1	199	6	202						

NC	.05	.05	.04	0.1	0.3					
X1	18	8	0	201	10	10	10	.886		
GR	4.6	0	-0.4	5	-4	40	-4	148	2.2	191
GR	3.4	194	3.4	198	4.5	201				

X1	50	42	54.03	171.33	50	50	50			
GR	3.63	0.00	3.4	5	3.53	15.66	3.98	27.28	4.07	44.95
GR	4.16	54.03	1.29	57.84	-0.26	72.15	-2	92.4	-2	98.92
GR	-2	112.30	-2	119.94	-2	120.17	-2	124.24	-2	138.17
GR	-2	141.43	-2	143.47	-2	155.33	-2	157.73	-2	158.38
GR	-2	160.85	6.18	171.33	10.87	172.3	10.07	172.85	10.5	173.65
GR	11.54	175.07	11.4	199.7	8.67	202.95	4.1	206.4	6.64	213.9
GR	5.18	219.55	6.4	223.45	8.85	227.25	8.93	230.02	8.11	231.64
GR	4.84	233.36	9.72	244.83	10.14	245.8	9.09	253.34	8.83	254.06
GR	8.09	265.89	7.77	267.98						

X1	100	35	46.82	191.05	50	50	50			
GR	3.69	0.00	3.7	1.17	3.15	13.37	3.18	16.14	3.36	20.06
GR	3.59	36.01	3.01	37.83	1.64	46.82	0.1	47.85	0.12	55.53
GR	-2	92.29	-2	94.95	-2	96.74	-2	97.81	-2	122.92
GR	-2	151.14	-2	153.29	-2	156.37	-2	176.98	0.5	191.05
GR	0.49	191.77	0.43	207.89	2	215.42	1.15	218.11	2.14	222.95
GR	4.41	236.36	6.68	243.17	6.87	244.05	8.08	247.03	8.29	249.79
GR	8.03	261.91	7.94	262.99	7.1	275.02	7.03	275.92	6.91	276.69

X1	150	35	34.46	234.33	50	50	50			
GR	3.76	0.00	3.78	1.85	3.74	2.63	3.56	23.18	3.52	26.37
GR	2.71	28.25	2.8	34.46	1.84	35.77	0.67	44.46	-0.28	51.13
GR	-2	65.64	-2	67.61	-2	91.22	-2	92.57	-2	94.08
GR	-2	112.29	-2	120.09	-2	121.44	-2	148.36	-2	170.36
GR	-2	182.84	-2	188.13	-2	189.29	0.7	209.81	0.7	213.3
GR	1.18	219.31	0.67	221.86	3.47	234.33	4.74	236.04	5.32	251.56
GR	5.27	265.17	5.38	269.01	5.64	274.04	6.2	276.28	6.22	277.02

X1	200	32	0	233.84	50	50	50			
GR	3.82	0.00	2.47	27.34	2.43	30.13	2.3	30.78	2.09	31.76
GR	2.15	33.97	1.13	53.26	0.57	66.03	-2	87.13	-2	91.01
GR	-2	92.35	-2	115.4	-2	120.73	-2	122.14	-2	145.87
GR	-2	147.56	-2	167.16	-2	176.3	-2	178.09	-2	205.84
GR	-2	209.85	-0.53	218.35	1.9	231.01	3.58	232.87	4.23	233.84
GR	4.81	256.37	4.78	264.03	4.8	267.26	4.83	268.84	5.56	271.74
GR	5.62	272.64	5.6	273.53						

```
X1 250       32     37.71  232.62      50      50      50
GR  3.85    0.00     3.69    0.89    3.22   22.36       3   31.41    1.86   36.25
GR  1.74   37.71    -0.42      60      -2   68.55      -2   79.12      -2   87.67
GR    -2   98.52       -2  111.98      -2  116.49      -2   138.8      -2  145.34
GR    -2  146.61       -2  153.63      -2   162.7      -2  172.54      -2  184.13
GR    -2  200.68    -0.73  208.33    0.78  219.98    1.88  226.42    3.73  232.62
GR  4.11  233.79     4.39  255.91    4.44  261.34    4.52  265.35    4.92  266.93
GR  5.01  268.35     4.99  269.77

X1 300       24     35.73  231.78      50      50      50
GR  3.85    0.00      3.6   10.39    3.18    27.2    2.59   31.79    1.86   35.73
GR -0.55   50.50       -1   54.47    -2.3    85.7   -2.74   96.08   -2.77   97.49
GR -2.11  131.70    -2.81  161.73   -2.69  164.75   -2.88  189.91   -2.94  193.76
GR -2.34  197.43     1.88  226.01    2.41  227.62    3.28  231.78    3.36  239.94
GR  4.16  262.20     4.21  263.24    4.41  265.44    4.37  267.38

X1 350       29     28.88  236.87      50      50      50
GR  4.54    0.00     4.53    4.64     4.4     6.1    3.96    6.87    4.23   10.03
GR  4.07   13.15     3.26   24.13    2.47   28.88    0.01   48.26   -0.89   56.06
GR -1.20   58.69    -1.29    60.2   -1.99   77.94   -2.35   87.09    -1.7  121.83
GR -1.69  122.34    -2.04  135.03   -2.76  160.11   -2.76   161.1   -2.72  198.12
GR -2.73  200.83    -2.26  203.63   -1.92  213.98    1.94  231.13    2.32  233.29
GR  3.38  236.87     3.78  258.46    3.79  266.62    3.75  268.36

X1 400       24      32.7  237.36      50      50      50
GR  5.47    0.00     5.46    3.03    4.67   11.79     4.7   12.39    4.69   13.43
GR  4.73   16.93     4.78   26.23    4.41    32.7   -0.74   60.75   -1.88   83.21
GR -1.86   88.90     -1.8  101.09    -2.3  119.11   -2.72  143.55   -2.64  165.04
GR -2.54  204.89    -2.62  207.46   -2.29  208.86   -1.49  212.93    1.69  230.25
GR  3.01  237.36     3.42  239.72    3.69  263.85    3.68  269.59

X1 450       26     33.11  234.92      50      50      50
GR  6.39    0.00     6.39    1.42    6.02    5.65    5.68   10.47    5.04   17.66
GR  4.97   23.73     4.71   33.11    3.43   34.65    1.52   36.94   -1.09   90.71
GR -1.19   92.80    -1.58  100.02   -2.99  128.45    -3.5   156.2   -3.71  168.52
GR -5.60  203.62    -5.61  204.15   -5.49  204.66    0.11  227.19    5.75  234.92
GR  4.41  245.10     4.63  253.65    4.71  255.52    4.39  263.42    4.11  267.36
GR  4.23  268.03

X1 500       27     39.63  239.52      50      50      50
GR  7.02    0.00     7.48    0.57    6.03   19.03    5.27   23.39    5.26   24.89
GR  4.86   37.75     4.27   39.63    1.23   42.67   -0.17   69.47   -0.97   80.45
GR -1.36   90.42    -1.52   92.94   -3.53  125.43   -3.68  129.41   -4.09   153.3
GR -4.19  161.84    -4.54  180.33   -3.97  199.35   -2.83  213.55   -0.12  231.99
GR  5.91  239.52     5.57  246.17     5.4  249.72    5.32  251.76    5.12  256.65
GR  4.53  265.09     4.79  266.54

X1 550       27     44.89  246.91      50      50      50
GR  5.48    0.00     7.08    2.02    6.36    15.4    4.71   24.95     4.7   30.11
GR  3.99   43.64     3.81   44.89    1.72   48.58   -0.33   51.18   -1.77   81.74
GR -2.38   94.46    -2.56    98.2   -3.89  125.07   -4.18  129.71   -4.25  133.89
GR -5.21  163.07    -5.36  171.03    -6.1   190.8    -5.4  199.55   -2.44  233.93
GR  0.06  241.94      0.2  242.99    5.95  246.91    5.93  251.21    5.86  252.92
GR  4.95  265.85     5.34  268.07

X1 600       29      51.8  255.91      50      50      50
GR  4.14    0.00     4.15    0.76    4.79    2.89     4.7    8.67    5.46   20.74
GR  5.26   25.48     5.02   27.56    4.41   36.01    3.73    51.8     3.1   52.67
GR  2.63   53.23    -1.73   80.84   -3.27   96.11   -3.51  102.78   -3.64  106.36
GR -5.07  140.98    -6.01  170.91   -6.15  182.49   -6.49   207.8    -6.4  208.[illegible]9
GR -6.25  209.60    -2.53   244.2   -0.07  249.96    5.36  253.36    6.09  255.91
GR  5.39  265.92     5.53  266.58    5.93  268.95       6  269.51

X1 650       30     37.49  262.07      49      55      50
GR  4.98    0.00     5.08     5.2    5.26   13.24    6.01   15.77    5.77   35.37
GR  5.75   35.99     5.75   37.49    3.64    50.5    2.78   51.61   -1.27   75.06
GR -2.37   78.59    -4.51   90.24   -4.82  101.32   -4.84  101.98   -5.96  136.36
GR -6.65  152.94    -7.31   175.3   -7.91  186.95   -7.33  205.97   -6.14  214.81
GR -3.75  235.82    -0.87  245.23    0.02  249.75    1.73  251.86    2.08  252.52
GR  3.64  254.11     4.98  257.82    5.99  262.07    6.55  265.34    6.64  266.05

X1 700       27      49.4  262.07      49      55      50
GR  5.83    0.00     6.02   10.18    6.21   18.37    5.35   23.99    3.99   32.15
GR  3.49   42.94     3.17    49.4    0.14      51   -5.11   86.36   -5.66   90.18
GR -5.70   91.68    -5.88   98.19   -6.62   125.8   -6.63  161.64    -7.8  189.59
GR -8.19  196.62    -5.53  217.86   -3.82  232.55   -2.91  236.61   -0.12  244.39
GR  0.28  245.35     3.42  252.06    6.47  259.17    6.94  260.35    7.08  260.98
GR  7.17  262.07     7.28  262.94
```

X1	750	26	43.68	255.43	48	55	50			
GR	6.59	0.00	5.92	4.65	4.26	16.12	4.11	17.1	2.98	43.68
GR	2.80	45.05	0.66	46.59	-0.07	49.5	-5.1	70.43	-6.37	84.79
GR	-6.66	93.17	-6.9	100.17	-6.81	119.83	-6.82	136.72	-6.39	161.8
GR	-6.80	173.24	-7.08	196.52	-7.12	199.68	-7.01	201.64	-3.6	231.11
GR	-1.01	241.46	-0.25	243.95	0.14	245.43	3.66	252.08	6.04	255.43
GR	7.99	260.16								
X1	800	30	42.42	255.42	48	55	50			
GR	6.04	0.00	5.53	4.08	4.53	8.01	3.8	12.18	3.89	20.47
GR	3.97	33.69	3.98	42.42	3.63	45.79	3.33	48.96	1.07	58.85
GR	-2.89	72.52	-4.28	83.86	-5.05	95.79	-5.36	100.59	-5.35	106.75
GR	-5.48	115.38	-5.65	132.87	-4.85	154.76	-4.52	170.65	-4.19	188.48
GR	-3.98	207.98	-2.8	231.34	-2.34	241.1	-1.3	245.3	-0.17	249.28
GR	4.61	253.37	5.06	255.42	6.12	263.63	6.77	267.91	6.84	268.41
X1	850	30	45.2	257.84	48	55	50			
GR	5.42	0.00	4.41	8.09	4.11	9.25	4.03	29.73	4.05	31.5
GR	4.09	33.02	3.72	45.2	0.57	50.42	0.11	51.93	-1.73	73.42
GR	-2.14	76.13	-2.41	84.12	-2.89	96.38	-3.29	106.8	-3.39	110.54
GR	-3.62	120.32	-4	138.33	-3.94	161.36	-3.9	164.61	-3.86	167.28
GR	-3.71	174.26	-3.21	197.33	-3.12	208.76	-2.41	238.99	-2.29	243.23
GR	-1.11	250.74	-0.6	254.16	0.61	255.19	4.69	257.84	5.22	264.62
X1	900	27	34.13	258.97	49	55	50			
GR	4.81	0.00	4.49	2.55	4.41	7.63	4.5	18.42	4.13	31.58
GR	4.10	32.75	3.66	34.13	0.09	45.87	-1.18	56.74	-2.98	76.31
GR	-4.10	92.21	-4.19	95.29	-4.65	112.34	-4.64	117.82	-4.11	134.33
GR	-3.88	148.57	-3.65	155.51	-3.31	167.03	-3.49	188.43	-4.86	202.29
GR	-5.00	232.95	-3.93	244.6	0.32	252.07	1.06	253.91	3.83	258.97
GR	2.35	260.06	4.44	261.66						
X1	950	29	32.8	259.53	49	55	50			
GR	4.65	0.00	4.78	0.6	4.73	3.27	4.67	19.36	4.77	22.05
GR	4.44	26.26	4.21	32.8	2.54	35.32	1.41	38.65	0.82	40.91
GR	0.13	42.46	-1.56	49.3	-4.76	64.39	-6.04	91.77	-6.19	93.85
GR	-6.61	99.72	-6.77	125.55	-7.31	133.86	-6.06	154.32	-4.88	169.86
GR	-5.76	191.34	-7.71	209.69	-6.4	225.18	-2.87	247.46	-1.28	252.85
GR	-0.35	253.21	1.05	257.85	3.9	258.9	4.38	259.53		
X1	1000	30	35.77	259.12	48	57	50			
GR	4.80	0.00	4.77	0.96	4.79	1.53	4.67	4.43	4.62	7.57
GR	4.39	21.17	4.25	28.99	4.22	30.11	3.77	35.77	0.51	40.21
GR	-2.58	50.17	-6.01	68.42	-6.53	94.16	-6.63	99	-6.8	107.19
GR	-6.66	142.74	-6.66	143.33	-6.61	177.25	-6.65	178.23	-6.64	190.15
GR	-6.71	208.76	-6.55	210.2	-6.09	211.39	-1.02	244.15	-1.13	246.89
GR	1.15	251.86	2.87	254.51	3.67	256.72	4.51	258.47	4.77	259.12
X1	1050	28	39.25	252.52	48	57	50			
GR	5.03	0.00	4.94	3.02	4.99	4.81	4.96	5.47	4.72	16.89
GR	4.69	19.96	4.51	28.85	4.17	39.25	-1.73	61.88	-2.23	63.9
GR	-3.73	69.36	-6.48	95.16	-6.49	95.74	-6.61	101.33	-6.6	125.82
GR	-6.81	138.09	-7.16	157.68	-7.83	172.59	-9.34	191.22	-8.02	209.11
GR	-4.49	228.47	-1.26	246.18	-0.8	249.47	-0.57	250.15	3.81	252.52
GR	4.17	253.03	4.96	256.59	4.9	260.15				
X1	1100	29	41.11	260.85	48	57	50			
GR	5.26	0.00	5.15	4	5.06	5.48	4.86	18.18	4.75	22.91
GR	3.10	30.56	2.3	41.11	0.06	44.34	-2.39	61.59	-2.74	63.95
GR	-4.90	92.49	-5.16	95.13	-5.68	100.36	-6.56	126.88	-6.54	136.2
GR	-7.85	171.64	-8.25	177.62	-9.53	207.98	-9.83	213.63	-9.57	215.05
GR	-6.98	222.64	-0.49	247.45	1.6	249.86	2.25	254.37	2.36	255.56
GR	3.60	257.97	4.89	259.46	4.92	260.62	5.59	260.85		
X1	1150	25	40.22	259.15	48	57	50			
GR	5.48	0.00	5.42	1.07	4.79	16.79	4.7	20.8	4.69	29.58
GR	4.28	40.22	1.82	43.26	-1.47	52.5	-3.86	68.38	-6.21	91.84
GR	-6.50	94.70	-7.03	105.74	-6.98	131	-6.98	142.74	-8.55	165.66
GR	-9.12	177.05	-9.31	204.66	-8.52	215.01	-2.6	234.24	0.25	244.34
GR	2.73	249.97	4.38	255.03	4.66	256.77	4.93	258.48	5.17	259.15
X1	1200	25	39.16	245.55	48	57	50			
GR	5.33	0.00	5.19	4.33	5.07	7.29	4.91	21.42	4.81	23.87
GR	4.92	38.63	4.49	39.16	-0.68	44.48	-4.84	68.97	-5.27	71.53
GR	-5.35	72.05	-6.16	88.99	-7.1	108.63	-7.1	109.95	-7.04	144.83
GR	-7.12	148.99	-8.62	179.36	-8.72	182.95	-6.67	212.25	-2.92	224.09
GR	-1.07	235.29	3.32	245.55	3.35	248.43	4	250.15	4.78	254.7
X1	1250	25	41.26	245.92	48	57	50			
GR	5.17	0.00	5.15	1.66	5.09	5.66	4.95	19.99	4.89	24.19
GR	4.53	39.41	3.24	41.26	0.14	44.49	-2.02	54.53	-5.66	70.54
GR	-6.24	85.98	-6.53	93.62	-6.86	100.52	-6.82	128.86	-6.81	135.99
GR	-7.36	162.07	-7.57	166.35	-8.42	198.34	-8.3	200.08	-7.48	202.66
GR	-7.09	203.96	-1.74	237.15	4.17	245.92	4.22	246.62	4.56	249.7

X1	1300	26	47.83	259	48	57	50			
GR	5.37	0.00	5.29	6.18	5.32	11.48	5.1	26.36	5.04	30.51
GR	4.86	36.54	4.66	47.83	0.88	52.88	-3.26	70.94	-4.71	73.96
GR	-5.39	77.03	-6.01	95.15	-6.24	102.08	-6.6	112.18	-6.61	113.33
GR	-6.65	147.33	-6.77	151.85	-7.67	179.88	-7.71	189.16	-7.46	214.22
GR	-3.72	238.56	-1.89	249.24	-1.72	250.32	2.46	256.21	4.4	258.05
GR	4.44	259.00								
X1	1350	31	51.93	253.15	48	57	50			
GR	5.56	0.00	5.53	2.05	5.55	4.54	5.57	6.21	7.28	17.58
GR	7.54	20.67	7.13	24.72	4.49	47.72	4.41	51.93	1.2	57.86
GR	-1.19	61.01	-2.42	70.11	-5.1	98.8	-5.5	101.98	-6.48	109.64
GR	-6.59	112.52	-6.91	152.59	-6.91	154.27	-7.24	167.21	-7.63	183.56
GR	-7.65	186.86	-7.81	218.61	-7.09	223.85	1.42	249.67	1.97	253.15
GR	1.24	258.58	-0.17	260.09	1.17	261.35	3.27	262.16	3.56	262.77
GR	3.75	263.32								
X1	1400	27	58.95	260.04	48	57	50			
GR	5.63	0.00	5.71	4.45	7.62	17.75	7.75	19.19	5.63	36.97
GR	5.04	42.85	4.98	45.56	4.46	58.95	2.48	61.57	-0.73	64.64
GR	-1.80	72.49	-4.9	89.73	-5.56	107.02	-5.75	112.04	-6.12	120.04
GR	-6.63	152.31	-6.66	153.22	-6.67	153.8	-7.6	182.91	-8.8	205.14
GR	-8.93	208.31	-5.37	238.6	-4.76	244.16	-4.14	245.67	3.34	260.04
GR	3.13	264.41	3.07	267.75						
X1	1450	26	63.92	264.37	48	57	50			
GR	5.56	0.00	5.69	7.17	5.69	9.13	5.49	14.54	5.66	33.55
GR	5.60	34.38	5.04	52.66	4.71	63.92	0.82	69.11	-1.12	70.88
GR	-2.61	84.59	-5.45	104.29	-5.67	110.32	-5.85	115.2	-6.77	143.54
GR	-7.31	164.34	-7.83	178.14	-8.78	200.14	-8.93	214.81	-0.15	249.22
GR	1.35	260.38	2.91	264.37	2.65	269.26	2.78	270.55	3.15	271.6
GR	3.63	272.16								
X1	1500	30	68.02	270.96	48	57	50			
X2	2781									
GR	5.49	0.00	5.59	5.6	5.6	10.81	5.27	19.75	5.36	22.34
GR	6.68	34.36	8.08	44.01	5.24	57.94	4.59	64.16	4.06	68.02
GR	-1.89	74.98	-4.35	91.1	-4.72	93.19	-4.85	95.84	-5.59	111.45
GR	-5.79	115.77	-6.82	143.17	-7.09	154.45	-8.06	179.69	-8.57	189.73
GR	-8.87	215.22	-7.82	227.22	-3.71	251.76	0.2	263.62	1.17	269.39
GR	1.45	270.04	3.06	270.96	3.24	272.85	3.52	273.6	3.86	274.51
X1	1550	29	65.68	275.39	48	57	50			
GR	5.43	0.00	5.5	4.05	5.5	12.53	5.35	16.79	5.46	19.98
GR	4.99	30.80	5.52	34.2	4.86	40.29	4.62	65.68	1.67	71.6
GR	-0.92	74.53	-4.65	94.56	-4.88	95.89	-5.1	100.39	-5.59	110.42
GR	-6.42	127.37	-6.63	134.13	-7.34	164.71	-7.88	175.42	-8.9	194.74
GR	-9.23	212.70	-7.78	229.51	-4.1	251.74	-0.72	263.94	0.27	267.32
GR	0.62	268.92	2.45	272.31	4.06	274.45	4.79	275.39		
X1	1600	26	58.06	269.9	48	57	50			
GR	5.36	0.00	5.41	2.5	5.41	13.37	6.25	20.11	7.23	32.53
GR	6.40	41.59	4.88	55.26	2.72	58.06	0.42	70.08	-3.46	83.97
GR	-5.57	107.22	-5.68	108.46	-5.94	113.69	-6.93	148.4	-6.97	149.49
GR	-8.38	176.70	-8.84	183.55	-8.94	188.7	-9.27	218.85	-4.99	237.13
GR	-0.26	262.24	0.19	263.38	2.4	268.12	4.49	269.9	4.1	270.61
GR	3.86	271.15								
X1	1650	24	59.45	263.49	48	57	50			
GR	5.29	0.00	5.31	0.93	5.31	4.92	6.35	13.15	8.21	27.45
GR	5.58	49.71	4.08	59.45	0.97	64.02	-0.7	65.89	-4.51	86.9
GR	-4.69	87.82	-4.77	88.37	-5.43	101.81	-5.7	107.33	-6.29	119.31
GR	-7.32	157.95	-8.56	194.93	-8.57	196.95	-8.18	228.58	-8.15	231.5
GR	-4.57	246.25	-0.2	256.53	2.41	263.49	2.08	264.46		
X1	1700	30	60.41	261.83	48	57	50			
GR	5.27	0.00	5.24	0.98	5.22	1.61	5.21	3.38	5.09	8.69
GR	5.00	15.16	6.16	25.58	4.61	40.34	4.11	50.08	3.89	59.17
GR	2.94	60.41	-2.7	75.62	-3.97	77.92	-4.2	79.05	-4.35	79.87
GR	-5.32	100.30	-5.95	113.45	-6.01	114.81	-6.58	130.03	-7.25	147.69
GR	-7.31	149.67	-8.37	181.03	-8.4	182.02	-8.46	214.04	-8.06	217.4
GR	-3.74	246.37	-3.31	247.74	3.38	258.45	4.51	261.83	3.16	262.87
X1	1750	28	46.33	267.46	48	57	50			
GR	5.31	0.00	5.19	3.3	5.15	5.42	5.09	11.41	4.75	26.85
GR	6.18	38.62	6.6	42.35	6.29	46.33	4.22	61.87	2.33	63.89
GR	-3.29	85.40	-4.35	91.24	-5.21	105.03	-6.32	122.62	-6.43	125.4
GR	-7.41	159.68	-8.58	200.16	-8.59	200.8	-5.35	227.05	-4.76	231.96
GR	-4.50	233.58	-2.05	247.55	-1.33	249.47	3.7	264.74	4	267.46
GR	4.06	268.81	3.59	269.96	4.2	270.49				

X1	1800	38	67.03	260.68	47	55	50			
GR	5.35	0.00	5.15	5.67	5.08	9.32	4.97	19.7	4.9	22.6
GR	5.30	25.82	6.87	41.24	4.96	55.7	3.71	64.4	3.57	66.15
GR	3.12	67.03	1.83	68.51	-0.89	73.17	-3.2	82.09	-4.14	86.23
GR	-4.34	90.61	-5.37	107.71	-5.6	111.48	-6.79	141.59	-6.98	146.71
GR	-8.07	180.60	-8.13	182	-8.31	204.48	-8.41	216.03	-8.33	216.72
GR	-7.85	218.65	-4.6	243.65	-2.86	254.86	-2.34	255.31	2.85	260.68
GR	0.82	263.71	2.28	267.5	3.7	269.08	3.88	270.25	4.24	272.33
GR	4.17	274.15	3.77	275.82	4.83	276.44				
X1	1850	30	63.22	274.11	50	50	50			
GR	5.39	0.00	5.1	8.22	5	13.53	4.94	19.42	4.47	37.48
GR	4.55	41.90	3.51	63.22	-0.98	68.9	-3.79	81.48	-4.14	83.53
GR	-5.37	109.99	-5.76	118.55	-5.8	119.54	-6.23	130.52	-7.17	155.01
GR	-7.23	156.84	-7.64	165.72	-8.57	187.73	-8.84	199.73	-8.87	201.97
GR	-7.98	235.41	-7.63	237.14	-3.26	263.96	-2.79	264.88	-2.15	266.16
GR	4.37	274.11	4.8	277.99	4.68	279.5	5.13	280.76	5.29	281.51
X1	1900	30	50.81	281.38	50	50	50			
GR	5.43	0.00	5.05	10.78	4.96	15.57	7.04	32.7	7.16	33.83
GR	6.87	36.18	4.83	49.98	4.11	50.81	-0.87	62.67	-3.41	78.99
GR	-3.87	82.44	-4.91	112.27	-5.16	119.65	-5.19	120.5	-5.49	133.08
GR	-6.09	155.79	-7.98	188.11	-8.11	191.22	-8.14	192.5	-8.71	224.46
GR	-8.64	227.09	-6.65	233.96	-5.94	236.58	-0.92	268.08	-0.48	270.98
GR	3.72	276.91	3.87	278	4.17	278.76	5.36	281.38	5.16	281.9
X1	1950	26	47.2	272.34	50	50	50			
GR	5.47	0.00	5.23	6.82	6.34	18.84	5.84	31.39	4.79	38.87
GR	4.16	47.20	0.64	50.99	-0.53	54.12	-2.83	67.33	-3.29	69.86
GR	-4.51	87.86	-4.58	90.06	-5.32	114.55	-5.59	123.58	-5.62	124.64
GR	-6.48	159.32	-7.57	195.36	-8.08	229.02	-8.17	231.53	-5.91	239.62
GR	-1.83	269.10	2.35	272.34	3.49	277.13	4.26	278.66	5.36	281.07
GR	4.97	282.08								
X1	2000	32	35.61	279.22	50	50	50			
GR	5.45	0.00	5.46	0.5	5.45	1.52	5.31	6.16	6.65	17.16
GR	4.86	31.16	4.73	34.27	3.71	35.61	-0.55	46.89	-2.04	55.41
GR	-3.57	70.32	-4.44	97.56	-4.81	105.4	-5.18	118.54	-5.62	134.06
GR	-5.68	139.90	-6.23	170.37	-6.38	174.58	-6.95	204.52	-7.1	209.81
GR	-8.20	242.10	-8.07	243.87	-7.25	245.39	-7.08	259.6	-6.6	262.92
GR	5.26	279.22	5.25	279.81	4.55	280.88	4.88	281.4	5.36	282.47
GR	5.38	283.13	4.78	283.97						
X1	2050	28	40.48	290.38	50	50	50			
GR	5.20	0.00	5.24	2.92	5.19	8.81	5.02	14.56	4.11	37.35
GR	3.63	40.48	-0.57	46.89	-1.36	48.42	-3.7	68.57	-4.09	91.58
GR	-4.12	100.49	-5.4	127.09	-5.47	129.02	-5.66	134.09	-5.99	163.53
GR	-6.07	168.86	-7.19	197.83	-7.33	202.26	-8.3	234.1	-8.25	236.95
GR	-5.67	270.68	-5.01	271.89	-4.67	273.31	1.31	284.83	1.27	286.75
GR	5.41	290.38	5.39	291.24	4.59	292.35				
X1	2100	26	30.45	297.9	50	50	50			
GR	4.94	0.00	5.02	5.34	5.01	6.53	4.01	23.34	3.45	30.45
GR	0.04	34.50	-1.26	35.29	-2.41	44.42	-3.8	62.09	-3.97	71.27
GR	-4.64	95.91	-4.76	122.51	-4.81	131.97	-5.06	139.49	-5.78	160.74
GR	-5.94	165.55	-6.45	198.09	-6.52	200.97	-7.54	232.88	-7.52	236.08
GR	-6.78	274.08	1.32	294.59	5.4	297.9	5.41	298.66	5.32	299.45
GR	4.40	300.72								
X1	2150	29	9.34	282.42	50	50	50			
GR	2.59	0.00	3.16	9.34	1.79	12.55	-1.48	16.82	-1.53	18.83
GR	-3.63	40.03	-3.99	56.92	-4.24	67.43	-4.68	90.75	-4.81	100.34
GR	-4.95	128.35	-5.04	133.65	-5.25	139.48	-6.18	166.16	-6.18	166.67
GR	-6.36	173.38	-7.04	202.07	-7.09	203.61	-6.84	237.37	-6.76	241.64
GR	-3.03	254.77	-2.74	275.66	3.3	282.42	5.49	291.64	5.53	292.89
GR	5.48	293.68	5.43	294.2	5.03	297.48	4.21	298.61		
X1	2200	21	0	241.96	50	50	50			
GR	-3.29	0.00	-3.96	27.21	-4.16	34.66	-4.59	62.93	-4.87	67.11
GR	-5.07	74.26	-5.37	92	-5.53	101.26	-5.75	107.21	-6.08	137.19
GR	-6.08	141.49	-6.81	173.06	-6.77	175.39	-6.38	206.21	-2.73	216.6
GR	3.01	237.43	5.5	240.52	5.56	241.03	5.57	241.96	4.73	248.05
GR	4.03	249.03								
X1	2250	22	0	229.69	50	50	50			
GR	-1.96	0.00	-2.02	2.42	-2.44	18.13	-2.54	30.86	-2.7	35.1
GR	-3.87	53.61	-4.12	54.86	-4.52	60.19	-5.18	83.94	-5.36	90.39
GR	-6.42	119.91	-6.58	125.27	-6.55	154.27	-6.55	161.32	-6.39	168.55
GR	-5.91	197.54	-3.97	205.81	-0.02	221.01	4.35	228.11	5.52	229.69
GR	4.44	238.03	3.84	238.87						

```
X1 2300    30  105.72  296.77    46      57     50
GR  0.76   0.00   1.26    0.54  2.52    1.25   3.5   35.48   3.56   40.33
GR  3.60  44.00   3.48   66.51  4.07   87.68  4.23   92.52   3.94   95.38
GR  2.91 105.72  -1.22   118.2 -1.84  120.17 -4.41  153.15  -5.02  160.91
GR -5.15 164.40  -5.36  169.99 -6.24  198.23 -6.16  209.46  -6.16  234.09
GR -6.06 250.27  -5.68  269.15 -1.65  285.95 -0.22  291.04   4.76  296.77
GR  5.03 297.72   5.64  297.84  4.87  300.89  4.08  307.26    3.6  307.93

X1 2350    30   45.49  228.59    50      50     50
GR  5.61   0.00   4.76   11.25     4   16.22  4.17   23.96    1.5   40.72
GR  0.91  45.49     -2   54.71 -2.46   55.35 -3.56    66.8  -3.89   68.88
GR -4.04  71.76  -4.49   83.36 -5.01   96.77 -5.28  105.52  -6.12  129.72
GR -6.33 148.08  -6.24  164.27 -5.78  192.21 -5.72  201.54  -4.19  207.05
GR  1.67 226.94   1.96  228.01  4.79  228.59   5.5  228.73   4.52  229.17
GR  5.27 230.27   4.98  232.14  4.41  234.29  3.79   239.3   3.41  239.82

X1 2400    30   75.78   263.9    50      50     50
GR  6.14   0.00   6.12   18.31  6.14   38.79  4.92   53.47   3.95   59.04
GR  3.99  63.25   4.11   72.79  3.29   75.78 -1.46   80.47  -3.45   94.97
GR -4.48 112.70  -4.88  119.57 -5.44  132.41 -5.93  145.99   -6.4  168.96
GR -6.53 176.09  -6.34  206.23 -6.28  209.95 -5.06  229.43  -3.86   243.8
GR -3.51 244.40   0.78  255.77  2.22  257.34  1.82  258.37   2.57  259.35
GR  2.69 261.14   4.57   263.9  4.36  265.26  3.95  266.83    3.5  270.46

X1 2450    45  144.64  349.65    50      50     50
GR -0.58   0.00   0.64    2.72  3.21    7.99  3.55   18.43   4.09   33.11
GR  4.08  37.53   4.07   48.32  4.01   54.61  4.09   56.19   3.99   62.99
GR  4.55  74.91   4.56   79.37  3.84   94.44  3.87   99.05    3.8  101.62
GR  3.78 103.04   3.78  106.29  4.17  128.55  4.19  131.48    3.5  144.64
GR  1.46 147.85  -0.87  151.67 -2.01  157.02 -2.72  160.55  -3.75  177.09
GR -4.87 190.06  -5.17  193.54 -5.61  204.25 -5.91   220.6  -6.24  242.37
GR -6.49 257.68  -6.29   279.5 -5.81  292.02 -3.77  314.88  -0.99   327.3
GR -0.71 328.96   1.97  331.59  2.55  333.88  2.76  335.53   2.47  340.51
GR  2.70 343.84   3.87  345.56  3.74  346.41  3.49  347.38    3.2  349.65

X1 2500    35    86.2  297.26    50      50     50
GR  0.09   0.00   0.02    8.76  0.17   24.64 -0.41   27.75   -0.2   44.75
GR  0.44  48.23   1.76   54.31  3.66   68.46  3.63   84.12   3.55    86.2
GR  2.49  92.90   0.85   97.62 -0.93  104.23 -1.56   110.7  -3.68  117.45
GR -4.72 143.15  -5.32  152.68 -4.94  178.04 -5.13  188.53  -6.33  216.16
GR -6.45 223.54  -6.12  241.54 -5.73  251.79 -2.72  278.98  -1.25  288.21
GR  0.15 289.44   0.49  291.29  3.02  297.26  2.92  303.39   2.84   308.7
GR  2.62 310.58   2.71  311.87  3.17  312.54  3.02  313.25   2.91  314.13

X1 2550    27    9.26  261.98    46      57     50
GR  1.05   0.00   1.03    3.34  1.09    9.26 -1.67   24.49  -1.75   26.14
GR -2.16  43.27  -2.12   44.83 -3.32   61.01 -3.67   76.27     -4   79.41
GR -4.16  83.28  -5.55  113.94 -5.57  117.73 -5.68   146.3  -5.63  149.79
GR -5.80 176.70  -6.17  184.76 -5.48  216.44 -5.45  218.17  -4.93  222.38
GR -1.83 247.87  -1.28  249.35  0.47  260.07  2.68  261.98   2.98  276.59
GR  2.96 280.87   2.91  282.28

X1 2600    28   34.51  249.76    48      57     50
GR  2.73   0.00   2.31    5.76  2.49    8.38  2.11   11.87   3.61   19.14
GR  3.57  24.37   1.92   29.71  3.39   34.51    -2   39.36  -2.58   40.15
GR -2.62  41.94  -3.38   44.59 -4.36   64.27  -5.3    75.6  -5.33   91.03
GR -5.36 103.14  -5.52  114.99 -5.73   135.9 -5.94  150.71     -6  169.33
GR -5.92 186.65  -4.55  200.64  -2.7  222.45  1.19  235.21   2.75  240.31
GR  3.24 249.76   3.39  258.64   3.3  259.41

X1 2650    27   13.11  236.51    48      56     50
GR  5.26   0.00   5.13    1.82  5.93   13.11  5.59   16.63   4.58   19.91
GR  4.01  22.08  -1.56      36 -3.75   53.63 -4.83   66.35  -5.08    76.9
GR -5.41  91.27  -5.44   92.87 -6.02   132.4 -6.07  136.11  -6.26  149.22
GR -6.25 152.36  -5.81  173.27  -5.6  183.52 -5.59  184.26   -5.3  187.71
GR -3.50 208.79  -1.04  214.95  1.49  223.21  2.92  227.89   3.51  236.51
GR  3.66 245.89   3.56  246.73

X1 2700    25   13.26  218.05    48      54     50
GR  6.37   0.00   5.93    9.18  5.67   13.26  4.61   15.83    0.1    30.3
GR -1.80  35.41  -2.61   41.78 -4.53   68.51 -4.98   74.75  -4.99   75.33
GR -5.62 104.74  -5.72  114.76 -5.85  137.39 -5.73  167.72  -5.66  172.89
GR -4.57 188.77  -3.36  203.24  0.37  212.69  1.99  216.74   3.53  218.05
GR  3.71 228.54    3.7  229.83  3.72   230.9  3.74  234.91    3.5  236.79

X1 2750    28   14.21   211.2    49      54     50
GR  6.24   0.00   5.45    8.73  4.99   14.21 -0.73   31.75  -0.98   32.35
GR -2.47  39.40  -4.04   53.71 -4.53   59.08 -4.71   64.73  -5.23   82.83
GR -5.48  91.53  -5.51   93.14 -5.88  126.38 -5.85  130.32  -5.85  162.04
GR -4.96 164.34  -4.72  180.81 -3.57   198.2 -3.42  198.96  -0.88  203.49
GR  2.42 211.20    2.4  212.51  2.45  213.32  2.59  221.61   3.74     225
GR  3.76 226.75   3.28  230.62  3.56  231.59
```

X1	2800	25	15.66	215.14	49	54	50					
GR	6.04	0.00	5.8	3.37	5.67	6.37	5.28	8.47	4.82	15.66		
GR	2.85	19.32	-0.69	31.98	-1.37	33.81	-1.75	35.77	-3.72	48.55		
GR	-3.91	54.33	-4.28	63.06	-5.15	83.33	-5.7	111.06	-5.89	119.76		
GR	-5.82	126.80	-5.6	155.53	-4.84	173.29	-4.28	186.92	-1.44	196.82		
GR	3.02	215.14	3.36	223.63	3.27	227.83	3.25	228.86	3.51	229.76		
X1	2850	27	17.33	207.51	49	54	50					
GR	5.87	0.00	5.6	3.77	5.96	6.5	5.65	7.98	4.23	14.95		
GR	2.23	16.10	1.1	17.33	-2.3	34.7	-4.02	46.66	-4.44	62.57		
GR	-4.48	64.18	-5.02	81.22	-5.58	101.5	-5.94	118.16	-5.73	142.41		
GR	-5.64	150.65	-3.97	179.43	-3.65	186.33	-1.39	198.55	-1.01	200.63		
GR	-0.75	201.15	-0.67	201.95	3.06	207.51	3.01	211.17	3.04	213.07		
GR	3.14	223.00	3.18	227.9								
X1	2900	32	17.28	209.23	49	54	50					
GR	5.70	0.00	5.64	0.83	5.73	1.4	5.49	2.37	5.29	5.03		
GR	2.96	11.08	2.43	12.02	3.81	15.35	3.87	17.28	2.41	18.65		
GR	1.41	20.30	0.52	26.43	-0.89	29.33	-3.61	42.09	-4.24	46.32		
GR	-4.52	60.65	-4.8	74.62	-4.96	80.78	-5.09	85.73	-5.93	117		
GR	-5.62	140.20	-5.44	151.2	-5.34	154.01	-2.89	185.46	-1.51	192.36		
GR	0.14	200.48	0.52	201.08	2.25	209.23	2.28	215.14	2.33	218.2		
GR	2.50	221.66	2.92	222.48								
X1	2950	26	16.33	201.94	49	54	50					
GR	5.82	0.00	5.55	4.77	5.16	7.45	4.22	14.3	3.95	15.26		
GR	3.32	16.33	1.03	20.01	-2.46	26.96	-3.3	39.58	-3.65	45.56		
GR	-4.00	56.21	-4.09	59.39	-4.77	81.32	-4.96	90.53	-5.41	116.39		
GR	-5.39	126.81	-5.15	150.5	-4.72	161.81	-3.84	177.47	-1.08	189.93		
GR	0.71	193.06	1.45	199.04	2.09	201.94	2.27	203.87	2.13	217.94		
GR	2.51	218.92										
X1	3000	28	15.02	195.06	49	54	50					
GR	5.97	0.00	5.94	0.8	5.88	1.87	5.59	4.06	5.51	10.56		
GR	5.15	14.10	4.48	15.02	2.48	19.64	1.69	20.64	1.16	21.5		
GR	0.14	25.25	-2.32	32.71	-3.84	58.63	-3.99	61.27	-4.53	66.73		
GR	-4.83	89.49	-4.97	99.74	-4.98	100.57	-5.44	121.82	-5.73	135.25		
GR	-5.74	136.05	-3.83	172.08	-2.4	179.76	0.21	192.05	1.07	193.06		
GR	2.39	195.06	1.73	211.02	1.72	217.07						
X1	3050	16	8	183.52	49	54	50					
GR	5.77	0.00	5.25	5.67	5.05	8	1.81	15.87	-3.77	45.14		
GR	-4.28	56.13	-4.46	60.03	-4.94	80.5	-5.16	95.1	-5.18	115.73		
GR	-5.39	129.18	-4.78	153.5	-4.08	164.52	-3.76	175.48	-3.05	180.21		
GR	-2.94	183.52										
X1	3100	23	2.19	235.66	49	54	50					
GR	5.05	0.00	5	2.19	4.2	4.71	3.39	5.63	-4.63	71.83		
GR	-5.17	90.13	-5.18	96.91	-5.19	103.15	-5.41	116.78	-5.44	136.6		
GR	-5.30	147.97	-4.77	170.34	-4.53	179.31	-2.98	198.79	-1.61	209.87		
GR	-2.20	217.89	-2.07	221.21	0.5	234.4	0.67	235.39	2.18	235.66		
GR	0.19	252.13	-0.37	268.83	-0.43	271.34						
X1	3150	24	13.71	198.92	50	50	50					
X2	2184											
GR	5.68	0.00	5.6	0.33	5.59	0.71	5.5	2.14	5.5	2.34		
GR	5.26	2.95	5.12	3.56	5.06	5.57	6.78	6.23	5.37	11.74		
GR	4.45	13.71	2.56	14.49	1.14	16.12	-2.48	29.88	-3.81	35.83		
GR	-4.40	56.02	-4.78	69.14	-4.96	72.6	-4.88	76.53	-4.93	136.24		
GR	-4.98	141.50	-5.23	168	-4.05	173.53	-2.92	198.92				
X1	3200	24	22.51	166.96	50	50	50					
GR	5.73	0.00	5.66	0.28	5.62	1.4	5.37	5.68	5.35	6.28		
GR	4.72	7.91	4.67	8	4.47	9.55	3.77	15.03	3.58	16.61		
GR	2.89	22.51	0.68	26.77	-3.17	35.67	-4.13	57.64	-4.35	62.48		
GR	-4.82	71.72	-4.17	97.25	-3.97	107.89	-2.3	116.35	-4.18	134.26		
GR	-4.22	140.03	-4.26	143.49	0.74	166.96	1.18	176.79				
X1	3250	38	10.69	124.51	50	50	50					
GR	5.78	0.00	5.72	0.22	5.65	2.1	5.33	7.48	5.44	9.18		
GR	5.44	9.25	10.04	10.69	7.44	12.49	5.46	13.09	4.45	17.58		
GR	3.92	19.82	3.03	20.75	1.38	22.29	1.1	23.11	0.62	24.42		
GR	-0.50	28.36	-2.45	33.79	-3.52	43.55	-4.15	55.32	-3.98	59.26		
GR	-3.41	72.57	-3.18	79.92	-3.13	100.24	-2.16	104.83	4.63	116.62		
GR	5.25	117.34	5.27	118.91	6.45	122.91	6.69	123.96	6.84	124.51		
GR	6.16	128.64	6.09	129.62	6.34	139.8	5.4	146.05	4.77	151.4		
GR	4.65	152.79	4.42	156.46	4.15	159.31						
X1	3300	31	16.75	112.17	50	50	50					
GR	5.82	0.00	5.78	0.18	5.69	2.81	5.46	6.62	5.74	11.21		
GR	5.54	12.04	5.66	12.43	5.37	12.71	5.14	13.81	5.03	14.34		
GR	3.78	16.75	-1.12	27.28	-0.9	30.13	-3.37	49.09	-4.58	51.71		
GR	-4.75	54.94	-4.56	60.89	-4.02	77.3	-3.91	80.67	-2.96	99.32		
GR	0.25	107.09	7.13	112.17	7.32	112.38	7.3	113.34	6.98	115.09		
GR	6.05	122.38	6.12	122.51	7.11	124.71	7.03	125.59	6.19	139.22	5.18	149.81

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X1 3350    30     8.46  128.02    50     50      50
GR  5.87   0.00   5.84    0.13   5.72    3.5    5.59    5.75    5.75    8.46
GR  4.88  12.05   4.82   13.48   4.83   13.89   3.71   18.47    3.7    19.57
GR  3.32  21.09   2.37   21.79  -0.58   30.91  -2.19   45.34   -5.83   57.55
GR -5.60  62.51  -5.49   64.77  -5.05   77.21  -3.88   92.49   -3.4    98.42
GR  1.02 109.69   1.33  110.63   2.02  111.37   2.98  114.45    3.66  117.03
GR  6.60 124.37   6.64  124.97   6.66  125.23   7.38  128.02    6.2   140.31

X1 3400    33    22.94  130.8     50     50      50
GR  5.92   0.00   5.9     0.08   5.75    4.2    5.71    4.89    5.76    5.72
GR  5.49   6.81   5.47    7.43   5.65    7.94   5.35   10.19    5.06   18.69
GR  5.06  18.84   4.92   19.14   3.24   22.94   2.87   23.41    1.05   26.66
GR -4.07  37.33  -5.24   54.95  -5.82   61.16  -5.74   64.13   -5.49   72.91
GR -5.31  77.04  -4.94   81.48  -2.46  100.41  -1.57  104.85    0.69  108.18
GR  3.05 115.59   5.85  120.09   7.12  129.8    7.36  129.94    7.21  130.05
GR  7.24 130.40   7.26  130.48   7.23  130.8

X1 3450    29    13.6   131.3     50     50      50
GR  5.97   0.00   5.97    0.02   5.89    2      6.15    9.75    6.06   11.82
GR  5.47  13.60   4.3    18.84   2.62   23.46  -0.16   29.17   -1.82   33.13
GR -3.22  47.85  -5.57   55.31  -5.89   60.29  -5.5    65.75   -4.33   82.24
GR -4.07  84.80  -2.85   88.77  -0.12  104.27  -0.07  108.29    1.09  109.89
GR  2.17 113.72   3.23  115.25   4.03  116.86   4.72  118.72    5.65  121.69
GR  6.26 124.04   6.66  127.24   7.3   131.3    7.27  134.69

X1 3500    27    13.29  121.27    50     50      50
GR  6.02   0.00   6.22    0.05   5.97    0.9    5.86    3.42    5.77    4.53
GR  5.79  10.16   5.42   13.29   3.59   20.55   2.71   22.79    0.3    33.16
GR -1.41  42.80  -5.55   51.81  -5.92   57.78  -5.57   66.45   -5.2    75.29
GR -4.82  79.22  -2.64   96.67  -1.25  102.87   0.64  110.91    0.81  111.76
GR  2.82 115.42   3.13  115.95   5.16  121.21   5.16  121.27    6.69  132.22
GR  6.80 134.10   6.99  137.4

X1 3550    27    18.45  137.14    50     50      50
GR  6.07   0.00   6.63    0.16   5.94    2.54   5.64    9.51    5.65    9.57
GR  5.66   9.61   5.62    9.99   5.22   15.32   5.19   15.62    5.17   17.16
GR  4.90  17.70   4.72   18.45   2.47   26.41   1.16   28.58   -3.75   36.41
GR -4.52  43.94  -6.13   59.25  -5.69   66.42  -5.61   67.63   -5      78.23
GR -3.56  91.17  -2.84   98.53   1.32  112      4.93  123.62    6.59  133.44
GR  6.86 136.39   6.81  137.14

X1 3600    24    24.06  137.96    50     50      50
GR  6.13   0.00   7.04    0.26   5.9     4.17   5.72    8.31    6.21   11.89
GR  6.24  11.99   5.86   18.92   5.05   23.62   4.94   24.06    2.4    27.08
GR -2.90  36.62  -4.54   42.41  -5.71   60.56  -5.57   63.26   -5.47   66.38
GR -4.99  80.96  -4.37   87.27   1.95  109.62   3.64  116.53    4.11  118.26
GR  4.25 119.51   4.73  122.79   6.61  136.69   6.71  137.96

X1 3650    26     9.8   118.84    50     50      50
GR  6.18   0.00   7.45    0.36   5.87    5.8    5.81    7.12    5.98    8.35
GR  6.35   9.80   2.92   20.53   2.87   21.2    2.7    21.53   -1.71   32.6
GR -3.09  36.77  -5.82   64.75  -5.91   66.09  -5.89   66.34   -4.16   86.26
GR -4.04  87.26  -3.07   90.93   2.84  114.2    4.03  118.84    5.65  126.75
GR  5.85 134.68   5.89  135.49   5.9   136.26   5.93  136.64    6.45  140.65
GR  6.54 141.76

X1 3700    25    19.97  115.43    50     50      50
GR  6.23   0.00   7.87    0.47   6.83    4.03   6.3     4.43    5.93    5.69
GR  5.68  12.12   5.01   16.3    3.56   19.97  -0.73   33.32   -3.84   41.52
GR -4.34  48.95  -5.53   66.38  -5.72   69.14  -5.03   78.87   -3.39   93.31
GR  4.43 115.43   4.51  115.65   4.54  116.02   4.67  118.89    5.41  133.69
GR  5.43 134.38   5.52  135.21   6.03  138.45   6.41  143.57    6.46  145.29

X1 3750    23    24.67  116.17    53     48      50
GR  6.29   0.00   7.61    0.38   7.17    2.55   5.7    15.57    5.52   19.06
GR  6.36  24.67   5.05   26.44   4.05   30.05  -4.08   41.01   -4.62   58.89
GR -5.26  68.78  -5.27   68.83  -4.44   80.6   -3.46   94.35    1.36  107.61
GR  4.46 116.17   5.07  123.28   5.19  126.29   5.36  129.17    6.31  139.17
GR  6.39 140.18   6.41  140.51   6.63  148.35

X1 3800    30    21.81  126.57    52     48      50
GR  6.37   0.00   6.33    0.05   6.34    0.1    6.34    0.15    7.4     0.29
GR  5.95   7.12   5.94    9.66   5.59   18.59   5.4    21.81    3.43   24.45
GR  1.42  26.95  -1.13   33.96  -2.18   39.56  -4.1    43.06   -5.38   62.92
GR -5.49  66.44  -5.29   70.39  -4.53   85.4   -4.18   90.05   -2.11   98.57
GR -0.68 111.44   0.81  120.23   4.8   126.57   4.87  126.9     6.43  144.52
GR  6.60 147.09   6.79  148.03   6.69  148.63   6.72  149.17    6.75  150.43

X1 3850    32    25.94  122.27    52     48      50
GR  6.50   0.00   6.32    0.21   6.36    0.41   6.39    0.64   10.71    1.2
GR 10.25   3.32   9.56    5.28  13.01   14.27  11.94   16.16    9.74   20.72
GR  8.38  25.94  -4.68   43.13  -5.4    55.34  -5.59   66.44   -5.63   68.61
GR -4.81  80.03  -3.7    89     -0.39  104.44   0.1   106.33    1.35  110.5
GR  1.91 112.45   4.35  119.58   5.21  122.27   5.32  123.87    5.63  130.21   5.66  130.72
GR 5.96 134.56    6.02   135.5   6.94  139.95   6.46  142.84 6.61 145.35   6.73  151.27
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X1 3900     27    21.26   107.7     52      48     50
GR  6.62   0.00    6.32    0.38   6.33    0.46   8.24   21.26    7.51   22.46
GR  2.07  23.81   -1.47   31.47   1.12   39.27   1.33   48.83   -5.49   59.16
GR -5.60  65.03   -5.55   65.95  -4.73   82.66   -4.3   86.24    0.54   97.72
GR  3.33 104.53     4.1   107.7   2.37  109.07   6.35  114.26    6.38  115.62
GR  5.16 118.07    5.18  119.99   6.82  131.24   7.01  132.86    6.22  137.62
GR  6.49 142.14    6.71   152.7

X1 3950     23     3.21  106.93     52      48     50
GR  6.75   0.00    6.69    0.07   6.66    0.24   7.24    3.21    7.43    4.89
GR  3.55  21.70    2.73   25.64   2.34   26.49  -3.59   42.02   -4.55   44.76
GR -4.71  46.81    -5.5   68.89  -5.72   75.24  -5.67   76.05   -4.28   89.07
GR -2.48  93.40    3.54  106.93   4.37   111.5   5.44  117.73    5.78  124.79
GR  6.25 137.30    6.38  139.44   6.69  154.73

X1 4000     27    17.85  111.24     52      48     50
GR  6.23   0.00    6.89    0.47   6.42    2.86   6.49    3.56    5.95   12.71
GR  5.75  15.36    4.28   17.85   0.23   25.62  -1.14   31.46   -4.44   42.94
GR -5.48  55.79    -5.8   64.64   -5.6   67.55  -4.55   82.86   -4.13   87.09
GR -1.11  94.19    3.46  106.15   4.99  111.24   4.61  112.14    5.73  114.08
GR  5.54 114.58    6.13  129.54   6.33  132.15   6.37  134.13     6.3  135.05
GR  6.42 137.41    6.67  149.64

X1 4050     27    16.84  113.26     53      49     50
GR  5.53   0.00    7.02    1.09    6.8    2.22   6.92    3.43    6.58    4.38
GR  6.16   7.03    5.97    8.51   5.76    15.8   5.76   16.48    5.27   16.84
GR  0.80  23.22   -1.66   31.78  -4.44   42.93  -4.75   52.05   -5.73   67.42
GR -5.74  67.59   -5.31   78.82  -4.54   86.44   0.94  101.86    2.66  107.32
GR  4.49 112.47    4.73  113.26   6.11  125.56    6.3  131.58    6.29  131.95
GR  6.51 136.16    6.65  142.84

X1 4100     28    20.34  116.94     50      50     50
GR  4.87   0.00    7.09    1.63   7.12    1.78   7.18    1.89    7.14    2.08
GR  6.31   9.13    6.23    17.7   4.91   20.34    2.2   23.94   -1.25   31.82
GR -2.60  40.60    -5.5   56.03  -5.72    69.8  -5.75   71.42   -5.51   77.46
GR -4.52  86.62   -1.92   94.71   1.08  104.29   1.85  106.18    3.85  107.39
GR  3.54 110.38    4.32  112.86   6.03  116.94   6.32  128.56     6.6  134.36
GR  6.59 134.58    6.61  134.97   6.62  135.58

X1 4150     31    19.58   99.06     50      50     50
GR  4.22   0.00     5.9    1.23   6.62    4.89   7.39     6.3    6.04    6.72
GR  5.95   7.40    5.34   14.91   5.27   19.58   3.07   22.53   -2.37   35.51
GR -2.08  35.72   -2.47   36.35  -2.83   37.02  -2.89   37.44   -6.23   64.69
GR -6.24  65.84   -5.83   72.29  -4.98   85.58   -3.4   88.55     3.3   99.06
GR  4.10 107.67     4.1  108.96   4.01  109.53   5.78  115.58    6.19  116.39
GR  6.29 123.99    6.35  127.78   6.34  129.51   6.44  132.89    6.49  135.12
GR  6.57 137.58

X1 4200     30    25.63  110.92     50      50     50
X2  1799
GR  3.57   0.00    4.71    0.83   5.99    7.32   6.12    8.25    4.87   11.12
GR  4.86  24.47    4.78   25.57   4.74   25.63   0.91   33.18    0.87   33.34
GR -5.11  57.07   -5.07   67.59  -5.86   74.78  -5.86   74.79   -5.29   83.63
GR -4.41  89.29     0.9  101.63   1.24  103.11   1.67  107.05    4.46  110.92
GR  5.13 112.33    5.79  117.53   6.25  120.91   6.22  121.87    6.25     124
GR  6.60 132.33    6.56  133.15   6.32  134.02   6.35  135.45    6.52  140.62

X1 4250     30    31.33  114.43     50      50     50
GR  2.93   0.00    3.53    0.44    4.2    3.86   4.59    6.75    5.27   25.49
GR  5.08  27.83    4.81   30.87   4.82   31.33   3.22   37.01    2.88   37.87
GR  1.04  41.74   -0.25   45.44  -4.08   58.57   -5.5   69.38   -6.05   74.36
GR -5.60  77.27   -5.41   78.48  -4.25   91.91  -1.29  104.03     1.8     110
GR  2.34 111.61    4.82   114.1   4.93  114.43   6.05  121.34    5.98  123.32
GR  5.99 124.49    6.05  129.31   6.15  133.29   6.31  138.89    6.46  143.67

X1 4300     34    34.18  125.27     50      50     50
GR  2.28   0.00    2.34    0.04   2.41    0.39   2.45    0.69    2.54    3.16
GR  2.65   4.22    5.43   16.14   5.61   17.13   5.36   28.53    5.32   28.72
GR  5.29  28.85    4.43   34.18   1.89   38.64   1.26   39.72    1.34   39.77
GR  1.16  41.48   -1.44   61.62  -2.18   62.55  -2.23   62.99   -4.87   79.76
GR -4.91  80.04   -4.85   80.74  -4.68   96.38  -4.27   97.95   -4.11   98.42
GR -0.43 111.47    3.61  120.54   4.42   122.2   4.93  122.43    5.46  125.27
GR  5.73 131.37    6.28  142.38   6.39  146.04   6.41  146.72

X1 4350     31    10.56  126.19     50      50     50
GR  4.66   0.00    5.61    9.84   5.03   10.56   2.09   14.24    0.99   15.53
GR  0.61  15.98    0.44   16.48   0.25    18.2  -1.31   33.57   -3.04   41.75
GR -3.74  51.53   -3.98   56.44  -4.98   71.93  -5.23   79.55   -5.11   81.77
GR -4.29  97.60   -2.19  108.52   0.07  110.84   2.03  115.94    3.07  119.78
GR  3.28 120.81    4.22  122.62   5.04  126.19   5.53  128.33    5.84  132.63
GR  6.02 137.23    6.22  141.66   6.25  144.09   6.33   144.9    6.19  145.92
GR  6.41 147.53
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X1	4400	35	31.7	112.25	50	50	50			
GR	5.51	0.00	5.56	0.03	5.56	0.04	5.52	0.55	5.47	2.16
GR	5.74	3.68	0.42	6.08	0.52	6.44	0.77	6.85	1.66	8.54
GR	5.09	10.36	4.91	14.46	3.64	31.7	1.63	32.73	-0.2	41.24
GR	-2.04	45.24	-3.17	52.39	-4.35	70.46	-4.57	77.32	-4.41	80.91
GR	-3.86	93.73	-3.4	99.17	1.31	107.56	3.37	112.25	3.25	113.34
GR	3.00	118.26	3.13	119.13	3.38	121.64	4.91	127.19	5.27	129.14
GR	6.43	137.47	6.43	137.55	6.06	140.73	5.94	141.59	6.43	145.14
X1	4450	37	32.13	124.7	50	50	50			
GR	5.45	0.00	5.57	0.07	5.57	0.11	5.48	1.37	5.35	5.35
GR	6.02	9.12	3.73	10.16	4.29	12.12	5.57	14.18	5.55	14.86
GR	5.54	15.03	5.03	26.97	4.88	28.71	4.55	32.13	1.42	34.63
GR	-2.37	47.29	-3.32	48.52	-3.71	50.22	-3.16	72.38	-3.23	73.43
GR	-3.14	74.65	-3.09	78.7	-2.98	88.15	-2.87	102.55	-2.75	103.34
GR	-2.29	104.26	-2.19	104.59	2.91	117.98	3.51	119.51	3.57	119.68
GR	6.20	124.70	6.65	130.12	6.77	132.28	6.86	133.96	6.81	135.04
GR	5.94	137.77	6.44	141.39						
X1	4500	36	28.11	114.83	50	50	50			
GR	5.38	0.00	5.57	0.1	5.57	0.17	5.43	2.17	5.23	8.54
GR	5.89	12.30	5.42	14.77	5.39	15.24	5.31	16.19	5.11	20.44
GR	4.60	28.11	0.7	32.95	-0.46	35.47	-3.97	49.12	-4.83	60.13
GR	-5.38	68.69	-4.85	76.48	-4.33	84.15	-3.66	93.66	-1.81	101.56
GR	0.86	105.92	2.23	110.96	2.48	112.38	2.97	113.53	3.69	113.92
GR	5.28	114.83	6.3	120.8	6.43	121.44	6.43	121.66	6.64	125.23
GR	6.85	129.15	6.86	129.65	6.86	129.71	6.57	135.68	6.3	136.52
GR	6.45	137.64								
X1	4550	31	11.35	104.45	50	50	50			
GR	5.31	0.00	5.58	0.14	5.58	0.24	5.38	2.99	5.24	7.63
GR	6.12	11.08	6.16	11.35	6.01	13.73	5	17.82	5.05	19.43
GR	4.45	21.89	3.31	24.28	0.19	30.95	-3.77	40.86	-5.27	58.39
GR	-5.59	63.41	-5.07	70.76	-4.85	74.27	-3.83	90.81	0.57	99.19
GR	3.52	104.45	3.21	111.27	3.18	112.1	5.86	118.95	6.42	120.78
GR	6.44	121.83	6.67	127.45	6.67	127.69	6.47	132.4	6.49	133.7
GR	6.39	135.39								
X1	4600	32	27.12	115.39	50	50	50			
GR	5.25	0.00	5.59	0.18	5.58	0.3	5.38	3.12	5.72	3.49
GR	5.04	12.58	2.24	16.97	2.66	17.81	2.25	20.36	0.22	21.24
GR	1.99	25.55	4.07	27.12	-1.38	37.62	-3.5	41	-4.44	42.25
GR	-5.96	67.96	-5.98	68.31	-5.85	69.47	-5.58	72.05	-4.09	86.04
GR	-2.02	91.56	2.92	104.85	6.04	115.39	6.37	116.49	6.41	116.81
GR	6.51	124.16	6.44	125.58	6.61	125.79	6.57	125.92	6.49	126.19
GR	6.54	129.59	6.26	134.32						
X1	4650	32	19.2	99.28	50	50	50			
GR	5.18	0.00	5.59	0.22	5.59	0.37	5.49	1.75	5.77	2.07
GR	5.12	2.69	5.41	3.59	5.25	9.84	4.63	17.8	4.69	19.2
GR	2.83	19.96	1.06	27.05	-4.17	36.72	-4.88	53.85	-5.6	63.66
GR	-5.02	69.84	-4.34	77.22	-3.79	86.64	2.81	97.43	3.3	99.28
GR	4.56	104.69	4.26	106.18	4.53	108.78	4.83	113.01	6.09	115.83
GR	6.23	116.14	6.26	116.22	6.27	116.25	7.05	122.88	6.57	124.37
GR	6.59	125.49	6.13	133.27						
X1	4700	26	16.92	101.24	50	50	50			
GR	5.12	0.00	5.6	0.26	5.59	0.4	5.04	6.72	4.29	15.63
GR	2.57	16.43	1.72	16.92	-1	26.93	-4.06	37.23	-4.56	43.29
GR	-5.13	63.56	-4.9	67.63	-4.38	76.62	-3.7	85.32	0.74	98.04
GR	3.50	101.24	5.65	110.8	5.73	110.91	5.81	111.09	5.86	111.68
GR	5.87	113.25	6.03	115.92	6.17	122.18	6.24	122.76	6.45	124.58
GR	6.00	132.21								
X1	4750	26	17.65	90.82	50	50	50			
GR	5.25	0.00	5.38	0.16	4.96	1.87	5.01	3.82	4.78	7.03
GR	4.32	14.53	4.07	15.85	3.5	17.65	1.73	22.76	-3.76	38.36
GR	-4.25	45.38	-5.58	64.15	-5.59	64.21	-5.05	70.47	-3.41	85.43
GR	0.63	90.82	3.45	101.54	3.44	101.92	3.71	103.26	5.9	109.34
GR	6.05	118.64	6.06	119.53	6.1	120.03	5.89	123.43	6.13	125.47
GR	5.87	129.89								
X1	4800	26	13.51	108.34	50	50	50			
GR	5.52	0.00	5.88	0.44	4.74	5	4.74	5.23	4.56	6.81
GR	3.74	13.51	1.63	17.27	1.2	18.09	1.64	19.22	-0.31	23.42
GR	-4.97	41.82	-5.06	53.05	-5.21	59.83	-5.35	66.65	-4.62	73.25
GR	-3.78	81.71	2.56	97.05	3.31	98.92	5.18	108.34	5.35	109.28
GR	5.79	117.47	5.88	120.43	5.81	123.81	5.75	124.83	5.81	125.41
GR	5.74	126.67								

X1	4850	31	23.66	97.32	53	48	50			
GR	5.80	0.00	6.31	0.61	5.94	1.2	6.34	4.13	7.71	8.55
GR	7.75	10.47	6.76	12.61	0.13	16.32	3.18	19.63	3.03	22.47
GR	3.00	23.66	-0.8	30.96	-3.46	34.22	-5.08	51.8	-5.43	56.76
GR	-5.44	57.60	-5.41	58.01	-4.08	76.49	-3.95	77.75	-1.79	87.7
GR	0.31	95.02	3.35	97.32	3.88	99.84	5.33	108.74	5.36	110.62
GR	5.78	120.32	5.81	120.44	5.8	120.72	5.75	125.8	5.73	128.08
GR	5.71	128.44								
X1	4900	33	28.37	106.62	53	48	50			
GR	6.09	0.00	6.22	0.15	5.82	0.79	6.09	1.56	6.25	5.43
GR	6.14	6.40	5.83	7.77	5.61	9.21	5.36	10.15	4.61	13.78
GR	2.94	17.09	2.38	18.11	3.28	24.79	3.24	28.37	-0.04	33.78
GR	-1.52	48.96	-4.97	60.56	-4.98	60.77	-5.13	64.33	-3.65	79.1
GR	-3.49	81.58	-2.48	85.57	-0.41	94.23	1.93	96.61	4.1	102.21
GR	5.15	106.62	5.3	107.72	5.87	112.85	6.11	116.97	5.89	124.49
GR	5.86	127.59	5.8	133.93	5.76	134.9				
X1	4950	27	14.02	99.87	52	48	50			
GR	6.63	0.00	6.63	1.59	6.6	5.15	6.08	13.87	6.04	14.02
GR	4.12	19.28	3.16	21.87	3.11	22.01	3.08	22.11	-4.21	40.48
GR	-4.62	48.86	-5.18	61.02	-3.73	64.1	-0.65	70.66	-0.64	80.48
GR	0.75	90.85	1.04	95.93	0.87	98.01	3.31	99.87	4.59	107.25
GR	5.37	110.74	5.53	113.5	6.06	122.42	5.98	125.1	5.97	126.22
GR	5.87	136.67	5.81	138.27						
X1	5000	27	14.25	101.68	52	48	50			
GR	5.97	0.00	6.22	0.6	6.17	2.05	6.43	13.57	6.45	13.95
GR	6.43	14.09	6.35	14.25	0.02	25.55	-1.15	29.52	-1.79	37.45
GR	-5.41	62.43	-4.99	66.46	-4.29	72.98	-1.53	91.08	-1.22	95.02
GR	2.65	99.79	4.53	101.68	5.65	105.02	5.65	111.4	6.33	114.12
GR	5.77	116.49	6.01	120.99	5.99	122.19	6.05	123.21	6.05	123.56
GR	5.95	134.76	5.85	136.99						
X1	5050	26	17.31	107.63	50	50	50			
GR	6.25	0.00	6.63	0.94	6.24	3.13	5.13	15.88	5.16	16.8
GR	4.76	17.31	3.83	20.12	-1.24	31.65	-1.73	37.14	-5.99	62.67
GR	-5.72	68.94	-5.65	69.87	-4.84	80.31	-1.61	95.87	-2.5	101.19
GR	0.35	102.91	5.6	107.63	5.79	112.64	5.95	117.32	5.99	119.4
GR	6.03	120.02	5.98	120.25	6.1	122.55	6.1	123.73	6.03	130.9
GR	5.91	133.85								
X1	5100	31	21.86	104.91	50	50	50			
GR	6.52	0.00	6.75	0.57	6.5	1.99	6.79	6.22	6.72	6.39
GR	6.71	7.00	6.24	15.22	6.13	17.21	6.05	19.36	5.81	21.86
GR	4.49	28.09	3.98	30.08	1.51	33.2	1.1	36.26	-4.88	52.1
GR	-5.72	61.28	-4.98	73.27	-4.79	76.29	-4.47	83.58	0.78	98.84
GR	3.93	104.91	3.88	107.87	5.59	110.85	5.3	111.79	5.55	114.44
GR	6.21	121.14	6.14	121.45	6.16	121.82	6.14	123.85	6.11	126.94
GR	5.96	130.61								
X1	5150	24	24.64	110.05	50	50	50			
GR	6.79	0.00	6.88	0.21	6.78	0.73	6.89	2.27	6.73	2.68
GR	5.84	20.05	5.47	22.97	5.15	24.64	4.27	26.6	3.15	30.54
GR	0.34	36.21	-3.22	44.97	-4.39	48.19	-5.84	64.39	-5.02	76.67
GR	-4.36	86.51	-4.25	88.4	0.62	92.62	13.2	110.05	14.55	112.96
GR	5.03	116.53	5.97	122.58	6.12	124.91	6.02	127.37		
X1	5200	30	24.8	127.19	50	50	50			
GR	7.17	0.00	6.84	0.34	6.79	0.48	6.79	1.56	6.76	2.4
GR	6.56	4.99	6.13	8.29	6.31	21.53	6.18	23.95	6.28	24.8
GR	4.39	28.12	1.91	34.62	0.41	36.82	-1.84	44.32	-3.56	49.62
GR	-5.02	63.29	-5.43	69.71	-3.63	77.96	-0.42	92.64	0.51	101.97
GR	1.76	108.30	1.84	112.2	1.8	113.1	4.54	121.45	4.91	122.9
GR	5.91	125.49	6.16	126.35	6.26	126.72	6.3	127.17	6.29	127.19
X1	5250	31	34.82	111.93	50	50	50			
GR	7.71	0.00	6.57	1.15	6.42	1.63	6.41	5.27	6.32	8.09
GR	5.67	16.46	5.63	16.57	5.56	17.64	4.95	24.63	4.08	27.71
GR	4.04	30.33	4.13	32.22	3.57	34.82	1.11	37.53	-0.52	44.82
GR	-4.33	50.42	-4.86	67.73	-5.38	76.02	-5.34	76.39	-4.06	89.48
GR	-3.25	96.91	-0.66	104.61	4.22	111.93	4.46	112.69	4.14	114.64
GR	5.23	119.67	5.6	120.92	6.29	123.41	6.37	125.96	6.66	128.84
GR	6.47	129.13								
X1	5300	29	24.46	123.94	50	50	50			
GR	8.25	0.00	6.31	1.96	6.05	2.78	6.04	8.98	5.96	11.36
GR	5.89	16.18	5.31	24.46	4.27	29.32	3.55	32.13	-4.63	50.8
GR	-4.67	50.85	-4.7	50.96	-5.19	72.19	-5.2	72.35	-5.02	74.82
GR	-3.56	95.28	-3.53	95.54	-3.34	96	-2.99	96.85	3.48	112.46
GR	4.02	113.70	4.15	114.93	4.2	116.44	5.59	120.87	6.43	123.94
GR	6.09	124.56	6.24	125.75	6.3	128.38	6.46	129.51		

```
X1 5350     25     15.54  111.56     50      50      50
GR  8.79    0.00    6.05    2.77   5.69    3.92    5.67    7.99    5.6    12.66
GR  5.50   13.89    5.48   15.54   5.16   18.06    4.7    21.24    1.19   33.14
GR  1.26   33.77    0.44   34.4   -0.54   37.87   -3.72   48.4    -4.22   53.62
GR -5.03   73.24   -5.08   74.64  -4.71   81.09   -3.64   92.16    3.5   108.72
GR  4.70  111.56    4.79  112.66   6.05  123.37    5.83  125.1     6.11  127.1

X1 5400     26     29.49  104.97     50      50      50
GR  9.33    0.00    5.79    3.58   5.32    5.07    5.32    5.63    5.31    6.28
GR  5.23    7.19    4.87   13.02   4.82   14.75    4.8    15.26    4.25   29.35
GR  4.24   29.49   -0.04   33.77  -0.07   33.89   -4.22   57.34   -5.16   67.06
GR -4.89   71.67   -4.5    78.21  -3.64   89.62    3.58  104.97    4.6   107.21
GR  4.80  108.44    5.22  114.16   5.73  119.03    5.7   119.64    5.95  123.96
GR  6.15  124.50

X1 5450     24     17.94   99.53     50      50      50
GR  9.87    0.00    5.53    4.39   5.48    4.54    5.54    5.05    5.44    8.19
GR  5.53   17.89    5.53   17.91   5.52   17.94    1.81   30.88   -1.66   38.4
GR -2.81   48.16   -5.18   58.83  -5.49   63.17   -4.96   70.1    -3.5    89.31
GR -3.27   92.29   -1.33   97      2.32   99.53    2.31  104.96    2.5   105.38
GR  4.16  108.68    5.29  116.36   5.57  118.23    5.92  120.74

X1 5500     35     22.67  101.13     50      50      50
GR 10.40    0.00    7.63    2.82   6.51    4.95    5.84    6.58    5.7     9.7
GR  5.34   11.48    7.37   11.78   7.37   16.36    9.52   20.99    9.64   22.13
GR  9.51   22.67    6.96   24.63   5      26.38    1.85   31.37   -0.11   34.41
GR -1.16   36.84   -2.52   41.71  -3.38   43.42   -4.67   47      -5.03   68.53
GR -5.05   69.65   -4.82   72.99  -3.46   87.76   -2.38   91.78    2.05  101.13
GR  2.21  101.49    2.24  101.7    2.65  104.44    3.42  105.37    2.01  107.31
GR  1.58  110.32    1.54  111.34   4.87  112.94    5.35  114.97    5.5   116.62

X1 5550     22     18.35  108.33     50      50      50
GR 10.94    0.00    9.96    0.99   9.56    1.75    7.66    6.38    6.26    7.24
GR  6.11    8.02    5.68   11.04   5.1    18.35    2.15   25.36   -0.64   29.01
GR -3.75   36.52   -4.18   48.12  -5.21   60.97   -4.78   66.95   -4.09   76.81
GR -3.11   85.78    1.27   97.56   2.13   99.39    2.77  101.35    4.85  108.33
GR  4.81  109.26    5.1   112.46

X1 5600     23      0     103.87     50      50      50
GR  9.95    0.00    9.41    0.51   8.61    1.43    6.85    4.01    5.57    6.54
GR  5.43    7.62    1.39   12.46   1.39   12.64    2.26   12.9     1.6    14.32
GR -4.10   30.92   -4.82   42.19  -5.28   56.99   -4.72   62.59   -3.63   73.41
GR -3.04   78.83   -1.31   83.59   2.19   95.48    3.44  100.83    3.67  102.71
GR  4.51  103.87    4.63  105.14   4.74  108.14

X1 5650     21     12.4   100.74     54      47      50
GR  6.84    0.00    5.81    0.98   5.38    2.52    3.59   10.54    3.05   12.4
GR  0.39   17.96   -3.59   25.1   -4.29   29.05   -5.05   57.93   -5.03   58.24
GR -5.00   58.53   -3.37   75.43  -3.16   76.69   -0.88   89.79    0.82   95.57
GR  0.98   96.56    1.34   97.05   4.19  100.74    4.24  101.28    4.79  105.85
GR  4.92  107.26

X1  5700    23     15.09   95.33     54      47      50
GR  6.11    0       5.88    1.04   5.79    1.48    5.55    2.13    3.58    5.71
GR  3.05    6.82    1.1     9.59   1.03   12.19    3.01   15.09    1.4    21.42
GR -5.23   40.56   -5.37   50.91  -4.79   58.53   -4.31   64.91   -3.86   69.77
GR  1.36   81.68    3.61   92.15   4.86   95.33    4.39  101.6     4.4   101.8
GR  4.98  103.39    5.26  106.3    5.17  106.91

X1 5750     24      2.79  103.47     54      47      50
GR  7.19    0.00    6.7     0.75   6.08    1.08    6.02    2.79    5.86    4.94
GR  4.94    7.44    4.83    8.44   3       9.81    1.77   11.67   -1.05   19.94
GR -0.75   23.87   -4.06   33.3   -0.2    41.57    1.04   58.88    1.38   61.18
GR  2.30   67.57    2.76   73.98  -0.6    88.68    1.49   90.55   -0.15   91.49
GR  1.54   93.66    5.47  103.47   5.6   104.86    5.15  107.84

X1 5800     19     17.83  107.37     55      47      50
GR  7.86    0.00    7.14    0.84   8.06    0.94    7.99    7.58    7.88    7.82
GR  2.41   13.06    4.78   17.83  -0.62   29.05   -4.76   44.23   -5.01   56.38
GR -4.78   59.95   -4.3    66.72  -3.59   76.91   -1.59   87.92   -0.64   92.83
GR -0.37   94.22    0.57   96.13   5.18  107.37    4.93  108.68

X1 5850     24     20.85   94.65     55      47      50
GR  7.41    0.00    6.34    1.26   6.06    3.26    5.45    5.09    5.49    5.28
GR  5.14    6.76    3.84    8.18   0.9    13.07    2.83   17.86    4.61   20.85
GR -2.27   38.41   -5.54   44.67  -5.78   47.87   -3.63   64.2    -3.4    66.06
GR -3.06   68.88   -2.64   71.04   0.44   88.98    3.92   93.69    5.59   94.65
GR  5.58   99.22    4.85  103.31   4.29  105.56    4.04  106.89

X1 5900     25      5.66  111.61     56      47      50
GR  6.96    0.00    6.95    0.02   6.94    0.07    6.93    0.09    6.87    0.42
GR  8.29    5.66    1.54   15.19   1.21   15.51    1.18   15.88    1.06   16.31
GR -4.37   38.98   -5.24   46.61  -5.35   58.67   -4.66   65.97   -3.3    72.77
GR -1.67   80.88   -1.18   84.38  -0.41   87.62    0.63   94.84    0.84   95.83
GR  1.60   96.38    1.75   98.62   5.7   111.61    5.64  112.02    4.95  113.66
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X1 5950       24     2.08    96.61      56      47      50
GR  6.81    0.00     6.76     0.35    6.85    1.06    6.93    2.08    6.89    2.56
GR  6.50    4.01     4.61    12.95    3.96    14.4   -0.26   26.83    -2.6   32.61
GR -3.51   36.81    -4.26    43.65   -5.03   50.68   -5.53   55.92   -5.34   57.39
GR -3.95   73.41    -3.68    76.54   -0.61    83.7    1.91   94.38    5.07   96.61
GR  5.40   97.87     5.89   103.52    5.95  104.43    6.75  111.93

X1 6000       13        0       95      56      48      50
GR   6.6       0        5        7     4.4       8    -0.6     8.1      -1      11
GR    -4      32       -5       41    -5.6      51      -5      57      -4      66
GR    -3      71        6       90     6.8      95

X1 6050       12        0       97      53      49      50
GR   6.4       0        5        7     0.2      10       0      11      -4      29
GR    -5      39     -5.7       48      -5    57.5      -4      66     1.1      90
GR     5      95      6.5       97

X1  6100      13       13      105      50      50      50
X3    10
GR  10.7       0       11       12    11.5      12    11.5      13     7.3      13
GR     2      19        2       21      -1      24      -4      52      -3      83
GR     1     101      5.5      105     8.5     111

NC   .05     .05      .04       .1      .3
SB  1.05    1.56      2.6        0      55       5     900       1       0       0
X1  6110      12        0      117      10      10      10
X2                      1      6.5      10       0       0       0
X3    10
BT   -10       0       10       10       0      10       8    14.5      10       6
BT            57       10        6      57      10     -11      60      10     -11
BT            60       10        6     103      10       6     117      10       8
BT           117       10       10
GR    10       0        3     14.5       3      17       2      17       2      20
GR    -4    28.5       -4     88.5       2      97       2     100       3     100
GR     3   102.5       10      117

NC   .05     .05      .04       .1      .3
SB  1.05    1.56      2.6        0      55       5     900       1       0       0
X1  6191      12        0      117      81      81      81
X2                      1      6.5      10       0       0       0
X3    10
BT   -10       0       10       10       0      10       8    14.5      10       6
BT            57       10        6      57      10     -11      60      10     -11
BT            60       10        6     103      10       6     117      10       8
BT           117       10       10
GR    10       0        3     14.5       3      17       2      17       2      20
GR    -4    28.5       -4     88.5       2      97       2     100       3     100
GR     3   102.5       10      117

NC   .05     .05      .04       .1      .3
X1  6201      14        0       90      10      10      10
GR   7.3       0      2.0      0.1       0       9      -1      13      -2      19
GR    -3      22       -4       30      -5      39      -5      48      -4      56
GR    -3      65        0       83     5.1      90     7.1      96

X1 6250       13       22      124      49      49      49
GR   7.9       0      5.5       22       1      24       0      26      -3      42
GR    -4      50     -4.7       62      -4      80      -3      85       0      95
GR     1      98      2.6      110     7.7     124

X1 6300       11       13    102.1      48      51      50
GR   7.6       0        5       12     4.4      13       1      15    -4.9      42
GR  -4.6      64       -4       69       0     102     5.5   102.1       6     105
GR   6.6     115

X1 6350       28    34.24   119.35      46      52      50
GR  7.38    0.00     7.36    13.99     7.4   14.55    7.28   16.49    6.97   18.19
GR  5.74   27.79     4.99     28.8    5.82    32.4     4.7   34.24    2.27   36.29
GR  1.70   38.67    -4.49    55.78   -4.58   65.85   -4.62   72.68   -4.07   75.99
GR -2.82   87.49    -2.05    94.57   -1.29  100.91    2.51  112.97    4.99  119.35
GR  5.89  124.57     6.06   127.21    6.73  132.22    6.63  136.22    7.01  140.52
GR  7.16  144.24     7.04   144.95    7.07  145.41

X1 6400       23     19.9   140.81      47      52      50
GR  7.38    0.00     7.37     7.85    7.38   10.23    7.22    12.5    7.21   15.63
GR  6.79   19.27     5.93     19.9    2.98    27.5   -0.68   39.69   -3.85   50.12
GR -4.31   62.04    -4.34    68.05   -3.48   84.99   -3.46   85.42   -2.89   93.37
GR -2.66   95.25    -0.86   110.38    2.29  119.22    6.51  138.94    6.63  140.81
GR  6.65  141.37     6.44   142.62     6.5  143.42
```

X1	6450	25	8.46	122.7	46	52	50			
GR	7.37	0.00	7.37	0.1	7.5	0.35	7.62	0.82	7.61	1.35
GR	8.41	8.46	6.36	13.11	6.01	16.42	3.75	18.62	2.99	19.65
GR	2.34	20.18	-1.2	36.24	-3.09	43.05	-3.2	46.03	-3.92	73.2
GR	-3.82	75.28	-3.61	79.24	-2.67	97.74	-1.9	100.77	3.02	119.02
GR	5.72	122.70	6.34	125.92	6.68	131.46	6.92	138.06	6.46	141.73

X1	6500	21	15.73	127.81	47	53	50			
GR	6.99	0.00	6.86	4.16	7	4.44	6.87	4.67	6.58	7.28
GR	5.82	15.73	3.87	17.42	2.91	18.24	-2.19	42.7	-2.89	46.27
GR	-3.98	66.56	-4.01	70.9	-3.75	76.18	-3.13	88.42	-2.89	95.8
GR	1.14	119.00	2.97	123.98	5.58	127.81	5.93	128.94	6.28	137.46
GR	6.59	145.51								

X1	6550	19	20.93	115.12	47	53	50			
GR	4.92	0.00	2.47	11.91	2.38	18.36	1.75	20.93	-2.91	38.73
GR	-3.52	58.46	-3.56	64.03	-3.62	70.27	-3.28	80.71	-2.71	100.73
GR	-1.13	106.34	1.92	115.12	3.43	124.69	4.04	126.89	4.82	127.33
GR	6.83	130.57	7.44	131.48	7.55	132.01	7.56	136.68		

X1	6600	11	0	127	47	53	50			
GR	11.4	0	1.2	0	1.2	2	-0.1	2	0	5
GR	-2	25	-3	59	-3.6	76	-3	103	-0.3	127
GR	7.1	127								

X1	6650	10	0	135	48	52	50			
GR	7.1	0	-0.1	0	-1	11	-2	22.5	-3	61
GR	-3	103	-2	119	-1	126	0.2	135	4.7	135

X1	6700	12	0	142	48	52	50			
GR	3.3	0	0.4	0	0	4	-1	15	-2	25
GR	-3	68	-3.1	93	-3	108	-2	127	0	139
GR	0.5	142	4.7	142						

X1	6750	11	0	152.5	48	53	50			
GR	3.5	0	0	0	-2	29	-3	67	-2.5	92
GR	-2.3	120	-2	123	-1	130	0	137	1	145
GR	6.6	152.5								

X1	6800	12	0	164	48	53	50			
GR	9.5	0	8	0	0.9	11	0	17	-1	30
GR	-2	47	-2	116	-2	146	-1	153	0	160
GR	0.4	164	6	164						

X1	6850	21	0	157.40	47	53	50			
GR	5.84	0.00	4.98	2.78	-1.75	24.55	-2.06	43	-2.27	47.11
GR	-2.27	50.85	-2.4	64.27	-2.44	68.19	-2.22	81.76	-1.95	93.77
GR	-1.70	106.61	-1.49	119.63	-2.12	128.68	-2.54	136.83	6.51	155.81
GR	7.31	157.40	7.12	166.46	7.07	167.18	7.07	167.49	7.11	168.65
GR	5.70	169.00								

X1	6900	35	14.77	179.81	47	54	50			
GR	5.81	0.00	5.68	0.26	5.64	0.4	3.26	6.38	2.71	7.74
GR	2.41	9.06	3.12	10.34	3.14	14.77	-0.61	26.31	-1.81	30.2
GR	-2.19	51.34	-2.18	53.97	-2.13	55.79	-2.15	58.35	-2.15	71.72
GR	-2.14	83.23	-2.44	97.34	-2.23	106.98	-1.74	122.51	-1.63	129.43
GR	1.73	139.69	-1.52	149.5	-1.03	156.07	-0.75	158.22	1.78	166.52
GR	2.32	168.35	3.2	171.73	3.59	173.21	3.28	174.41	4.72	176.37
GR	6.88	179.62	6.85	179.81	4.37	179.98	4.19	180.07	4.58	180.25

X1	6950	25	21.37	192.36	47	54	50			
GR	4.52	0.00	2.63	14.68	2.22	17.98	2.08	18.56	2.09	19.53
GR	1.88	20.19	1.76	21.37	-2	36.92	-1.97	43.15	-2.42	63.33
GR	-2.31	68.17	-2.26	81.49	-2.21	93.55	-2.27	98.83	-2.4	104.41
GR	-1.87	132.00	-1.75	135.41	-1.55	162.23	-1.48	162.69	1.62	178.44
GR	1.62	178.58	2.07	179.51	7.3	192.33	7.25	192.36	7.26	192.36

EJ

ER

THIS RUN EXECUTED 14OCT93 15:13:41

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.0; February 1991
****

T1 KAELEPULU STREAM ORIGINAL CHANNEL FILE: KKDORIG2.DAT
T2 STREAM HYDRAULICS, NOT OBSTRUCTED DATE:10/14/93
T3 SUBCRITICAL FLOW (STA. -800 TO STA. 69+50)

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	-10				0		.1	2835	1.76	
J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	-1		-1				-1			

J3 VARIABLE CODES FOR SUMMARY PRINTOUT

150

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

-10 -10

THIS RUN EXECUTED 14OCT93 15:14:02

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HEC-2 WATER SURFACE PROFILES

Version  4.6.0;  February 1991
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NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

SUBCRITICAL FLOW (STA

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	800.000	.00	.00	.00	-6.00	2835.00	1.76	-2.98	1.85	1.89	2.36	1199.39	2062.93
	750.000	50.00	.00	.00	-6.00	2835.00	1.78	-2.52	1.86	2.01	2.29	1236.78	2000.55
	700.000	50.00	.00	.00	-4.00	2835.00	1.79	-2.04	1.87	2.19	2.26	1252.77	1916.24
	650.000	50.00	.00	.00	-5.50	2835.00	1.82	-2.70	1.88	1.55	1.93	1468.41	2277.58
	600.000	50.00	.00	.00	-4.00	2835.00	1.85	-2.59	1.89	1.00	1.55	1824.53	2834.13
*	550.000	50.00	.00	.00	-4.00	2835.00	1.83	-2.09	1.90	2.17	2.10	1347.39	1926.67
	500.000	50.00	.00	.00	-4.00	2835.00	1.79	-1.77	1.94	4.29	3.13	905.56	1368.22
	450.000	50.00	.00	.00	-4.00	2835.00	1.80	-1.70	1.97	4.78	3.34	849.28	1296.43
	400.000	50.00	.00	.00	-4.00	2835.00	1.82	-1.69	2.00	4.78	3.35	847.28	1296.69
	350.000	50.00	.00	.00	-4.00	2835.00	1.85	-1.68	2.02	4.74	3.34	847.97	1301.50
	300.000	50.00	.00	.00	-4.00	2835.00	1.89	-1.74	2.04	4.16	3.13	906.04	1389.31
	250.000	50.00	.00	.00	-4.00	2835.00	1.88	-1.48	2.09	5.77	3.64	779.05	1180.50
	200.000	50.00	.00	.00	-4.00	2835.00	1.95	-1.69	2.11	4.45	3.27	866.61	1343.89
*	150.000	50.00	.00	.00	-4.00	2835.00	1.86	-.71	2.22	15.09	4.82	588.26	729.72
*	100.000	50.00	.00	.00	-4.00	2835.00	2.14	-1.82	2.27	3.34	2.91	974.51	1550.09
	50.000	63.00	.00	.00	-4.00	2835.00	2.15	-1.65	2.30	4.03	3.10	915.24	1412.78
	36.000	14.00	.00	.00	-4.00	2835.00	2.13	-1.16	2.32	6.18	3.55	798.98	1140.67
	26.000	10.00	8.00	6.00	-4.00	2835.00	2.33	.00	2.46	3.41	2.92	969.48	1535.06
	8.000	34.00	8.00	6.00	-4.00	2835.00	2.44	.00	2.56	2.77	2.71	1046.69	1704.64
*	18.000	10.00	.00	.00	-4.00	2835.00	2.42	-1.22	2.57	8.17	3.20	886.85	991.87
*	50.000	50.00	.00	.00	-2.00	2835.00	2.03	1.34	2.93	83.47	7.61	372.51	310.30
*	100.000	50.00	.00	.00	-2.00	2835.00	2.89	.84	3.16	18.83	4.28	699.36	653.25
	150.000	50.00	.00	.00	-2.00	2835.00	3.07	.40	3.25	12.10	3.37	842.09	814.87
	200.000	50.00	.00	.00	-2.00	2835.00	3.14	.43	3.31	13.30	3.34	849.34	777.38
	250.000	50.00	.00	.00	-2.00	2835.00	3.21	.34	3.37	10.37	3.25	876.35	880.45
	300.000	50.00	.00	.00	-2.94	2835.00	3.28	-.10	3.42	7.47	2.93	971.99	1037.60
	350.000	50.00	.00	.00	-2.76	2835.00	3.33	-.07	3.46	7.06	2.82	1008.58	1067.29
	400.000	50.00	.00	.00	-2.72	2835.00	3.36	-.02	3.50	7.76	2.95	961.63	1017.41
	450.000	50.00	.00	.00	-5.61	2835.00	3.43	-.90	3.53	5.08	2.60	1091.21	1257.65
	500.000	50.00	.00	.00	-4.54	2835.00	3.46	-1.00	3.55	4.43	2.50	1134.62	1347.13
	550.000	50.00	.00	.00	-6.10	2835.00	3.51	-2.02	3.57	2.47	2.08	1365.41	1805.03
	600.000	50.00	.00	.00	-6.49	2835.00	3.53	-2.80	3.59	1.90	1.92	1477.70	2057.79

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
650.000	50.00	.00	.00	-7.91	2835.00	3.55	-3.91	3.59	1.31	1.71	1661.90	2479.86
700.000	50.00	.00	.00	-8.19	2835.00	3.56	-4.26	3.60	1.06	1.60	1770.43	2747.51
750.000	50.00	.00	.00	-7.12	2835.00	3.57	-4.31	3.61	.97	1.55	1837.04	2872.53
* 800.000	50.00	.00	.00	-5.65	2835.00	3.56	-2.40	3.62	2.00	1.93	1470.49	2006.04
850.000	50.00	.00	.00	-4.00	2835.00	3.56	-1.20	3.63	2.93	2.14	1326.41	1657.64
900.000	50.00	.00	.00	-5.00	2835.00	3.60	-2.09	3.65	1.94	1.85	1533.36	2033.37
* 950.000	50.00	.00	.00	-7.71	2835.00	3.62	-4.14	3.66	.86	1.44	1963.68	3048.67
1000.000	50.00	.00	.00	-6.80	2835.00	3.63	-4.32	3.66	.88	1.47	1931.09	3015.67
1050.000	50.00	.00	.00	-9.34	2835.00	3.63	-4.91	3.67	.85	1.48	1920.74	3067.22
1100.000	50.00	.00	.00	-9.83	2835.00	3.64	-5.05	3.67	.82	1.44	1972.74	3133.94
1150.000	50.00	.00	.00	-9.31	2835.00	3.64	-5.42	3.67	.74	1.42	2002.72	3290.47
1200.000	50.00	.00	.00	-8.72	2835.00	3.64	-4.88	3.68	.85	1.49	1903.06	3076.02
1250.000	50.00	.00	.00	-8.42	2835.00	3.65	-4.74	3.68	.85	1.50	1894.56	3068.82
1300.000	50.00	.00	.00	-7.71	2835.00	3.65	-4.57	3.69	.87	1.49	1901.27	3046.23
1350.000	50.00	.00	.00	-7.81	2835.00	3.66	-4.58	3.69	.98	1.57	1818.60	2867.95
1400.000	50.00	.00	.00	-8.93	2835.00	3.66	-4.60	3.70	.90	1.53	1853.68	2985.33
1450.000	50.00	.00	.00	-8.93	2835.00	3.66	-4.73	3.70	1.03	1.60	1777.09	2792.04
1500.000	50.00	.00	.00	-8.87	2781.00	3.68	-4.98	3.71	.78	1.45	1922.22	3152.56
1550.000	50.00	.00	.00	-9.23	2781.00	3.68	-5.10	3.71	.76	1.43	1946.22	3188.56
1600.000	50.00	.00	.00	-9.27	2781.00	3.69	-5.18	3.72	.80	1.44	1929.21	3101.33
1650.000	50.00	.00	.00	-8.57	2781.00	3.69	-5.07	3.72	.74	1.43	1948.53	3222.02
1700.000	50.00	.00	.00	-8.46	2781.00	3.69	-4.90	3.73	.81	1.47	1886.37	3098.37
1750.000	50.00	.00	.00	-8.59	2781.00	3.69	-4.54	3.73	1.00	1.57	1773.08	2774.33
1800.000	50.00	.00	.00	-8.41	2781.00	3.70	-4.75	3.74	.82	1.50	1870.22	3067.75
1850.000	50.00	.00	.00	-8.87	2781.00	3.71	-5.15	3.74	.67	1.36	2044.10	3408.75
1900.000	50.00	.00	.00	-8.71	2781.00	3.71	-4.42	3.75	.83	1.42	1963.77	3060.78
1950.000	50.00	.00	.00	-8.17	2781.00	3.72	-4.36	3.75	.74	1.37	2035.90	3236.19
2000.000	50.00	.00	.00	-8.20	2781.00	3.73	-4.37	3.75	.70	1.31	2125.52	3323.66
2050.000	50.00	.00	.00	-8.30	2781.00	3.73	-4.49	3.76	.63	1.25	2221.31	3512.46
2100.000	50.00	.00	.00	-7.54	2781.00	3.74	-4.15	3.76	.57	1.19	2344.28	3669.28
2150.000	50.00	.00	.00	-7.09	2781.00	3.74	-3.81	3.76	.62	1.20	2316.98	3523.75
2200.000	50.00	.00	.00	-6.81	2781.00	3.74	-3.69	3.77	.80	1.36	2042.61	3102.80
2250.000	50.00	.00	.00	-6.58	2781.00	3.74	-3.64	3.77	.95	1.46	1900.50	2846.93
2300.000	50.00	.00	.00	-6.24	2781.00	3.74	-3.24	3.79	1.47	1.80	1579.79	2296.99
2350.000	50.00	.00	.00	-6.33	2781.00	3.74	-3.25	3.79	1.44	1.81	1555.52	2320.59
2400.000	50.00	.00	.00	-6.53	2781.00	3.75	-3.34	3.80	1.40	1.78	1559.91	2346.40
2450.000	50.00	.00	.00	-6.49	2781.00	3.76	-3.31	3.81	1.47	1.74	1614.25	2296.87
2500.000	50.00	.00	.00	-6.45	2781.00	3.78	-3.09	3.81	1.23	1.60	1869.96	2510.15
2550.000	50.00	.00	.00	-6.17	2781.00	3.79	-3.18	3.82	.91	1.39	2029.49	2919.04
2600.000	50.00	.00	.00	-6.00	2781.00	3.79	-3.20	3.83	1.22	1.62	1750.22	2514.07

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	2650.000	50.00	.00	.00	-6.26	2781.00	3.79	-3.27	3.84	1.35	1.68	1659.91	2394.53
	2700.000	50.00	.00	.00	-5.85	2781.00	3.80	-2.98	3.85	1.47	1.77	1576.98	2295.74
	2750.000	50.00	.00	.00	-5.88	2781.00	3.80	-2.98	3.85	1.52	1.81	1553.63	2258.08
	2800.000	50.00	.00	.00	-5.89	2781.00	3.81	-2.84	3.86	1.69	1.85	1507.69	2138.50
	2850.000	50.00	.00	.00	-5.94	2781.00	3.82	-2.78	3.87	1.55	1.83	1532.05	2231.51
	2900.000	50.00	.00	.00	-5.93	2781.00	3.82	-2.69	3.88	1.73	1.88	1495.17	2116.22
	2950.000	50.00	.00	.00	-5.41	2781.00	3.83	-2.41	3.89	1.86	1.95	1445.95	2037.02
	3000.000	50.00	.00	.00	-5.74	2781.00	3.84	-2.28	3.90	2.08	2.04	1388.99	1926.73
	3050.000	50.00	.00	.00	-5.39	2781.00	3.84	-2.39	3.91	2.11	2.09	1328.56	1916.62
	3100.000	50.00	.00	.00	-5.44	2781.00	3.88	-2.50	3.92	1.51	1.66	1738.41	2264.87
	3150.000	50.00	.00	.00	-5.23	2184.00	3.90	-2.82	3.93	.98	1.46	1491.83	2211.35
*	3200.000	50.00	.00	.00	-4.82	2184.00	3.88	-1.68	3.95	2.37	2.10	1062.93	1419.39
*	3250.000	50.00	.00	.00	-4.15	2184.00	3.80	-.31	4.02	8.98	3.68	593.33	728.82
	3300.000	50.00	.00	.00	-4.75	2184.00	3.85	-.36	4.06	8.76	3.68	593.64	737.82
	3350.000	50.00	.00	.00	-5.83	2184.00	3.91	-.79	4.10	7.96	3.49	626.20	774.09
	3400.000	50.00	.00	.00	-5.82	2184.00	3.98	-1.40	4.14	5.84	3.25	672.43	903.45
	3450.000	50.00	.00	.00	-5.89	2184.00	3.99	-.60	4.18	8.21	3.56	613.27	762.10
	3500.000	50.00	.00	.00	-5.92	2184.00	4.03	-.82	4.23	8.04	3.51	622.44	770.24
	3550.000	50.00	.00	.00	-6.13	2184.00	4.10	-1.41	4.26	6.03	3.20	681.95	889.55
	3600.000	50.00	.00	.00	-5.71	2184.00	4.12	-1.21	4.30	7.03	3.45	633.54	823.79
	3650.000	50.00	.00	.00	-5.91	2184.00	4.16	-.94	4.34	7.12	3.35	651.42	818.39
	3700.000	50.00	.00	.00	-5.72	2184.00	4.19	-.99	4.38	7.09	3.45	634.28	820.08
	3750.000	50.00	.00	.00	-5.27	2184.00	4.21	-.82	4.42	8.09	3.70	590.44	767.76
	3800.000	50.00	.00	.00	-5.49	2184.00	4.32	-.90	4.46	5.45	3.08	709.65	935.78
	3850.000	50.00	.00	.00	-5.63	2184.00	4.32	-1.05	4.51	7.14	3.53	618.97	817.10
	3900.000	50.00	.00	.00	-5.60	2184.00	4.30	.21	4.58	13.65	4.31	510.20	591.15
	3950.000	50.00	.00	.00	-5.72	2184.00	4.45	-1.09	4.64	7.01	3.51	624.47	824.66
	4000.000	50.00	.00	.00	-5.80	2184.00	4.50	-1.08	4.68	6.40	3.37	647.22	863.46
	4050.000	50.00	.00	.00	-5.74	2184.00	4.55	-1.12	4.71	5.76	3.23	676.69	909.72
	4100.000	50.00	.00	.00	-5.75	2184.00	4.57	-.96	4.74	6.30	3.33	655.34	870.47
	4150.000	50.00	.00	.00	-6.24	2184.00	4.58	-1.14	4.78	6.55	3.58	617.01	853.30
	4200.000	50.00	.00	.00	-5.86	1799.00	4.68	-1.13	4.82	5.12	3.00	600.44	795.40
	4250.000	50.00	.00	.00	-6.05	1799.00	4.70	-.91	4.85	5.74	3.14	575.91	750.97
	4300.000	50.00	.00	.00	-4.91	1799.00	4.72	-.10	4.88	6.54	3.18	579.01	703.63
*	4350.000	50.00	.00	.00	-5.23	1799.00	4.83	-1.40	4.91	2.74	2.22	810.98	1086.90
	4400.000	50.00	.00	.00	-4.57	1799.00	4.81	-.60	4.94	4.90	3.00	631.38	812.57
	4450.000	50.00	.00	.00	-3.71	1799.00	4.83	-.09	4.97	5.67	3.03	596.65	755.58
	4500.000	50.00	.00	.00	-5.38	1799.00	4.88	-1.09	5.00	4.05	2.77	650.05	894.06
	4550.000	50.00	.00	.00	-5.59	1799.00	4.90	-1.33	5.02	4.03	2.80	654.98	895.70
	4600.000	50.00	.00	.00	-5.98	1799.00	4.92	-1.47	5.04	4.25	2.82	660.71	872.81

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
4650.000	50.00	.00	.00	-5.60	1799.00	4.94	-1.34	5.06	4.11	2.86	637.31	887.10
4700.000	50.00	.00	.00	-5.13	1799.00	4.97	-1.21	5.08	3.33	2.66	685.64	986.33
4750.000	50.00	.00	.00	-5.59	1799.00	4.97	-1.10	5.11	4.14	2.97	633.99	884.56
4800.000	50.00	.00	.00	-5.35	1799.00	5.02	-1.23	5.13	4.01	2.69	674.99	898.20
4850.000	50.00	.00	.00	-5.44	1799.00	5.02	-1.01	5.16	4.15	2.95	632.66	883.36
4900.000	50.00	.00	.00	-5.13	1799.00	5.02	.24	5.20	7.40	3.45	539.40	661.32
4950.000	50.00	.00	.00	-5.18	1799.00	5.06	.45	5.24	7.51	3.39	537.79	656.32
5000.000	50.00	.00	.00	-5.41	1799.00	5.14	-.37	5.27	4.68	2.91	618.12	831.72
5050.000	50.00	.00	.00	-5.99	1799.00	5.19	-1.08	5.29	3.47	2.59	694.42	966.21
5100.000	50.00	.00	.00	-5.72	1799.00	5.18	-.89	5.33	5.18	3.08	588.44	790.70
5150.000	50.00	.00	.00	-5.84	1799.00	5.20	-1.23	5.36	5.25	3.15	570.83	785.43
5200.000	50.00	.00	.00	-5.43	1799.00	5.25	-.03	5.38	5.85	2.98	604.53	744.03
5250.000	50.00	.00	.00	-5.38	1799.00	5.28	-1.05	5.41	3.86	2.85	645.73	915.26
5300.000	50.00	.00	.00	-5.20	1799.00	5.32	-1.11	5.43	4.32	2.73	659.03	865.16
5350.000	50.00	.00	.00	-5.08	1799.00	5.34	-.87	5.45	4.34	2.74	657.32	863.08
5400.000	50.00	.00	.00	-5.16	1799.00	5.34	-.47	5.48	4.57	3.03	610.93	841.90
5450.000	50.00	.00	.00	-5.49	1799.00	5.38	-.77	5.51	4.26	2.87	645.50	871.25
5500.000	50.00	.00	.00	-5.05	1799.00	5.40	-.92	5.53	3.82	2.86	651.39	920.24
5550.000	50.00	.00	.00	-5.21	1799.00	5.43	-.92	5.55	3.87	2.70	668.58	914.88
5600.000	50.00	.00	.00	-5.28	1799.00	5.47	-1.08	5.57	3.27	2.49	725.66	995.60
5650.000	50.00	.00	.00	-5.05	1799.00	5.49	-1.11	5.58	2.74	2.45	748.13	1087.36
5700.000	50.00	.00	.00	-5.37	1799.00	5.48	-.55	5.61	4.92	3.01	624.50	810.90
* 5750.000	50.00	.00	.00	-4.06	1799.00	5.45	2.66	5.69	15.44	3.92	459.44	457.82
* 5800.000	50.00	.00	.00	-5.01	1799.00	5.63	-.59	5.74	3.67	2.66	687.04	939.57
5850.000	50.00	.00	.00	-5.78	1799.00	5.62	.15	5.78	5.71	3.21	588.30	752.55
5900.000	50.00	.00	.00	-5.35	1799.00	5.71	-.75	5.80	3.26	2.44	737.25	996.44
5950.000	50.00	.00	.00	-5.53	1799.00	5.71	-.74	5.83	4.07	2.75	655.59	892.19
6000.000	50.00	.00	.00	-5.60	1799.00	5.74	-.91	5.85	3.55	2.64	682.46	955.38
6050.000	50.00	.00	.00	-5.70	1799.00	5.77	-1.03	5.87	2.91	2.43	739.91	1055.11
6100.000	50.00	.00	.00	-4.00	1799.00	5.78	-.09	5.89	3.65	2.63	683.10	941.42
6110.000	10.00	10.00	6.50	-4.00	1799.00	5.78	.00	5.89	3.02	2.38	755.56	1035.51
6191.000	81.00	10.00	6.50	-4.00	1799.00	5.80	.00	5.89	3.02	2.38	755.35	1035.10
6201.000	10.00	.00	.00	-5.00	1799.00	5.80	-.52	5.89	3.08	2.49	721.86	1024.64
6250.000	49.00	.00	.00	-4.70	1799.00	5.81	-.43	5.91	3.49	2.53	710.15	962.80
6300.000	50.00	.00	.00	-4.90	1799.00	5.84	-.68	5.93	2.63	2.37	762.33	1109.86
6350.000	50.00	.00	.00	-4.62	1799.00	5.83	-.13	5.95	4.19	2.83	640.91	879.37
6400.000	50.00	.00	.00	-4.34	1799.00	5.89	-.43	5.98	3.07	2.29	784.61	1026.57
6450.000	50.00	.00	.00	-3.92	1799.00	5.91	-.32	5.99	2.76	2.29	785.49	1082.14
6500.000	50.00	.00	.00	-4.01	1799.00	5.93	-.24	6.00	2.56	2.20	819.63	1123.67
6550.000	50.00	.00	.00	-3.62	1799.00	5.94	-.39	6.02	2.14	2.20	876.32	1231.09

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
6600.000	50.00	.00	.00	-3.60	1799.00	5.98	-.55	6.03	1.46	1.72	1046.07	1488.00
6650.000	50.00	.00	.00	-3.00	1799.00	5.99	-.53	6.03	1.29	1.62	1108.85	1583.36
6700.000	50.00	.00	.00	-3.10	1799.00	6.00	-.60	6.04	1.17	1.55	1160.50	1661.06
6750.000	50.00	.00	.00	-3.00	1799.00	6.01	-.34	6.05	1.22	1.54	1164.68	1627.35
6800.000	50.00	.00	.00	-2.00	1799.00	6.02	-.01	6.05	1.25	1.52	1181.59	1609.22
6850.000	50.00	.00	.00	-2.54	1799.00	6.02	-.09	6.06	1.55	1.67	1079.87	1444.28
6900.000	50.00	.00	.00	-2.44	1799.00	6.03	.00	6.07	1.32	1.55	1184.94	1563.80
6950.000	50.00	.00	.00	-2.42	1799.00	6.05	-.25	6.08	1.04	1.42	1298.13	1763.46

SUBCRITICAL FLOW (STA

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	800.000	2835.00	1.76	.00	.00	.00	179.00	.00
	750.000	2835.00	1.78	.00	.02	.00	203.50	50.00
	700.000	2835.00	1.79	.00	.01	.00	226.50	50.00
	650.000	2835.00	1.82	.00	.03	.00	263.00	50.00
	600.000	2835.00	1.85	.00	.03	.00	328.05	50.00
*	550.000	2835.00	1.83	.00	-.01	.00	273.09	50.00
	500.000	2835.00	1.79	.00	-.04	.00	164.73	50.00
	450.000	2835.00	1.80	.00	.01	.00	151.80	50.00
	400.000	2835.00	1.82	.00	.02	.00	150.53	50.00
	350.000	2835.00	1.85	.00	.02	.00	150.07	50.00
	300.000	2835.00	1.89	.00	.05	.00	162.51	50.00
	250.000	2835.00	1.88	.00	-.01	.00	142.24	50.00
	200.000	2835.00	1.95	.00	.07	.00	150.38	50.00
*	150.000	2835.00	1.86	.00	-.06	.00	147.08	50.00
*	100.000	2835.00	2.14	.00	.05	.00	162.87	50.00
	50.000	2835.00	2.15	.00	.01	.00	161.83	63.00
	36.000	2835.00	2.13	.00	-.03	.00	161.70	14.00
	26.000	2835.00	2.33	.00	.20	.00	164.09	10.00
	8.000	2835.00	2.44	.00	.12	.00	169.18	34.00
*	18.000	2835.00	2.42	.00	-.03	.00	167.77	10.00
*	50.000	2835.00	2.03	.00	-.20	.00	109.16	50.00
*	100.000	2835.00	2.89	.00	.09	.00	188.76	50.00
	150.000	2835.00	3.07	.00	.18	.00	205.15	50.00
	200.000	2835.00	3.14	.00	.07	.00	218.56	50.00
	250.000	2835.00	3.21	.00	.07	.00	207.98	50.00
	300.000	2835.00	3.28	.00	.08	.00	208.56	50.00
	350.000	2835.00	3.33	.00	.05	.00	213.56	50.00
	400.000	2835.00	3.36	.00	.03	.00	201.03	50.00
	450.000	2835.00	3.43	.00	.06	.00	197.08	50.00
	500.000	2835.00	3.46	.00	.03	.00	196.02	50.00
	550.000	2835.00	3.51	.00	.05	.00	199.82	50.00
	600.000	2835.00	3.53	.00	.02	.00	200.13	50.00
	650.000	2835.00	3.55	.00	.02	.00	203.40	50.00
	700.000	2835.00	3.56	.00	.01	.00	210.98	50.00
	750.000	2835.00	3.57	.00	.01	.00	222.10	50.00
*	800.000	2835.00	3.56	.00	-.01	.00	205.97	50.00
	850.000	2835.00	3.56	.00	.00	.00	211.65	50.00

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	900.000	2835.00	3.60	.00	.03	.00	226.08	50.00
*	950.000	2835.00	3.62	.00	.03	.00	225.12	50.00
	1000.000	2835.00	3.63	.00	.00	.00	220.64	50.00
	1050.000	2835.00	3.63	.00	.00	.00	211.13	50.00
	1100.000	2835.00	3.64	.00	.01	.00	229.95	50.00
	1150.000	2835.00	3.64	.00	.01	.00	211.76	50.00
	1200.000	2835.00	3.64	.00	.00	.00	209.18	50.00
	1250.000	2835.00	3.65	.00	.00	.00	204.47	50.00
	1300.000	2835.00	3.65	.00	.00	.00	208.17	50.00
	1350.000	2835.00	3.66	.00	.00	.00	209.72	50.00
	1400.000	2835.00	3.66	.00	.01	.00	207.74	50.00
	1450.000	2835.00	3.66	.00	.00	.00	206.84	50.00
	1500.000	2781.00	3.68	.00	.01	.00	205.55	50.00
	1550.000	2781.00	3.68	.00	.00	.00	206.38	50.00
	1600.000	2781.00	3.69	.00	.00	.00	212.41	50.00
	1650.000	2781.00	3.69	.00	.00	.00	204.44	50.00
	1700.000	2781.00	3.69	.00	.00	.00	200.37	50.00
	1750.000	2781.00	3.69	.00	.00	.00	202.63	50.00
	1800.000	2781.00	3.70	.00	.01	.00	204.59	50.00
	1850.000	2781.00	3.71	.00	.01	.00	214.24	50.00
	1900.000	2781.00	3.71	.00	.00	.00	225.15	50.00
	1950.000	2781.00	3.72	.00	.01	.00	229.91	50.00
	2000.000	2781.00	3.73	.00	.01	.00	241.52	50.00
	2050.000	2781.00	3.73	.00	.01	.00	249.10	50.00
	2100.000	2781.00	3.74	.00	.01	.00	269.76	50.00
	2150.000	2781.00	3.74	.00	.00	.00	284.27	50.00
	2200.000	2781.00	3.74	.00	.00	.00	238.34	50.00
	2250.000	2781.00	3.74	.00	.00	.00	227.12	50.00
	2300.000	2781.00	3.74	.00	-.01	.00	274.02	50.00
	2350.000	2781.00	3.74	.00	.01	.00	202.18	50.00
	2400.000	2781.00	3.75	.00	.01	.00	190.61	50.00
	2450.000	2781.00	3.76	.00	.01	.00	233.24	50.00
	2500.000	2781.00	3.78	.00	.02	.00	314.13	50.00
	2550.000	2781.00	3.79	.00	.01	.00	282.28	50.00
	2600.000	2781.00	3.79	.00	.00	.00	259.41	50.00
	2650.000	2781.00	3.79	.00	.00	.00	224.11	50.00
	2700.000	2781.00	3.80	.00	.00	.00	218.35	50.00
	2750.000	2781.00	3.80	.00	.01	.00	213.74	50.00
	2800.000	2781.00	3.81	.00	.01	.00	212.21	50.00

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	2850.000	2781.00	3.82	.00	.01	.00	212.71	50.00
	2900.000	2781.00	3.82	.00	.01	.00	212.27	50.00
	2950.000	2781.00	3.83	.00	.01	.00	203.46	50.00
	3000.000	2781.00	3.84	.00	.01	.00	200.56	50.00
	3050.000	2781.00	3.84	.00	.01	.00	172.59	50.00
	3100.000	2781.00	3.88	.00	.04	.00	266.27	50.00
	3150.000	2184.00	3.90	.00	.02	.00	184.98	50.00
*	3200.000	2184.00	3.88	.00	-.02	.00	162.63	50.00
*	3250.000	2184.00	3.80	.00	-.05	.00	95.25	50.00
	3300.000	2184.00	3.85	.00	.04	.00	93.14	50.00
	3350.000	2184.00	3.91	.00	.07	.00	100.02	50.00
	3400.000	2184.00	3.98	.00	.06	.00	95.80	50.00
	3450.000	2184.00	3.99	.00	.01	.00	97.07	50.00
	3500.000	2184.00	4.03	.00	.05	.00	99.50	50.00
	3550.000	2184.00	4.10	.00	.07	.00	100.33	50.00
	3600.000	2184.00	4.12	.00	.01	.00	93.30	50.00
	3650.000	2184.00	4.16	.00	.05	.00	102.85	50.00
	3700.000	2184.00	4.19	.00	.03	.00	96.40	50.00
	3750.000	2184.00	4.21	.00	.02	.00	86.02	50.00
	3800.000	2184.00	4.32	.00	.10	.00	102.54	50.00
	3850.000	2184.00	4.32	.00	.00	.00	88.19	50.00
	3900.000	2184.00	4.30	.00	-.02	.00	88.33	50.00
	3950.000	2184.00	4.45	.00	.15	.00	94.18	50.00
	4000.000	2184.00	4.50	.00	.05	.00	92.13	50.00
	4050.000	2184.00	4.55	.00	.05	.00	94.82	50.00
	4100.000	2184.00	4.57	.00	.02	.00	92.66	50.00
	4150.000	2184.00	4.58	.00	.01	.00	91.26	50.00
	4200.000	1799.00	4.68	.00	.09	.00	86.43	50.00
	4250.000	1799.00	4.70	.00	.02	.00	91.85	50.00
	4300.000	1799.00	4.72	.00	.03	.00	103.14	50.00
*	4350.000	1799.00	4.83	.00	.11	.00	116.25	50.00
	4400.000	1799.00	4.81	.00	-.02	.00	117.08	50.00
	4450.000	1799.00	4.83	.00	.02	.00	96.18	50.00
	4500.000	1799.00	4.88	.00	.05	.00	90.68	50.00
	4550.000	1799.00	4.90	.00	.02	.00	96.44	50.00
	4600.000	1799.00	4.92	.00	.02	.00	98.83	50.00
	4650.000	1799.00	4.94	.00	.02	.00	99.33	50.00
	4700.000	1799.00	4.97	.00	.04	.00	100.27	50.00
	4750.000	1799.00	4.97	.00	.00	.00	103.08	50.00
	4800.000	1799.00	5.02	.00	.04	.00	103.64	50.00

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	4850.000	1799.00	5.02	.00	.01	.00	93.28	50.00
	4900.000	1799.00	5.02	.00	-.01	.00	94.26	50.00
	4950.000	1799.00	5.06	.00	.04	.00	92.64	50.00
	5000.000	1799.00	5.14	.00	.08	.00	87.08	50.00
	5050.000	1799.00	5.19	.00	.05	.00	92.07	50.00
	5100.000	1799.00	5.18	.00	-.01	.00	85.30	50.00
	5150.000	1799.00	5.20	.00	.02	.00	75.76	50.00
	5200.000	1799.00	5.25	.00	.05	.00	97.16	50.00
	5250.000	1799.00	5.28	.00	.04	.00	99.15	50.00
	5300.000	1799.00	5.32	.00	.03	.00	95.61	50.00
	5350.000	1799.00	5.34	.00	.02	.00	100.62	50.00
	5400.000	1799.00	5.34	.00	.00	.00	110.31	50.00
	5450.000	1799.00	5.38	.00	.04	.00	98.54	50.00
	5500.000	1799.00	5.40	.00	.02	.00	89.85	50.00
	5550.000	1799.00	5.43	.00	.03	.00	98.31	50.00
	5600.000	1799.00	5.47	.00	.04	.00	100.83	50.00
	5650.000	1799.00	5.49	.00	.02	.00	105.13	50.00
	5700.000	1799.00	5.48	.00	-.01	.00	104.65	50.00
*	5750.000	1799.00	5.45	.00	-.01	.00	99.41	50.00
*	5800.000	1799.00	5.63	.00	.06	.00	98.71	50.00
	5850.000	1799.00	5.62	.00	-.01	.00	102.32	50.00
	5900.000	1799.00	5.71	.00	.09	.00	104.36	50.00
	5950.000	1799.00	5.71	.00	.00	.00	93.72	50.00
	6000.000	1799.00	5.74	.00	.03	.00	85.69	50.00
	6050.000	1799.00	5.77	.00	.03	.00	92.90	50.00
	6100.000	1799.00	5.78	.00	.01	.00	90.83	50.00
	6110.000	1799.00	5.78	.00	.00	.00	99.56	10.00
	6191.000	1799.00	5.80	.00	.02	.00	99.55	81.00
	6201.000	1799.00	5.80	.00	.00	.00	92.07	10.00
	6250.000	1799.00	5.81	.00	.01	.00	99.64	49.00
	6300.000	1799.00	5.84	.00	.03	.00	95.94	50.00
	6350.000	1799.00	5.83	.00	-.01	.00	97.13	50.00
	6400.000	1799.00	5.89	.00	.06	.00	116.07	50.00
	6450.000	1799.00	5.91	.00	.01	.00	107.16	50.00
	6500.000	1799.00	5.93	.00	.02	.00	114.42	50.00
	6550.000	1799.00	5.94	.00	.01	.00	129.14	50.00
	6600.000	1799.00	5.98	.00	.04	.00	127.00	50.00
	6650.000	1799.00	5.99	.00	.01	.00	135.00	50.00
	6700.000	1799.00	6.00	.00	.01	.00	142.00	50.00
	6750.000	1799.00	6.01	.00	.01	.00	151.71	50.00

SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
6800.000	1799.00	6.02	.00	.01	.00	160.93	50.00
6850.000	1799.00	6.02	.00	.00	.00	154.86	50.00
6900.000	1799.00	6.03	.00	.01	.00	178.73	50.00
6950.000	1799.00	6.05	.00	.01	.00	189.27	50.00

SUMMARY OF ERRORS AND SPECIAL NOTES

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WARNING SECNO=    550.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
CAUTION SECNO=    150.000  PROFILE=  1  INTERPOLATED X-SECTIONS USED
CAUTION SECNO=    100.000  PROFILE=  1  INTERPOLATED X-SECTIONS USED
WARNING SECNO=     18.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
CAUTION SECNO=     50.000  PROFILE=  1  INTERPOLATED X-SECTIONS USED
CAUTION SECNO=    100.000  PROFILE=  1  INTERPOLATED X-SECTIONS USED
WARNING SECNO=    800.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    950.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=   3200.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
CAUTION SECNO=   3250.000  PROFILE=  1  INTERPOLATED X-SECTIONS USED
WARNING SECNO=   4350.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
CAUTION SECNO=   5750.000  PROFILE=  1  INTERPOLATED X-SECTIONS USED
CAUTION SECNO=   5800.000  PROFILE=  1  INTERPOLATED X-SECTIONS USED
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Flood Routing Analysis - Improved Stream Conditions

Appendix F

Kaelepulu Stream Drainage Study

KAELEPULU STREAM DRAINAGE STUDY
IMPROVED CONDITIONS - 1993, 100 YEAR 24 HOUR DESIGN STORM
ENCHANTED LAKE RETENTION BASIN (AREA NO. 4)
IMPROVED CHANNEL "RESERVOIR" ROUTING ANALYSIS

Inflow Hydrograph: c:\pondpack\kaele\BASIN5O4.HYD
Rating Table file: c:\pondpack\kaele\BASIN4CI.PND

----INITIAL CONDITIONS----
Elevation = 1.80 ft
Outflow = 0.00 cfs
Storage = 0.00 ac-ft

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (ac-ft)	2S/t (cfs)	2S/t + 0 (cfs)
1.80	0.0	0.000	0.0	0.0
2.00	90.0	20.000	4840.0	4930.0
2.20	182.0	40.000	9680.0	9862.0
2.40	410.0	60.000	14520.0	14930.0
2.60	610.0	80.000	19360.0	19970.0
2.80	800.0	100.000	24200.0	25000.0
3.00	974.0	120.000	29040.0	30014.0
3.20	1136.0	140.000	33880.0	35016.0
3.40	1292.0	160.000	38720.0	40012.0
3.60	1446.0	180.000	43560.0	45006.0
3.80	1600.0	200.000	48400.0	50000.0
4.00	1748.0	220.000	53240.0	54988.0
4.20	1896.0	240.000	58080.0	59976.0
4.40	2043.0	260.000	62920.0	64963.0
4.60	2186.0	280.000	67760.0	69946.0
4.80	2333.0	300.000	72600.0	74933.0
5.00	2481.0	320.000	77440.0	79921.0
5.20	2631.0	340.000	82280.0	84911.0
5.40	2785.0	360.000	87120.0	89905.0
5.60	2933.0	380.000	91960.0	94893.0
5.80	3085.0	400.000	96800.0	99885.0
6.00	3240.0	420.000	101640.0	104880.0
6.20	3400.0	440.000	106480.0	109880.0
6.40	3560.0	460.000	111320.0	114880.0
6.60	3649.0	480.000	116160.0	119809.0
6.80	3715.0	500.000	121000.0	124715.0
7.00	3780.0	520.000	125840.0	129620.0

Time increment (t) = 0.100 hrs.

POND-2 Version: 5.17 S/N:
EXECUTED: 05-04-1993 14:46:30

Pond File: c:\pondpack\kaele\BASIN4CI.PND
Inflow Hydrograph: c:\pondpack\kaele\BASIN5O4.HYD
Outflow Hydrograph: c:\pondpack\kaele\BASIN4IO.HYD

INFLOW HYDROGRAPH — ROUTING COMPUTATIONS

TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
9.000	334.00	-----	0.0	0.0	0.00	1.80
9.100	377.60	711.6	685.6	711.6	12.99	1.83
9.200	420.36	798.0	1429.4	1483.6	27.08	1.86
9.300	464.28	884.6	2229.6	2314.1	42.24	1.89
9.400	522.37	986.7	3098.8	3216.2	58.71	1.93
9.500	579.70	1102.1	4047.5	4200.9	76.69	1.97
9.600	638.49	1218.2	5073.1	5265.7	96.26	2.01
9.700	721.25	1359.7	6196.8	6432.9	118.03	2.06
9.800	803.79	1525.0	7437.7	7721.9	142.08	2.11
9.900	888.09	1691.9	8792.9	9129.6	168.34	2.17
10.000	1023.05	1911.1	10264.3	10704.0	219.88	2.23
10.100	1290.33	2313.4	11969.3	12577.7	304.17	2.31
10.200	1794.24	3084.6	14224.1	15053.9	414.92	2.40
10.300	2595.24	4389.5	17501.2	18613.5	556.17	2.55
10.400	3624.10	6219.3	22217.2	23720.5	751.67	2.75
10.500	4522.82	8146.9	28393.4	30364.1	985.34	3.01
10.600	4957.10	9479.9	35422.9	37873.4	1225.22	3.31
10.700	5054.36	10011.5	42515.9	45434.4	1459.21	3.62
10.800	4626.32	9680.7	48866.3	52196.6	1665.18	3.89
10.900	4098.93	8725.3	53941.0	57591.5	1825.25	4.10
11.000	3571.22	7670.2	57722.8	61611.2	1944.20	4.27
11.100	3167.65	6738.9	60405.2	64461.6	2028.22	4.38
11.200	2763.51	5931.2	62171.5	66336.4	2082.41	4.46
11.300	2504.94	5268.5	63211.8	67440.0	2114.08	4.50
11.400	2246.65	4751.6	63705.2	67963.4	2129.10	4.52
11.500	2089.03	4335.7	63778.2	68040.9	2131.33	4.52
11.600	1938.63	4027.7	63556.7	67805.9	2124.58	4.51
11.700	1850.64	3789.3	63123.2	67346.0	2111.39	4.50
11.800	1760.75	3611.4	62546.9	66734.6	2093.84	4.47
11.900	1709.35	3470.1	61870.5	66017.0	2073.25	4.44
12.000	1656.13	3365.5	61134.3	65236.0	2050.83	4.41
12.100	1628.59	3284.7	60365.1	64419.1	2026.97	4.38
12.200	1596.79	3225.4	59585.4	63590.5	2002.54	4.34
12.300	1561.44	3158.2	58788.5	62743.7	1977.58	4.31
12.400	1530.13	3091.6	57975.8	61880.1	1952.13	4.28
12.500	1497.36	3027.5	57150.7	61003.3	1926.28	4.24
12.600	1461.55	2958.9	56309.8	60109.6	1899.94	4.21
12.700	1433.45	2895.0	55458.5	59204.8	1873.12	4.17
12.800	1404.61	2838.1	54604.3	58296.6	1846.17	4.13
12.900	1375.16	2779.8	53745.8	57384.0	1819.09	4.10
13.000	1345.28	2720.4	52882.6	56466.3	1791.86	4.06
13.100	1323.97	2669.3	52022.3	55551.8	1764.73	4.02
13.200	1302.28	2626.3	51172.7	54648.6	1737.93	3.99
13.300	1281.30	2583.6	50333.4	53756.3	1711.45	3.95
13.400	1259.06	2540.4	49503.2	52873.8	1685.27	3.92

Pond File: c:\pondpack\kaele\BASIN4CI.PND
Inflow Hydrograph: c:\pondpack\kaele\BASIN504.HYD
Outflow Hydrograph: c:\pondpack\kaele\BASIN4IO.HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
13.500	1236.61	2495.7	48680.3	51998.9	1659.31	3.88
13.600	1213.81	2450.4	47863.6	51130.7	1633.55	3.85
13.700	1191.65	2405.5	47053.1	50269.1	1607.98	3.81
13.800	1168.10	2359.8	46249.1	49412.8	1581.89	3.78
13.900	1145.22	2313.3	45451.0	48562.4	1555.67	3.74
14.000	1122.51	2267.7	44659.5	47718.8	1529.65	3.71
14.100	1095.79	2218.3	43870.3	46877.8	1503.72	3.67
14.200	1068.97	2164.8	43079.6	46035.1	1477.73	3.64
14.300	1042.07	2111.0	42287.3	45190.7	1451.69	3.61
14.400	1015.09	2057.2	41493.2	44344.4	1425.60	3.57
14.500	988.04	2003.1	40697.5	43496.4	1399.45	3.54
14.600	974.19	1962.2	39912.4	42659.7	1373.65	3.51
14.700	959.90	1934.1	39149.4	41846.5	1348.57	3.47
14.800	947.11	1907.0	38408.0	41056.4	1324.20	3.44
14.900	934.20	1881.3	37688.2	40289.3	1300.55	3.41
15.000	923.16	1857.4	36990.7	39545.5	1277.43	3.38
15.100	912.21	1835.4	36316.1	38826.0	1254.97	3.35
15.200	901.41	1813.6	35663.3	38129.7	1233.23	3.32
15.300	889.73	1791.1	35030.1	37454.4	1212.14	3.30
15.400	879.17	1768.9	34415.7	36799.0	1191.67	3.27
15.500	868.71	1747.9	33819.9	36163.5	1171.83	3.25
15.600	862.29	1731.0	33245.5	35550.9	1152.70	3.22
15.700	855.97	1718.3	32695.1	34963.7	1134.31	3.20
15.800	848.73	1704.7	32167.7	34399.8	1116.04	3.18
15.900	842.55	1691.3	31662.0	33859.0	1098.53	3.15
16.000	836.45	1679.0	31177.5	33341.0	1081.75	3.13
16.100	832.35	1668.8	30714.8	32846.3	1065.73	3.11
16.200	828.32	1660.7	30274.5	32375.5	1050.48	3.09
16.300	824.33	1652.7	29855.2	31927.2	1035.96	3.08
16.400	820.34	1644.7	29455.7	31499.9	1022.12	3.06
16.500	815.50	1635.8	29073.7	31091.5	1008.90	3.04
16.600	812.39	1627.9	28709.1	30701.6	996.27	3.03
16.700	809.25	1621.6	28362.2	30330.7	984.26	3.01
16.800	806.07	1615.3	28032.0	29977.5	972.73	3.00
16.900	802.87	1608.9	27718.9	29641.0	961.06	2.99
17.000	799.65	1602.5	27421.5	29321.4	949.96	2.97
17.100	794.42	1594.1	27136.8	29015.5	939.35	2.96
17.200	789.20	1583.6	26862.2	28720.4	929.11	2.95
17.300	783.02	1572.2	26596.1	28434.4	919.19	2.94
17.400	777.87	1560.9	26337.9	28157.0	909.56	2.93
17.500	772.74	1550.6	26088.0	27888.5	900.24	2.92
17.600	767.61	1540.4	25845.9	27628.3	891.21	2.90
17.700	762.49	1530.1	25611.1	27376.0	882.45	2.89
17.800	756.40	1518.9	25382.2	27130.0	873.92	2.88
17.900	751.35	1507.8	25158.7	26889.9	865.59	2.88
18.000	746.30	1497.7	24941.4	26656.4	857.48	2.87

POND-2 Version: 5.17 S/N:
EXECUTED: 05-04-1993 14:46:30

Pond File: c:\pondpack\kaele\BASIN4CI.PND
Inflow Hydrograph: c:\pondpack\kaele\BASIN504.HYD
Outflow Hydrograph: c:\pondpack\kaele\BASIN4IO.HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
18.100	742.23	1488.5	24730.7	26430.0	849.62	2.86
18.200	738.13	1480.4	24527.0	26211.1	842.03	2.85
18.300	734.01	1472.1	24329.8	25999.2	834.67	2.84
18.400	728.98	1463.0	24137.8	25792.8	827.51	2.83
18.500	725.87	1454.9	23951.5	25592.6	820.57	2.82
18.600	722.74	1448.6	23772.3	25400.1	813.88	2.82
18.700	719.61	1442.4	23599.8	25214.7	807.45	2.81
18.800	716.47	1436.1	23433.4	25035.9	801.24	2.80
18.900	713.32	1429.8	23273.5	24863.2	794.83	2.79
19.000	709.17	1422.5	23119.0	24696.0	788.52	2.79
19.100	706.00	1415.2	22969.3	24534.1	782.40	2.78
19.200	702.83	1408.8	22825.1	24378.2	776.51	2.78
19.300	699.65	1402.5	22686.0	24227.6	770.82	2.77
19.400	696.46	1396.1	22551.4	24082.1	765.33	2.76
19.500	693.26	1389.7	22421.1	23941.1	760.00	2.76
19.600	690.06	1383.3	22294.8	23804.5	754.84	2.75
19.700	685.85	1375.9	22171.1	23670.7	749.79	2.75
19.800	682.63	1368.5	22049.9	23539.6	744.84	2.74
19.900	679.40	1362.0	21931.9	23411.9	740.01	2.74
20.000	676.17	1355.6	21816.9	23287.5	735.31	2.73
20.100	671.93	1348.1	21703.6	23165.0	730.68	2.73
20.200	667.68	1339.6	21591.0	23043.2	726.09	2.72
20.300	662.42	1330.1	21478.2	22921.1	721.47	2.72
20.400	658.16	1320.6	21365.1	22798.8	716.85	2.71
20.500	653.89	1312.1	21252.6	22677.1	712.26	2.71
20.600	649.62	1303.5	21140.7	22556.1	707.69	2.70
20.700	645.34	1295.0	21029.4	22435.7	703.14	2.70
20.800	641.05	1286.4	20918.6	22315.8	698.61	2.69
20.900	635.75	1276.8	20807.3	22195.4	694.06	2.69
21.000	631.45	1267.2	20695.5	22074.5	689.49	2.68
21.100	627.14	1258.6	20584.2	21954.1	684.95	2.68
21.200	622.83	1250.0	20473.3	21834.2	680.42	2.67
21.300	618.51	1241.3	20362.9	21714.7	675.90	2.67
21.400	614.19	1232.7	20252.8	21595.6	671.40	2.66
21.500	608.86	1223.1	20142.0	21475.8	666.88	2.66
21.600	604.52	1213.4	20030.8	21355.4	662.33	2.66
21.700	600.18	1204.7	19919.9	21235.5	657.80	2.65
21.800	595.83	1196.0	19809.3	21115.9	653.28	2.65
21.900	591.47	1187.3	19699.0	20996.6	648.78	2.64
22.000	587.11	1178.6	19589.1	20877.6	644.28	2.64
22.100	581.75	1168.9	19478.4	20757.9	639.76	2.63
22.200	577.37	1159.1	19367.1	20637.5	635.21	2.63
22.300	573.00	1150.4	19256.1	20517.5	630.68	2.62
22.400	568.60	1141.6	19145.4	20397.7	626.16	2.62
22.500	564.20	1132.8	19034.9	20278.2	621.64	2.61
22.600	558.80	1123.0	18923.7	20157.9	617.10	2.61

Pond File: c:\pondpack\kaele\BASIN4CI.PND
Inflow Hydrograph: c:\pondpack\kaele\BASIN504.HYD
Outflow Hydrograph: c:\pondpack\kaele\BASIN4IO.HYD

INFLOW HYDROGRAPH / ROUTING COMPUTATIONS

TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
22.700	554.38	1113.2	18811.8	20036.9	612.53	2.60
22.800	549.96	1104.3	18700.4	19916.2	607.86	2.60
22.900	545.54	1095.5	18589.8	19795.9	603.09	2.59
23.000	541.11	1086.7	18479.7	19676.4	598.35	2.59
23.100	536.68	1077.8	18370.2	19557.5	593.63	2.58
23.200	531.24	1067.9	18260.4	19438.2	588.90	2.58
23.300	526.79	1058.0	18150.1	19318.4	584.14	2.57
23.400	522.34	1049.1	18040.4	19199.2	579.41	2.57
23.500	517.89	1040.2	17931.2	19080.6	574.71	2.56
23.600	513.42	1031.3	17822.5	18962.5	570.02	2.56
23.700	508.96	1022.4	17714.2	18844.9	565.35	2.56
23.800	503.48	1012.4	17605.3	18726.6	560.66	2.55
23.900	499.00	1002.5	17495.9	18607.8	555.94	2.55
24.000	0.00	499.0	16931.6	17994.9	531.62	2.52

****************** SUMMARY OF ROUTING COMPUTATIONS ******************

```
Pond File:          c:\pondpack\kaele\BASIN4CI.PND
Inflow Hydrograph:  c:\pondpack\kaele\BASIN504.HYD
Outflow Hydrograph: c:\pondpack\kaele\BASIN4IO.HYD

Starting Pond W.S. Elevation =      1.80 ft

        ***** Summary of Peak Outflow and Peak Elevation *****

                      Peak Inflow    =  5054.36 cfs
                      Peak Outflow   =  2131.33 cfs
                      Peak Elevation =     4.52 ft

          ***** Summary of Approximate Peak Storage *****

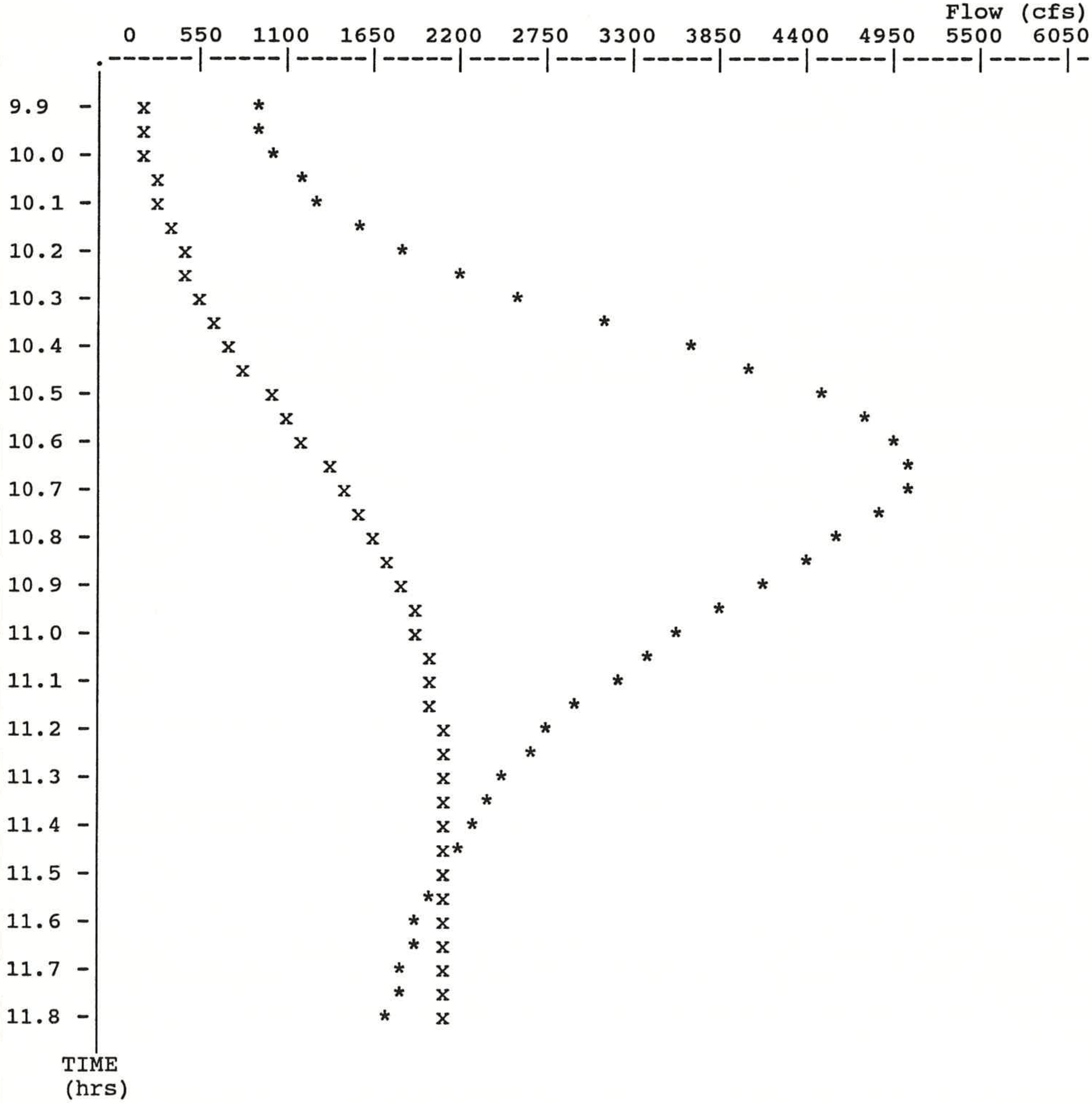
               Initial Storage             =     0.00 ac-ft
               Peak Storage From Storm     =   272.35 ac-ft
                                             ---------------
               Total Storage in Pond       =   272.35 ac-ft

       Warning: Inflow hydrograph truncated on left side.
```

Pond File: c:\pondpack\kaele\BASIN4CI.PND
Inflow Hydrograph: c:\pondpack\kaele\BASIN504.HYD
Outflow Hydrograph: c:\pondpack\kaele\BASIN4IO.HYD

EXECUTED: 05-04-1993
14:46:30

Peak Inflow = 5054.36 cfs
Peak Outflow = 2131.33 cfs
Peak Elevation = 4.52 ft



* File: c:\pondpack\kaele\BASIN504.HYD Qmax = 5054.4 cfs
x File: c:\pondpack\kaele\BASIN4IO.HYD Qmax = 2131.3 cfs

THIS RUN EXECUTED 22APR93 10:15:34

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

T1 KAELEPULU STREAM IMPROVED CHANNEL FILE: KKDIMP2.DAT
T2 STREAM HYDRAULICS, NOT OBSTRUCTED DATE: 3/31/93
T3 SUBCRITICAL FLOW (STA. -800 TO STA. 69+50)

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	-10				0		.1	3702	1.76	

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

J3 VARIABLE CODES FOR SUMMARY PRINTOUT

120

J5	LPRNT	NUMSEC	********REQUESTED SECTION NUMBERS********
	-10	-10	

THIS RUN EXECUTED 22APR93 10:16:16

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

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

SUBCRITICAL FLOW (STA

SUMMARY PRINTOUT TABLE 120

	SECNO	CWSEL	EG	VCH	10*KS	DEPTH	TOPWID	CLSTA	BW	STCHL	XLBEL	STCHR	RBEL
	800.000	1.76	1.91	3.09	3.22	7.76	179.00	0.00	0.01	0.00	-4.60	179.00	-6.00
	750.000	1.79	1.93	2.98	3.39	7.79	203.50	0.00	0.01	0.00	-4.30	203.50	-6.00
	700.000	1.81	1.94	2.95	3.71	5.81	226.50	0.00	0.01	0.00	-2.53	226.50	-4.00
	650.000	1.87	1.96	2.50	2.57	7.37	263.00	0.00	0.01	0.00	0.00	263.00	-5.50
	600.000	1.91	1.98	2.01	1.64	5.91	328.42	0.00	0.01	0.00	4.00	340.00	-4.00
*	550.000	1.89	2.00	2.72	3.58	5.89	273.31	0.00	0.01	36.00	5.00	324.00	1.00
*	500.000	1.81	2.07	4.07	7.23	5.81	164.79	0.00	0.01	59.50	5.00	253.00	5.40
	450.000	1.83	2.12	4.34	8.02	5.83	151.85	0.00	0.01	47.50	9.00	246.50	10.60
	400.000	1.87	2.16	4.34	7.95	5.87	150.60	0.00	0.01	58.00	7.00	241.50	10.00
	350.000	1.91	2.20	4.32	7.82	5.91	150.17	0.00	0.01	48.50	5.00	214.00	9.19
	300.000	1.99	2.24	4.02	6.73	5.99	162.80	0.00	0.01	30.00	3.10	198.00	5.00
	250.000	1.96	2.31	4.69	9.41	5.96	142.53	0.00	0.01	46.50	3.20	210.50	9.03
	200.000	2.08	2.35	4.17	7.05	6.08	150.60	0.00	0.01	37.50	3.50	205.00	9.00
*	150.000	1.93	2.53	6.17	24.54	5.93	148.87	0.00	0.01	24.00	3.95	203.70	11.40
*	100.000	2.41	2.61	3.64	4.96	6.41	163.23	0.00	0.01	32.00	3.90	198.00	5.00
	50.000	2.42	2.65	3.86	5.93	6.42	162.67	0.00	0.01	6.20	4.60	176.76	5.00
	36.000	2.38	2.69	4.40	8.97	6.38	162.74	0.00	0.01	0.00	4.70	182.52	8.30

	SECNO	CWSEL	EG	VCH	10*KS	DEPTH	TOPWID	CLSTA	BW	STCHL	XLBEL	STCHR	RBEL
	26.000	2.75	2.95	3.56	4.69	6.75	166.22	0.00	0.01	0.00	6.00	182.52	6.00
	8.000	2.94	3.11	3.27	3.67	6.94	169.71	0.00	0.01	0.00	6.00	178.97	6.00
	18.000	2.91	3.13	3.82	5.90	6.91	169.29	0.00	0.01	0.00	4.60	178.09	4.50
*	50.000	2.87	3.20	4.62	7.77	7.47	127.19	123.00	90.00	54.03	4.16	199.81	11.31
*	100.000	3.14	3.24	2.58	1.82	8.59	194.74	141.00	148.00	46.82	1.64	233.88	3.99
	150.000	3.16	3.25	2.45	1.66	9.46	205.70	121.00	125.00	34.46	2.80	239.31	4.86
	200.000	3.19	3.26	2.14	1.25	10.34	224.91	121.00	130.00	0.00	3.82	244.24	4.50
	250.000	3.21	3.26	1.95	0.84	11.21	216.09	118.00	130.00	30.98	3.01	244.21	4.24
	300.000	3.21	3.27	1.91	0.79	11.21	214.84	118.00	134.00	29.14	2.93	242.21	3.44
	350.000	3.22	3.27	1.89	0.78	11.22	218.15	119.00	135.00	28.88	2.47	244.07	3.51
	400.000	3.22	3.28	1.93	0.81	11.22	210.52	119.00	132.00	27.60	4.70	242.24	3.45
	450.000	3.23	3.28	1.88	0.77	11.23	214.54	123.00	136.00	29.37	4.81	254.29	4.66
	500.000	3.23	3.29	1.81	0.64	11.23	204.91	141.00	160.00	35.12	4.94	247.97	5.48
	550.000	3.24	3.29	1.80	0.64	11.24	204.94	148.00	160.00	44.17	3.91	255.37	5.69
	600.000	3.24	3.29	1.80	0.64	11.24	204.95	153.00	160.00	49.33	3.84	260.53	5.77
	650.000	3.24	3.30	1.80	0.63	11.24	205.19	151.00	160.00	37.49	5.75	262.07	5.99
	700.000	3.25	3.30	1.80	0.64	11.44	206.19	148.00	160.00	45.25	3.38	262.07	7.17
	750.000	3.25	3.30	1.78	0.62	11.25	214.05	146.00	162.00	42.98	3.01	255.43	6.04
	800.000	3.26	3.30	1.77	0.61	11.26	207.01	149.00	162.00	42.42	3.98	256.36	5.18
	850.000	3.26	3.31	1.75	0.60	11.26	211.42	149.00	162.00	44.52	3.74	257.84	4.69
	900.000	3.27	3.31	1.67	0.54	11.27	223.85	148.00	174.00	34.13	3.66	258.97	3.83
	950.000	3.27	3.31	1.64	0.53	11.27	224.45	147.00	174.00	32.80	4.21	259.53	4.38
	1000.000	3.27	3.32	1.68	0.55	11.27	219.17	148.00	170.00	35.77	3.77	259.12	4.77
	1050.000	3.28	3.32	1.69	0.54	12.62	215.11	150.00	170.00	39.25	4.17	260.15	4.57
	1100.000	3.28	3.32	1.66	0.52	13.11	227.62	149.00	170.00	41.11	2.30	260.85	5.43
	1150.000	3.28	3.33	1.63	0.49	12.59	219.14	145.00	174.00	32.87	4.56	259.15	5.17

SECNO	CWSEL	EG	VCH	10*KS	DEPTH	TOPWID	CLSTA	BW	STCHL	XLBEL	STCHR	RBEL
1200.000	3.28	3.33	1.70	0.55	12.00	215.14	143.00	170.00	32.26	4.87	252.97	4.48
1250.000	3.29	3.33	1.70	0.55	11.71	213.27	144.00	170.00	33.67	4.67	249.70	2.35
1300.000	3.29	3.33	1.69	0.54	11.29	214.58	153.00	172.00	41.45	4.77	259.00	2.00
1350.000	3.29	3.34	1.71	0.57	11.29	213.40	157.00	169.00	47.46	4.52	263.32	2.91
1400.000	3.30	3.34	1.69	0.54	12.23	212.34	163.00	170.00	52.59	4.71	267.75	1.88
1450.000	3.30	3.34	1.69	0.54	12.23	213.75	166.00	170.00	55.06	4.97	272.16	2.58
1500.000	3.30	3.35	1.68	0.54	12.17	212.62	166.00	166.00	55.54	5.73	271.16	3.08
1550.000	3.30	3.35	1.69	0.55	12.53	211.56	166.00	163.00	59.14	4.68	275.39	4.79
1600.000	3.31	3.35	1.69	0.54	12.58	211.60	163.00	163.00	58.06	2.72	269.90	4.49
1650.000	3.31	3.35	1.70	0.55	11.88	211.08	158.00	164.00	48.57	5.71	263.49	2.41
1700.000	3.31	3.36	1.73	0.57	11.77	207.08	154.00	160.00	49.75	4.13	261.83	4.51
1750.000	3.32	3.36	1.72	0.57	11.91	209.26	163.00	164.00	46.33	6.29	268.98	3.99
1800.000	3.31	3.37	1.80	0.62	11.72	204.78	163.00	153.00	62.55	3.98	260.90	2.70
1850.000	3.33	3.37	1.61	0.48	12.20	219.00	162.00	171.00	52.43	4.04	274.11	4.37
1900.000	3.33	3.37	1.56	0.46	12.04	227.03	162.00	180.00	44.81	5.59	281.38	5.36
1950.000	3.34	3.37	1.56	0.46	11.51	228.40	162.00	182.00	46.59	4.21	274.94	2.97
2000.000	3.35	3.38	1.43	0.38	11.55	244.38	155.00	199.00	29.31	5.10	280.33	4.91
2050.000	3.35	3.38	1.38	0.35	11.65	254.77	160.00	207.00	31.84	4.33	290.38	5.41
2100.000	3.35	3.38	1.34	0.34	11.35	265.67	170.00	207.00	30.45	3.45	299.73	5.12
2150.000	3.36	3.38	1.30	0.32	11.36	285.71	156.00	214.00	9.34	3.16	288.48	4.74
2200.000	3.35	3.39	1.40	0.36	11.35	239.71	110.00	214.00	0.00	-6.50	243.67	5.33
2250.000	3.35	3.39	1.48	0.40	11.35	228.21	101.00	205.50	0.00	-1.96	231.95	5.23
2300.000	3.34	3.40	1.83	0.65	11.34	227.62	197.00	152.00	97.55	3.72	299.46	5.23
2350.000	3.35	3.40	1.86	0.67	11.35	199.15	130.00	149.00	34.53	2.49	230.86	5.18
2400.000	3.35	3.40	1.90	0.73	11.35	195.80	160.00	142.00	64.98	4.01	263.90	4.57
2450.000	3.36	3.41	1.85	0.72	11.36	220.39	234.00	147.00	136.66	3.92	349.65	3.20

	SECNO	CWSEL	EG	VCH	10*KS	DEPTH	TOPWID	CLSTA	BW	STCHL	XLBEL	STCHR	RBEL
	2500.000	3.37	3.41	1.64	0.52	11.37	299.11	186.00	164.00	80.73	3.64	297.26	3.02
	2550.000	3.38	3.42	1.52	0.48	11.38	282.28	152.00	166.00	9.26	1.09	261.98	2.68
	2600.000	3.38	3.42	1.71	0.61	11.38	251.75	127.00	158.00	25.65	3.17	249.76	3.24
	2650.000	3.38	3.42	1.73	0.61	11.38	218.30	119.00	160.00	11.38	5.81	236.51	3.51
	2700.000	3.38	3.43	1.75	0.59	11.38	207.18	112.00	157.00	5.26	6.12	218.05	3.53
	2750.000	3.38	3.43	1.86	0.67	11.38	208.36	113.00	147.00	13.38	5.06	211.20	2.42
	2800.000	3.38	3.44	2.00	0.87	11.38	210.97	116.00	130.00	15.66	4.82	215.14	3.02
	2850.000	3.39	3.44	1.88	0.70	11.39	214.67	108.00	144.00	9.20	5.40	207.51	3.06
	2900.000	3.39	3.45	1.86	0.71	11.39	214.76	102.00	143.00	3.72	5.39	209.23	2.25
	2950.000	3.40	3.45	1.89	0.71	11.40	213.21	100.00	143.00	0.97	5.77	201.94	2.09
	3000.000	3.40	3.46	1.99	0.79	11.40	207.36	99.00	133.00	5.35	5.57	195.06	2.39
	3050.000	3.40	3.46	1.90	0.64	11.40	179.31	104.00	154.00	0.00	5.50	183.52	-6.74
	3100.000	3.43	3.47	1.50	0.42	11.43	269.20	117.00	184.00	0.00	4.50	235.66	2.18
	3150.000	3.44	3.47	1.29	0.30	11.44	190.79	123.00	167.92	4.84	5.08	198.92	-2.92
	3200.000	3.44	3.47	1.49	0.43	11.44	166.68	125.00	143.79	6.37	5.32	176.79	1.18
*	3250.000	3.37	3.51	3.01	2.43	11.37	109.54	59.00	40.00	0.00	5.00	124.51	6.84
	3300.000	3.37	3.53	3.12	2.66	11.37	107.22	60.00	39.00	0.00	5.50	124.80	7.10
	3350.000	3.40	3.54	3.02	2.49	11.40	111.23	59.00	40.00	0.00	5.00	128.02	7.38
	3400.000	3.40	3.56	3.14	2.72	11.40	107.39	63.00	39.00	2.01	5.83	130.80	7.23
	3450.000	3.41	3.57	3.19	2.83	11.41	106.45	63.00	38.00	2.30	5.90	131.30	7.30
	3500.000	3.42	3.59	3.37	3.29	11.42	103.93	63.00	32.00	5.68	5.77	121.27	5.16
	3550.000	3.48	3.61	2.86	2.15	11.48	114.90	66.00	46.00	0.07	6.31	137.14	6.81
	3600.000	3.48	3.63	3.17	2.78	11.48	106.90	64.00	38.00	0.23	6.92	137.96	6.71
	3650.000	3.49	3.65	3.17	2.78	11.49	106.89	64.00	38.00	0.21	6.93	119.49	4.16
	3700.000	3.50	3.66	3.17	2.77	11.50	106.98	64.00	38.00	0.20	6.93	121.38	4.79
	3750.000	3.52	3.67	3.16	2.76	11.52	107.07	67.00	38.00	2.40	7.20	125.47	5.16

	SECNO	CWSEL	EG	VCH	10*KS	DEPTH	TOPWID	CLSTA	BW	STCHL	XLBEL	STCHR	RBEL
	3800.000	3.54	3.69	3.07	2.61	11.54	110.19	68.00	38.00	7.15	5.95	126.57	4.80
	3850.000	3.53	3.71	3.38	3.35	11.53	105.34	62.00	31.00	0.75	7.25	122.27	5.21
	3900.000	3.52	3.75	3.82	4.35	11.52	95.59	59.00	24.00	3.24	6.59	107.70	4.10
	3950.000	3.59	3.77	3.41	3.32	11.59	101.53	67.00	32.00	3.21	7.24	124.26	5.75
	4000.000	3.57	3.80	3.85	4.47	11.57	93.48	61.00	24.00	5.95	6.35	114.13	5.71
	4050.000	3.64	3.83	3.49	3.52	11.64	99.82	62.00	30.00	2.51	6.83	116.17	5.06
	4100.000	3.65	3.85	3.55	3.66	11.65	98.64	61.00	28.00	1.69	7.10	117.10	6.03
	4150.000	3.67	3.87	3.59	3.78	11.67	97.95	63.00	28.00	4.98	6.67	119.70	6.23
	4200.000	3.70	3.89	3.45	3.80	11.70	87.31	71.00	17.00	23.92	4.86	122.17	6.22
	4250.000	3.72	3.91	3.46	3.81	11.72	88.63	73.00	17.00	24.77	5.24	123.44	5.98
	4300.000	3.78	3.93	3.11	2.94	11.78	102.26	72.00	18.00	22.52	5.49	125.27	5.46
*	4350.000	3.86	3.94	2.31	1.39	11.86	112.51	65.00	40.00	5.44	5.19	126.19	5.04
	4400.000	3.86	3.95	2.50	1.69	11.86	112.34	71.00	36.00	14.24	4.92	128.40	5.13
	4450.000	3.86	3.97	2.66	1.96	11.86	103.66	72.00	32.00	15.43	5.52	132.32	6.77
	4500.000	3.86	3.98	2.77	2.18	11.86	99.59	63.00	26.00	9.70	5.43	116.90	5.63
	4550.000	3.87	4.00	2.88	2.34	11.87	101.43	61.00	26.00	8.00	5.33	108.07	3.36
	4600.000	3.88	4.01	2.88	2.38	11.88	97.68	59.00	26.00	5.23	5.59	115.39	6.04
	4650.000	3.89	4.02	2.88	2.39	11.89	97.31	57.00	26.00	3.78	5.41	107.05	4.35
	4700.000	3.91	4.03	2.81	2.21	11.91	97.39	55.00	26.00	1.52	5.49	105.11	4.37
	4750.000	3.92	4.04	2.80	2.24	11.92	99.49	57.00	28.00	4.01	5.00	112.87	5.96
	4800.000	3.91	4.06	3.09	2.88	11.91	93.76	54.00	20.00	6.07	4.64	108.34	5.18
	4850.000	3.96	4.08	2.77	2.17	11.96	99.75	54.00	28.00	0.00	5.33	107.27	5.09
	4900.000	3.95	4.10	3.06	2.78	11.95	93.75	58.00	22.00	4.38	6.21	109.49	5.50
	4950.000	3.98	4.11	2.97	2.58	11.98	95.86	59.00	24.00	3.15	6.62	111.19	5.40
	5000.000	3.98	4.13	3.19	3.06	11.98	89.86	58.00	18.00	6.21	6.26	107.95	5.65
	5050.000	4.03	4.15	2.81	2.26	12.03	98.16	63.00	26.00	8.75	5.75	117.88	5.96

SECNO	CWSEL	EG	VCH	10*KS	DEPTH	TOPWID	CLSTA	BW	STCHL	XLBEL	STCHR	RBEL
5100.000	4.02	4.17	3.05	2.76	12.02	94.16	63.00	22.00	8.05	6.65	114.74	5.58
5150.000	4.04	4.18	3.05	2.76	12.04	94.19	66.00	22.00	12.29	6.24	116.48	5.16
5200.000	4.06	4.20	2.98	2.77	12.06	100.16	67.00	22.00	13.40	6.20	127.19	6.29
5250.000	4.09	4.21	2.77	2.16	12.09	99.55	68.00	27.00	12.59	5.97	124.47	6.32
5300.000	4.10	4.22	2.83	2.28	12.10	98.55	70.00	26.00	15.29	5.90	125.70	6.23
5350.000	4.11	4.23	2.82	2.27	12.11	98.63	68.00	26.00	14.52	5.49	123.03	6.01
5400.000	4.10	4.26	3.12	2.93	12.10	92.67	66.00	20.00	17.91	4.70	116.35	5.45
5450.000	4.12	4.27	3.08	2.81	12.12	92.69	64.00	20.00	13.53	5.49	111.90	4.63
5500.000	4.14	4.28	3.09	2.71	12.14	95.98	63.00	20.00	0.00	9.67	105.96	2.99
5550.000	4.17	4.30	2.84	2.31	12.17	98.04	59.00	25.00	0.00	7.50	110.18	4.89
5600.000	4.19	4.31	2.79	2.21	12.19	99.09	54.00	26.00	0.00	5.67	104.79	4.60
5650.000	4.21	4.32	2.71	2.01	12.21	99.43	51.00	26.00	0.00	4.67	100.74	4.19
5700.000	4.21	4.33	2.79	2.15	12.21	96.62	47.00	26.00	0.00	3.33	97.98	4.66
5750.000	4.25	4.35	2.53	1.70	12.25	103.74	51.00	32.00	0.00	3.67	106.88	5.29
5800.000	4.25	4.36	2.71	2.05	12.25	100.84	54.00	26.00	0.00	5.67	107.37	5.18
5850.000	4.24	4.38	2.95	2.53	12.24	96.57	54.00	22.00	0.00	6.33	103.45	4.82
5900.000	4.27	4.39	2.75	2.12	12.27	99.64	58.00	26.00	0.35	6.88	111.95	5.65
5950.000	4.27	4.41	3.05	2.76	12.27	93.64	57.00	20.00	2.08	6.93	110.93	6.64
6000.000	4.31	4.43	2.77	2.05	12.31	93.92	44.00	26.00	0.00	2.33	95.00	4.67
6050.000	4.32	4.44	2.79	2.11	12.32	93.92	52.00	24.00	0.00	5.33	97.00	3.00
6100.000	4.32	4.45	2.81	2.24	12.32	97.89	61.00	24.00	0.00	8.33	111.00	4.67
6110.000	4.34	4.45	2.73	2.06	12.34	98.27	61.00	24.00	0.00	8.33	117.00	6.67
6191.000	4.35	4.46	2.72	2.05	12.35	98.32	61.00	24.00	0.00	8.33	117.00	6.67
6201.000	4.34	4.46	2.78	2.15	12.34	95.94	52.00	20.00	0.00	6.00	96.00	3.33
6250.000	4.39	4.48	2.34	1.50	12.39	114.92	44.00	26.00	0.00	2.33	124.00	7.70
6300.000	4.40	4.49	2.41	1.51	12.40	108.17	61.00	34.00	0.00	6.67	115.00	4.33

Run Date: 22APR93 Run Time: 10:15:34 HMVersion: 6.51 Data File: C:\KKD\HEC2\KKDIMP2.DAT Page 11

SECNO	CWSEL	EG	VCH	10*KS	DEPTH	TOPWID	CLSTA	BW	STCHL	XLBEL	STCHR	RBEL
6350.000	4.40	4.49	2.48	1.63	12.40	106.37	77.00	32.00	14.86	7.38	137.13	6.71
6400.000	4.42	4.50	2.28	1.32	12.42	112.54	75.00	38.00	9.86	7.38	140.81	6.63
6450.000	4.44	4.51	2.16	1.16	12.44	116.58	72.00	42.00	3.46	7.85	137.72	6.91
6500.000	4.45	4.52	2.00	0.96	12.45	122.68	77.00	48.00	9.99	6.34	144.67	6.56
6550.000	4.46	4.52	2.00	0.94	12.46	124.86	65.00	48.00	5.85	3.72	135.67	7.56
6600.000	4.48	4.53	1.80	0.75	12.48	127.00	59.00	48.00	0.00	3.67	127.00	6.67
6650.000	4.49	4.53	1.71	0.69	12.49	135.00	60.00	48.00	0.00	4.00	135.00	4.70
6700.000	4.50	4.54	1.40	0.38	12.50	142.00	71.00	86.00	0.00	1.33	142.00	1.33
6750.000	4.51	4.54	1.38	0.38	12.51	151.51	71.00	86.00	0.00	1.33	152.50	4.83
6800.000	4.51	4.54	1.30	0.34	12.51	164.00	75.00	86.00	0.00	2.67	164.00	6.00
6850.000	4.51	4.54	1.38	0.38	12.51	154.54	74.00	86.00	0.00	2.33	162.60	7.20
6900.000	4.52	4.54	1.32	0.38	12.52	174.87	82.00	86.00	0.00	5.00	179.81	6.85
6950.000	4.52	4.55	1.31	0.35	12.52	185.49	91.00	86.00	16.96	2.35	192.36	7.26

SUMMARY OF ERRORS AND SPECIAL NOTES

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WARNING SECNO=    550.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
CAUTION SECNO=    500.000  PROFILE=  1  INTERPOLATED X-SECTIONS USED
CAUTION SECNO=    150.000  PROFILE=  1  INTERPOLATED X-SECTIONS USED
CAUTION SECNO=    100.000  PROFILE=  1  INTERPOLATED X-SECTIONS USED
CAUTION SECNO=     50.000  PROFILE=  1  INTERPOLATED X-SECTIONS USED
CAUTION SECNO=    100.000  PROFILE=  1  INTERPOLATED X-SECTIONS USED
CAUTION SECNO=   3250.000  PROFILE=  1  INTERPOLATED X-SECTIONS USED
WARNING SECNO=   4350.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
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T1      KAELEPULU STREAM IMPROVED CHANNEL       FILE:  KKDIMP2.DAT
T2      STREAM  HYDRAULICS, NOT OBSTRUCTED        DATE: 3/31/93
T3      SUBCRITICAL FLOW    (STA. -800 TO STA. 69+50)
J1     -10                                0              .1    3702    1.76
J2      -1              -1                               -1
J3     120
J5     -10     -10

NC     .04     .04     .03     0.1     0.3
X1     800       6       0     179
GR    -4.6       0    -4.8      40    -4.9     108      -5     147      -5     152
GR      -6     179

X1     750       7       0   203.5      50      50      50
GR    -4.3       0      -4      31    -3.8    54.5      -4    81.5    -4.1   131.5
GR      -5     181      -6   203.5

X1     700       4       0   226.5      50      50      50
GR   -2.53       0   -2.54      31      -4    51.2      -4   226.5

X1     650       5       0     263      50      50      50
GR       0       0     -.5    30.5      -4      63      -5   251.5    -5.5     263

X1     600       3       0     340      50      50      50
GR       4       0      -4    44.5      -4     340

X1     550       6      36     324      50      50      50
GR      11       0      10      19       5      36      -4    78.5      -4     257
GR       1     324

X1     500      10    59.5     253      50      50      50
GR      13       0      12      16      11    31.5      10    46.7       5    59.5
GR      -4    62.5      -4   210.5       5   233.5     5.4     253     5.1     277

X1     450      13    47.5   246.5      50      50      50
GR      13       0      12      12      11      24      10      36       9    47.5
GR     8.2      56       5    64.5      -4    72.5      -4     214       5     222
GR    10.6   246.5      11     256    11.9     299

X1     400      15      58   241.5      50      50      50
GR    11.5       0      11       7      10      20       9      33       8      45
GR       7      58     6.9      60       5      65      -4    70.5      -4     211
GR       5     221      10   241.5      11     253      12   270.5      13     289

X1     350      11    48.5     214      50      50      50
GR       8       0       7    23.5       6      37       5    48.5      -4      55
GR      -4     195       5     204    9.19     214      10     236      11   252.5
GR      12   268.5

X1     300       9      30     198      50      50      50
GR    2.19       0     2.6      18     3.1      30      -4      44      -4     189
GR       5     198    8.52     209       9     219      10     257

X1     250       9    46.5   210.5      50      50      50
GR       4       0       4    25.5     3.2    46.5     1.8      50      -4      62
GR      -4   184.5       5     196    9.03   210.5    8.08     254

X1     200      10    37.5     205      50      50      50
GR    3.63       0     4.6       6     3.9      23     3.5    37.5      -4      41
GR      -4     182       5     192       9     205    7.33     228    7.49     266
X1     150      16      24   203.7      50      50      50
GR    4.57       0     4.7       2    5.39    4.01       5    10.5    3.95      24
GR     1.9      29       1      45      -4    62.5      -4     139       1     159
GR     1.9   177.7       5   185.5      10   199.5    11.4   203.7      10     211
GR    7.46     223

X1     100      11      32     198      50      50      50
GR       5       0    4.53    18.5       5      22     3.9      32      -4    37.5
GR      -4     192       5     198      10   210.5   11.98     215      10     227
GR    7.46     236

X1      50       9       7   199.5   145.5      98      63    .886
GR       5       0     4.6       7      -4      12      -4   164.5    1.44     189
```

GR	5	199.5	8.82	209.5	9.54	221.5	8.15	232.5		

X1	36	6	0	206	14	14	14	.886		
X3	10									
GR	4.7	0	1.5	4	-4	59	-4	166	1.6	184
GR	8.3	206								

NC	.04	.04	.03	.1	.3					
SB	1.05	1.56	2.6	0	180	68	1220	1	0	0
X1	26	6	0	206	10	10	10	.886		
X2			1	6	8	0	0	0	.886	
X3	10									
BT	-39	0	8	5	0	8	6	21	8	6
BT		21	8	-8	23.5	8	-8	23.5	8	6
BT		48	8	6	48	8	-8	51	8	-8
BT		51	8	6	53	8	6	53	8	-8
BT		57	8	-8	57	8	5	80	8	5
BT		80	8	-8	84	8	-8	84	8	5
BT		106	8	5	106	8	-8	110	8	-8
BT		110	8	5	133	8	5	133	8	-8
BT		137	8	-8	137	8	5	160	8	5
BT		160	8	-8	164	8	-8	164	8	5
BT		167	8	6	167	8	-8	169	8	-8
BT		169	8	6	180	8	6	180	8	-8
BT		183	8	-8	183	8	6	206	8	6
GR	6	0	1.5	4	-4	21	-4	183	1.6	185
GR	6	206								

SB	1.05	1.56	2.6	0	180	68	1220	1	0	0
X1	08	7	0	202	34	34	34	.886		
X2			1	6	8	0	0	0	.886	
X3	10									
BT	-39	0	8	5	0	8	6	21	8	6
BT		21	8	-8	23	8	-8	23	8	6
BT		35	8	6	35	8	-8	38	8	-8
BT		38	8	6	41	8	6	41	8	-8
BT		45	8	-8	45	8	5	67	8	5
BT		67	8	-8	71	8	-8	71	8	5
BT		93	8	5	93	8	-8	97	8	-8
BT		97	8	5	120	8	5	120	8	-8
BT		124	8	-8	124	8	5	146	8	5
BT		146	8	-8	150	8	-8	150	8	5
BT		153	8	6	153	8	-8	155	8	-8
BT		155	8	6	179	8	6	179	8	-8
BT		182	8	-8	182	8	6	206	8	6
GR	6	0	-0.4	5	-4	21	-4	191	3.1	194
GR	3.1	199	6	202						

NC	0.04	0.04	0.03	0.1	0.3					
X1	18	8	0	201	10	10	10	.886		
GR	4.6	0	-0.4	5	-4	40	-4	148	2.2	191
GR	3.4	194	3.4	198	4.5	201				

X1	50	42	54.03	171.33	50	50	50			
CI	123	-4.6	0	2	2	90				
GR	3.63	0.00	3.4	5	3.53	15.66	3.98	27.28	4.07	44.95
GR	4.16	54.03	1.29	57.84	-0.26	72.15	0.41	92.4	0.37	98.92
GR	0.29	112.30	1.59	119.94	0.28	120.17	-0.11	124.24	-1.25	138.17
GR	-1.35	141.43	-0.4	143.47	-1.34	155.33	-1.42	157.73	-1.48	158.38
GR	-1.42	160.85	6.18	171.33	10.87	172.3	10.07	172.85	10.5	173.65
GR	11.54	175.07	11.4	199.7	8.67	202.95	4.1	206.4	6.64	213.9
GR	5.18	219.55	6.4	223.45	8.85	227.25	8.93	230.02	8.11	231.64
GR	4.84	233.36	9.72	244.83	10.14	245.8	9.09	253.34	8.83	254.06
GR	8.09	265.89	7.77	267.98						

X1	100	35	46.82	191.05	50	50	50			
CI	141	-5.45	0	2	2	148				
GR	3.69	0.00	3.7	1.17	3.15	13.37	3.18	16.14	3.36	20.06
GR	3.59	36.01	3.01	37.83	1.64	46.82	0.1	47.85	0.12	55.53
GR	0.06	92.29	0.05	94.95	0.06	96.74	0.06	97.81	0.25	122.92
GR	-0.35	151.14	-0.39	153.29	-0.39	156.37	-0.67	176.98	0.5	191.05
GR	0.49	191.77	0.43	207.89	2	215.42	1.15	218.11	2.14	222.95
GR	4.41	236.36	6.68	243.17	6.87	244.05	8.08	247.03	8.29	249.79

GR	8.03	261.91	7.94	262.99	7.1	275.02	7.03	275.92	6.91	276.69
X1	150	35	34.46	234.33	50	50	50			
CI	121	-6.3	0	2	5	125				
GR	3.76	0.00	3.78	1.85	3.74	2.63	3.56	23.18	3.52	26.37
GR	2.71	28.25	2.8	34.46	1.84	35.77	0.67	44.46	-0.28	51.13
GR	0.70	65.64	0.85	67.61	0.93	91.22	0.96	92.57	0.98	94.08
GR	1.24	112.29	1.33	120.09	1.28	121.44	0.34	148.36	0.17	170.36
GR	-0.10	182.84	-0.23	188.13	-0.07	189.29	0.7	209.81	0.7	213.3
GR	1.18	219.31	0.67	221.86	3.47	234.33	4.74	236.04	5.32	251.56
GR	5.27	265.17	5.38	269.01	5.64	274.04	6.2	276.28	6.22	277.02
X1	200	32	0	233.84	50	50	50			
CI	121	-7.15	0	2	5	130				
GR	3.82	0.00	2.47	27.34	2.43	30.13	2.3	30.78	2.09	31.76
GR	2.15	33.97	1.13	53.26	0.57	66.03	1.02	87.13	0.84	91.01
GR	0.78	92.35	0.97	115.4	1.3	120.73	1.05	122.14	0.63	145.87
GR	0.57	147.56	0.54	167.16	0.46	176.3	0.43	178.09	0.74	205.84
GR	1.19	209.85	-0.53	218.35	1.9	231.01	3.58	232.87	4.23	233.84
GR	4.81	256.37	4.78	264.03	4.8	267.26	4.83	268.84	5.56	271.74
GR	5.62	272.64	5.6	273.53						
X1	250	32	37.71	232.62	50	50	50			
CI	118	-8	0	2	5	130				
GR	3.85	0.00	3.69	0.89	3.22	22.36	3	31.41	1.86	36.25
GR	1.74	37.71	-0.42	60	-0.21	68.55	-0.67	79.12	-0.85	87.67
GR	-1.07	98.52	-0.19	111.98	-0.82	116.49	-1.42	138.8	-1.67	145.34
GR	-1.25	146.61	-1.25	153.63	-0.34	162.7	0.04	172.54	-0.14	184.13
GR	-0.40	200.68	-0.73	208.33	0.78	219.98	1.88	226.42	3.73	232.62
GR	4.11	233.79	4.39	255.91	4.44	261.34	4.52	265.35	4.92	266.93
GR	5.01	268.35	4.99	269.77						
X1	300	24	35.73	231.78	50	50	50			
CI	118	-8	0	2	5	134				
GR	3.85	0.00	3.6	10.39	3.18	27.2	2.59	31.79	1.86	35.73
GR	-0.55	50.50	-1	54.47	-2.3	85.7	-2.74	96.08	-2.77	97.49
GR	-2.11	131.70	-2.81	161.73	-2.69	164.75	-2.88	189.91	-2.94	193.76
GR	-2.34	197.43	1.88	226.01	2.41	227.62	3.28	231.78	3.36	239.94
GR	4.16	262.20	4.21	263.24	4.41	265.44	4.37	267.38		
X1	350	29	28.88	236.87	50	50	50			
CI	119	-8	0	2	5	135				
GR	4.54	0.00	4.53	4.64	4.4	6.1	3.96	6.87	4.23	10.03
GR	4.07	13.15	3.26	24.13	2.47	28.88	0.01	48.26	-0.89	56.06
GR	-1.20	58.69	-1.29	60.2	-1.99	77.94	-2.35	87.09	-1.7	121.83
GR	-1.69	122.34	-2.04	135.03	-2.76	160.11	-2.76	161.1	-2.72	198.12
GR	-2.73	200.83	-2.26	203.63	-1.92	213.98	1.94	231.13	2.32	233.29
GR	3.38	236.87	3.78	258.46	3.79	266.62	3.75	268.36		
X1	400	24	32.7	237.36	50	50	50			
CI	119	-8	0	2	5	132				
GR	5.47	0.00	5.46	3.03	4.67	11.79	4.7	12.39	4.69	13.43
GR	4.73	16.93	4.78	26.23	4.41	32.7	-0.74	60.75	-1.88	83.21
GR	-1.86	88.90	-1.8	101.09	-2.3	119.11	-2.72	143.55	-2.64	165.04
GR	-2.54	204.89	-2.62	207.46	-2.29	208.86	-1.49	212.93	1.69	230.25
GR	3.01	237.36	3.42	239.72	3.69	263.85	3.68	269.59		
X1	450	26	33.11	234.92	50	50	50			
CI	123	-8	0	2	5	136				
GR	6.39	0.00	6.39	1.42	6.02	5.65	5.68	10.47	5.04	17.66
GR	4.97	23.73	4.71	33.11	3.43	34.65	1.52	36.94	-1.09	90.71
GR	-1.19	92.80	-1.58	100.02	-2.99	128.45	-3.5	156.2	-3.71	168.52
GR	-5.60	203.62	-5.61	204.15	-5.49	204.66	0.11	227.19	5.75	234.92
GR	4.41	245.10	4.63	253.65	4.71	255.52	4.39	263.42	4.11	267.36
GR	4.23	268.03								
X1	500	27	39.63	239.52	50	50	50			
CI	141	-8	0	2	2	160				
GR	7.02	0.00	7.48	0.57	6.03	19.03	5.27	23.39	5.26	24.89
GR	4.86	37.75	4.27	39.63	1.23	42.67	-0.17	69.47	-0.97	80.45
GR	-1.36	90.42	-1.52	92.94	-3.53	125.43	-3.68	129.41	-4.09	153.3
GR	-4.19	161.84	-4.54	180.33	-3.97	199.35	-2.83	213.55	-0.12	231.99
GR	5.91	239.52	5.57	246.17	5.4	249.72	5.32	251.76	5.12	256.65

GR	4.53	265.09	4.79	266.54						
X1	550	27	44.89	246.91	50	50	50			
CI	148	-8	0	2	2	160				
GR	5.48	0.00	7.08	2.02	6.36	15.4	4.71	24.95	4.7	30.11
GR	3.99	43.64	3.81	44.89	1.72	48.58	-0.33	51.18	-1.77	81.74
GR	-2.38	94.46	-2.56	98.2	-3.89	125.07	-4.18	129.71	-4.25	133.89
GR	-5.21	163.07	-5.36	171.03	-6.1	190.8	-5.4	199.55	-2.44	233.93
GR	0.06	241.94	0.2	242.99	5.95	246.91	5.93	251.21	5.86	252.92
GR	4.95	265.85	5.34	268.07						
X1	600	29	51.8	255.91	50	50	50			
CI	153	-8	0	2	2	160				
GR	4.14	0.00	4.15	0.76	4.79	2.89	4.7	8.67	5.46	20.74
GR	5.26	25.48	5.02	27.56	4.41	36.01	3.73	51.8	3.1	52.67
GR	2.63	53.23	-1.73	80.84	-3.27	96.11	-3.51	102.78	-3.64	106.36
GR	-5.07	140.98	-6.01	170.91	-6.15	182.49	-6.49	207.8	-6.4	208.9
GR	-6.25	209.60	-2.53	244.2	-0.07	249.96	5.36	253.36	6.09	255.91
GR	5.39	265.92	5.53	266.58	5.93	268.95	6	269.51		
X1	650	30	37.49	262.07	49	55	50			
CI	151	-8	0	2	2	160				
GR	4.98	0.00	5.08	5.2	5.26	13.24	6.01	15.77	5.77	35.37
GR	5.75	35.99	5.75	37.49	3.64	50.5	2.78	51.61	-1.27	75.06
GR	-2.37	78.59	-4.51	90.24	-4.82	101.32	-4.84	101.98	-5.96	136.36
GR	-6.65	152.94	-7.31	175.3	-7.91	186.95	-7.33	205.97	-6.14	214.81
GR	-3.75	235.82	-0.87	245.23	0.02	249.75	1.73	251.86	2.08	252.52
GR	3.64	254.11	4.98	257.82	5.99	262.07	6.55	265.34	6.64	266.05
X1	700	27	49.4	262.07	49	55	50			
CI	148	-8	0	2	2	160				
GR	5.83	0.00	6.02	10.18	6.21	18.37	5.35	23.99	3.99	32.15
GR	3.49	42.94	3.17	49.4	0.14	51	-5.11	86.36	-5.66	90.18
GR	-5.70	91.68	-5.88	98.19	-6.62	125.8	-6.63	161.64	-7.8	189.59
GR	-8.19	196.62	-5.53	217.86	-3.82	232.55	-2.91	236.61	-0.12	244.39
GR	0.28	245.35	3.42	252.06	6.47	259.17	6.94	260.35	7.08	260.98
GR	7.17	262.07	7.28	262.94						
X1	750	26	43.68	255.43	48	55	50			
CI	146	-8	0	2	2	162				
GR	6.59	0.00	5.92	4.65	4.26	16.12	4.11	17.1	2.98	43.68
GR	2.80	45.05	0.66	46.59	-0.07	49.5	-5.1	70.43	-6.37	84.79
GR	-6.66	93.17	-6.9	100.17	-6.81	119.83	-6.82	136.72	-6.39	161.8
GR	-6.80	173.24	-7.08	196.52	-7.12	199.68	-7.01	201.64	-3.6	231.11
GR	-1.01	241.46	-0.25	243.95	0.14	245.43	3.66	252.08	6.04	255.43
GR	7.99	260.16								
X1	800	30	42.42	255.42	48	55	50			
CI	149	-8	0	2	2	162				
GR	6.04	0.00	5.53	4.08	4.53	8.01	3.8	12.18	3.89	20.47
GR	3.97	33.69	3.98	42.42	3.63	45.79	3.33	48.96	1.07	58.85
GR	-2.89	72.52	-4.28	83.86	-5.05	95.79	-5.36	100.59	-5.35	106.75
GR	-5.48	115.38	-5.65	132.87	-4.85	154.76	-4.52	170.65	-4.19	188.48
GR	-3.98	207.98	-2.8	231.34	-2.34	241.1	-1.3	245.3	-0.17	249.28
GR	4.61	253.37	5.06	255.42	6.12	263.63	6.77	267.91	6.84	268.41
X1	850	30	45.2	257.84	48	55	50			
CI	149	-8	0	2	2	162				
GR	5.42	0.00	4.41	8.09	4.11	9.25	4.03	29.73	4.05	31.5
GR	4.09	33.02	3.72	45.2	0.57	50.42	0.11	51.93	-1.73	73.42
GR	-2.14	76.13	-2.41	84.12	-2.89	96.38	-3.29	106.8	-3.39	110.54
GR	-3.62	120.32	-4	138.33	-3.94	161.36	-3.9	164.61	-3.86	167.28
GR	-3.71	174.26	-3.21	197.33	-3.12	208.76	-2.41	238.99	-2.29	243.23
GR	-1.11	250.74	-0.6	254.16	0.61	255.19	4.69	257.84	5.22	264.62
X1	900	27	34.13	258.97	49	55	50			
CI	148	-8	0	2	2	174				
GR	4.81	0.00	4.49	2.55	4.41	7.63	4.5	18.42	4.13	31.58
GR	4.10	32.75	3.66	34.13	0.09	45.87	-1.18	56.74	-2.98	76.31
GR	-4.10	92.21	-4.19	95.29	-4.65	112.34	-4.64	117.82	-4.11	134.33
GR	-3.88	148.57	-3.65	155.51	-3.31	167.03	-3.49	188.43	-4.86	202.29
GR	-5.00	232.95	-3.93	244.6	0.32	252.07	1.06	253.91	3.83	258.97
GR	2.35	260.06	4.44	261.66						

X1	950	29	32.8	259.53	49	55	50			
CI	147	-8	0	2	2	174				
GR	4.65	0.00	4.78	0.6	4.73	3.27	4.67	19.36	4.77	22.05
GR	4.44	26.26	4.21	32.8	2.54	35.32	1.41	38.65	0.82	40.91
GR	0.13	42.46	-1.56	49.3	-4.76	64.39	-6.04	91.77	-6.19	93.85
GR	-6.61	99.72	-6.77	125.55	-7.31	133.86	-6.06	154.32	-4.88	169.86
GR	-5.76	191.34	-7.71	209.69	-6.4	225.18	-2.87	247.46	-1.28	252.85
GR	-0.35	253.21	1.05	257.85	3.9	258.9	4.38	259.53		
X1	1000	30	35.77	259.12	48	57	50			
CI	148	-8	0	2	2	170				
GR	4.80	0.00	4.77	0.96	4.79	1.53	4.67	4.43	4.62	7.57
GR	4.39	21.17	4.25	28.99	4.22	30.11	3.77	35.77	0.51	40.21
GR	-2.58	50.17	-6.01	68.42	-6.53	94.16	-6.63	99	-6.8	107.19
GR	-6.66	142.74	-6.66	143.33	-6.61	177.25	-6.65	178.23	-6.64	190.15
GR	-6.71	208.76	-6.55	210.2	-6.09	211.39	-1.02	244.15	-1.13	246.89
GR	1.15	251.86	2.87	254.51	3.67	256.72	4.51	258.47	4.77	259.12
X1	1050	28	39.25	252.52	48	57	50			
CI	150	-8	0	2	2	170				
GR	5.03	0.00	4.94	3.02	4.99	4.81	4.96	5.47	4.72	16.89
GR	4.69	19.96	4.51	28.85	4.17	39.25	-1.73	61.88	-2.23	63.9
GR	-3.73	69.36	-6.48	95.16	-6.49	95.74	-6.61	101.33	-6.6	125.82
GR	-6.81	138.09	-7.16	157.68	-7.83	172.59	-9.34	191.22	-8.02	209.11
GR	-4.49	228.47	-1.26	246.18	-0.8	249.47	-0.57	250.15	3.81	252.52
GR	4.17	253.03	4.96	256.59	4.9	260.15				
X1	1100	29	41.11	260.85	48	57	50			
CI	149	-8	0	2	2	170				
GR	5.26	0.00	5.15	4	5.06	5.48	4.86	18.18	4.75	22.91
GR	3.10	30.56	2.3	41.11	0.06	44.34	-2.39	61.59	-2.74	63.95
GR	-4.90	92.49	-5.16	95.13	-5.68	100.36	-6.56	126.88	-6.54	136.2
GR	-7.85	171.64	-8.25	177.62	-9.53	207.98	-9.83	213.63	-9.57	215.05
GR	-6.98	222.64	-0.49	247.45	1.6	249.86	2.25	254.37	2.36	255.56
GR	3.60	257.97	4.89	259.46	4.92	260.62	5.59	260.85		
X1	1150	25	40.22	259.15	48	57	50			
CI	145	-8	0	2	2	174				
GR	5.48	0.00	5.42	1.07	4.79	16.79	4.7	20.8	4.69	29.58
GR	4.28	40.22	1.82	43.26	-1.47	52.5	-3.86	68.38	-6.21	91.84
GR	-6.50	94.70	-7.03	105.74	-6.98	131	-6.98	142.74	-8.55	165.66
GR	-9.12	177.05	-9.31	204.66	-8.52	215.01	-2.6	234.24	0.25	244.34
GR	2.73	249.97	4.38	255.03	4.66	256.77	4.93	258.48	5.17	259.15
X1	1200	25	39.16	245.55	48	57	50			
CI	143	-8	0	2	2	170				
GR	5.33	0.00	5.19	4.33	5.07	7.29	4.91	21.42	4.81	23.87
GR	4.92	38.63	4.49	39.16	-0.68	44.48	-4.84	68.97	-5.27	71.53
GR	-5.35	72.05	-6.16	88.99	-7.1	108.63	-7.1	109.95	-7.04	144.83
GR	-7.12	148.99	-8.62	179.36	-8.72	182.95	-6.67	212.25	-2.92	224.09
GR	-1.07	235.29	3.32	245.55	3.35	248.43	4	250.15	4.78	254.7
X1	1250	25	41.26	245.92	48	57	50			
CI	144	-8	0	2	2	170				
GR	5.17	0.00	5.15	1.66	5.09	5.66	4.95	19.99	4.89	24.19
GR	4.53	39.41	3.24	41.26	0.14	44.49	-2.02	54.53	-5.66	70.54
GR	-6.24	85.98	-6.53	93.62	-6.86	100.52	-6.82	128.86	-6.81	135.99
GR	-7.36	162.07	-7.57	166.35	-8.42	198.34	-8.3	200.08	-7.48	202.66
GR	-7.09	203.96	-1.74	237.15	4.17	245.92	4.22	246.62	4.56	249.7
X1	1300	26	47.83	259	48	57	50			
CI	153	-8	0	2	2	172				
GR	5.37	0.00	5.29	6.18	5.32	11.48	5.1	26.36	5.04	30.51
GR	4.86	36.54	4.66	47.83	0.88	52.88	-3.26	70.94	-4.71	73.96
GR	-5.39	77.03	-6.01	95.15	-6.24	102.08	-6.6	112.18	-6.61	113.33
GR	-6.65	147.33	-6.77	151.85	-7.67	179.88	-7.71	189.16	-7.46	214.22
GR	-3.72	238.56	-1.89	249.24	-1.72	250.32	2.46	256.21	4.4	258.05
GR	4.44	259.00								
X1	1350	31	51.93	253.15	48	57	50			
CI	157	-8	0	2	2	169				
GR	5.56	0.00	5.53	2.05	5.55	4.54	5.57	6.21	7.28	17.58

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GR  7.54   20.67    7.13   24.72    4.49   47.72    4.41   51.93     1.2   57.86
GR -1.19   61.01   -2.42   70.11    -5.1    98.8    -5.5  101.98   -6.48  109.64
GR -6.59  112.52   -6.91  152.59   -6.91  154.27   -7.24  167.21   -7.63  183.56
GR -7.65  186.86   -7.81  218.61   -7.09  223.85    1.42  249.67    1.97  253.15
GR  1.24  258.58   -0.17  260.09    1.17  261.35    3.27  262.16    3.56  262.77
GR  3.75  263.32

X1 1400       27   58.95  260.04      48      57      50
CI  163       -8       0       2       2     170
GR  5.63    0.00    5.71    4.45    7.62   17.75    7.75   19.19    5.63   36.97
GR  5.04   42.85    4.98   45.56    4.46   58.95    2.48   61.57   -0.73   64.64
GR -1.80   72.49    -4.9   89.73   -5.56  107.02   -5.75  112.04   -6.12  120.04
GR -6.63  152.31   -6.66  153.22   -6.67   153.8    -7.6  182.91    -8.8  205.14
GR -8.93  208.31   -5.37   238.6   -4.76  244.16   -4.14  245.67    3.34  260.04
GR  3.13  264.41    3.07  267.75

X1 1450       26   63.92  264.37      48      57      50
CI  166       -8       0       2       2     170
GR  5.56    0.00    5.69    7.17    5.69    9.13    5.49   14.54    5.66   33.55
GR  5.60   34.38    5.04   52.66    4.71   63.92    0.82   69.11   -1.12   70.88
GR -2.61   84.59   -5.45  104.29   -5.67  110.32   -5.85   115.2   -6.77  143.54
GR -7.31  164.34   -7.83  178.14   -8.78  200.14   -8.93  214.81   -0.15  249.22
GR  1.35  260.38    2.91  264.37    2.65  269.26    2.78  270.55    3.15   271.6
GR  3.63  272.16

X1 1500       30   68.02  270.96      48      57      50
CI  166       -8       0       2       2     166
X2 3635
GR  5.49    0.00    5.59     5.6     5.6   10.81    5.27   19.75    5.36   22.34
GR  6.68   34.36    8.08   44.01    5.24   57.94    4.59   64.16    4.06   68.02
GR -1.89   74.98   -4.35    91.1   -4.72   93.19   -4.85   95.84   -5.59  111.45
GR -5.79  115.77   -6.82  143.17   -7.09  154.45   -8.06  179.69   -8.57  189.73
GR -8.87  215.22   -7.82  227.22   -3.71  251.76     0.2  263.62    1.17  269.39
GR  1.45  270.04    3.06  270.96    3.24  272.85    3.52   273.6    3.86  274.51

X1 1550       29   65.68  275.39      48      57      50
CI  166       -8       0       2       2     163
GR  5.43    0.00     5.5    4.05     5.5   12.53    5.35   16.79    5.46   19.98
GR  4.99   30.80    5.52    34.2    4.86   40.29    4.62   65.68    1.67    71.6
GR -0.92   74.53   -4.65   94.56   -4.88   95.89    -5.1  100.39   -5.59  110.42
GR -6.42  127.37   -6.63  134.13   -7.34  164.71   -7.88  175.42    -8.9  194.74
GR -9.23  212.70   -7.78  229.51    -4.1  251.74   -0.72  263.94    0.27  267.32
GR  0.62  268.92    2.45  272.31    4.06  274.45    4.79  275.39

X1 1600       26   58.06   269.9      48      57      50
CI  163       -8       0       2       2     163
GR  5.36    0.00    5.41     2.5    5.41   13.37    6.25   20.11    7.23   32.53
GR  6.40   41.59    4.88   55.26    2.72   58.06    0.42   70.08   -3.46   83.97
GR -5.57  107.22   -5.68  108.46   -5.94  113.69   -6.93   148.4   -6.97  149.49
GR -8.38  176.70   -8.84  183.55   -8.94   188.7   -9.27  218.85   -4.99  237.13
GR -0.26  262.24    0.19  263.38     2.4  268.12    4.49   269.9     4.1  270.61
GR  3.86  271.15

X1 1650       24   59.45  263.49      48      57      50
CI  158       -8       0       2       2     164
GR  5.29    0.00    5.31    0.93    5.31    4.92    6.35   13.15    8.21   27.45
GR  5.58   49.71    4.08   59.45    0.97   64.02    -0.7   65.89   -4.51    86.9
GR -4.69   87.82   -4.77   88.37   -5.43  101.81    -5.7  107.33   -6.29  119.31
GR -7.32  157.95   -8.56  194.93   -8.57  196.95   -8.18  228.58   -8.15   231.5
GR -4.57  246.25    -0.2  256.53    2.41  263.49    2.08  264.46

X1 1700       30   60.41  261.83      48      57      50
CI  154       -8       0       2       2     160
GR  5.27    0.00    5.24    0.98    5.22    1.61    5.21    3.38    5.09    8.69
GR  5.00   15.16    6.16   25.58    4.61   40.34    4.11   50.08    3.89   59.17
GR  2.94   60.41    -2.7   75.62   -3.97   77.92    -4.2   79.05   -4.35   79.87
GR -5.32  100.30   -5.95  113.45   -6.01  114.81   -6.58  130.03   -7.25  147.69
GR -7.31  149.67   -8.37  181.03    -8.4  182.02   -8.46  214.04   -8.06   217.4
GR -3.74  246.37   -3.31  247.74    3.38  258.45    4.51  261.83    3.16  262.87

X1 1750       28   46.33  267.46      48      57      50
CI  163       -8       0       2       2     164
GR  5.31    0.00    5.19     3.3    5.15    5.42    5.09   11.41    4.75   26.85
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GR	6.18	38.62	6.6	42.35	6.29	46.33	4.22	61.87	2.33	63.89
GR	-3.29	85.40	-4.35	91.24	-5.21	105.03	-6.32	122.62	-6.43	125.4
GR	-7.41	159.68	-8.58	200.16	-8.59	200.8	-5.35	227.05	-4.76	231.96
GR	-4.50	233.58	-2.05	247.55	-1.33	249.47	3.7	264.74	4	267.46
GR	4.06	268.81	3.59	269.96	4.2	270.49				

X1	1800	38	67.03	260.68	47	55	50			
CI	163	-8	0	2	2	153				
GR	5.35	0.00	5.15	5.67	5.08	9.32	4.97	19.7	4.9	22.6
GR	5.30	25.82	6.87	41.24	4.96	55.7	3.71	64.4	3.57	66.15
GR	3.12	67.03	1.83	68.51	-0.89	73.17	-3.2	82.09	-4.14	86.23
GR	-4.34	90.61	-5.37	107.71	-5.6	111.48	-6.79	141.59	-6.98	146.71
GR	-8.07	180.60	-8.13	182	-8.31	204.48	-8.41	216.03	-8.33	216.72
GR	-7.85	218.65	-4.6	243.65	-2.86	254.86	-2.34	255.31	2.85	260.68
GR	0.82	263.71	2.28	267.5	3.7	269.08	3.88	270.25	4.24	272.33
GR	4.17	274.15	3.77	275.82	4.83	276.44				

X1	1850	30	63.22	274.11	50	50	50			
CI	162	-8	0	2	2	171				
GR	5.39	0.00	5.1	8.22	5	13.53	4.94	19.42	4.47	37.48
GR	4.55	41.90	3.51	63.22	-0.98	68.9	-3.79	81.48	-4.14	83.53
GR	-5.37	109.99	-5.76	118.55	-5.8	119.54	-6.23	130.52	-7.17	155.01
GR	-7.23	156.84	-7.64	165.72	-8.57	187.73	-8.84	199.73	-8.87	201.97
GR	-7.98	235.41	-7.63	237.14	-3.26	263.96	-2.79	264.88	-2.15	266.16
GR	4.37	274.11	4.8	277.99	4.68	279.5	5.13	280.76	5.29	281.51

X1	1900	30	50.81	281.38	50	50	50			
CI	162	-8	0	2	2	180				
GR	5.43	0.00	5.05	10.78	4.96	15.57	7.04	32.7	7.16	33.83
GR	6.87	36.18	4.83	49.98	4.11	50.81	-0.87	62.67	-3.41	78.99
GR	-3.87	82.44	-4.91	112.27	-5.16	119.65	-5.19	120.5	-5.49	133.08
GR	-6.09	155.79	-7.98	188.11	-8.11	191.22	-8.14	192.5	-8.71	224.46
GR	-8.64	227.09	-6.65	233.96	-5.94	236.58	-0.92	268.08	-0.48	270.98
GR	3.72	276.91	3.87	278	4.17	278.76	5.36	281.38	5.16	281.9

X1	1950	26	47.2	272.34	50	50	50			
CI	162	-8	0	2	2	182				
GR	5.47	0.00	5.23	6.82	6.34	18.84	5.84	31.39	4.79	38.87
GR	4.16	47.20	0.64	50.99	-0.53	54.12	-2.83	67.33	-3.29	69.86
GR	-4.51	87.86	-4.58	90.06	-5.32	114.55	-5.59	123.58	-5.62	124.64
GR	-6.48	159.32	-7.57	195.36	-8.08	229.02	-8.17	231.53	-5.91	239.62
GR	-1.83	269.10	2.35	272.34	3.49	277.13	4.26	278.66	5.36	281.07
GR	4.97	282.08								

X1	2000	32	35.61	279.22	50	50	50			
CI	155	-8	0	2	2	199				
GR	5.45	0.00	5.46	0.5	5.45	1.52	5.31	6.16	6.65	17.16
GR	4.86	31.16	4.73	34.27	3.71	35.61	-0.55	46.89	-2.04	55.41
GR	-3.57	70.32	-4.44	97.56	-4.81	105.4	-5.18	118.54	-5.62	134.06
GR	-5.68	139.90	-6.23	170.37	-6.38	174.58	-6.95	204.52	-7.1	209.81
GR	-8.20	242.10	-8.07	243.87	-7.25	245.39	-7.08	259.6	-6.6	262.92
GR	5.26	279.22	5.25	279.81	4.55	280.88	4.88	281.4	5.36	282.47
GR	5.38	283.13	4.78	283.97						

X1	2050	28	40.48	290.38	50	50	50			
CI	160	-8	0	2	2	207				
GR	5.20	0.00	5.24	2.92	5.19	8.81	5.02	14.56	4.11	37.35
GR	3.63	40.48	-0.57	46.89	-1.36	48.42	-3.7	68.57	-4.09	91.58
GR	-4.12	100.49	-5.4	127.09	-5.47	129.02	-5.66	134.09	-5.99	163.53
GR	-6.07	168.86	-7.19	197.83	-7.33	202.26	-8.3	234.1	-8.25	236.95
GR	-5.67	270.68	-5.01	271.89	-4.67	273.31	1.31	284.83	1.27	286.75
GR	5.41	290.38	5.39	291.24	4.59	292.35				

X1	2100	26	30.45	297.9	50	50	50			
CI	170	-8	0	2	2	207				
GR	4.94	0.00	5.02	5.34	5.01	6.53	4.01	23.34	3.45	30.45
GR	0.04	34.50	-1.26	35.29	-2.41	44.42	-3.8	62.09	-3.97	71.27
GR	-4.64	95.91	-4.76	122.51	-4.81	131.97	-5.06	139.49	-5.78	160.74
GR	-5.94	165.55	-6.45	198.09	-6.52	200.97	-7.54	232.88	-7.52	236.08
GR	-6.78	274.08	1.32	294.59	5.4	297.9	5.41	298.66	5.32	299.45
GR	4.40	300.72								

X1	2150	29	9.34	282.42	50	50	50			

CI	156	-8	0	2	2	214				
GR	2.59	0.00	3.16	9.34	1.79	12.55	-1.48	16.82	-1.53	18.83
GR	-3.63	40.03	-3.99	56.92	-4.24	67.43	-4.68	90.75	-4.81	100.34
GR	-4.95	128.35	-5.04	133.65	-5.25	139.48	-6.18	166.16	-6.18	166.67
GR	-6.36	173.38	-7.04	202.07	-7.09	203.61	-6.84	237.37	-6.76	241.64
GR	-3.03	254.77	-2.74	275.66	3.3	282.42	5.49	291.64	5.53	292.89
GR	5.48	293.68	5.43	294.2	5.03	297.48	4.21	298.61		
X1	2200	21	0	241.96	50	50	50			
CI	110	-8	0	2	2	214				
GR	-3.29	0.00	-3.96	27.21	-4.16	34.66	-4.59	62.93	-4.87	67.11
GR	-5.07	74.26	-5.37	92	-5.53	101.26	-5.75	107.21	-6.08	137.19
GR	-6.08	141.49	-6.81	173.06	-6.77	175.39	-6.38	206.21	-2.73	216.6
GR	3.01	237.43	5.5	240.52	5.56	241.03	5.57	241.96	4.73	248.05
GR	4.03	249.03								
X1	2250	22	0	229.69	50	50	50			
CI	101	-8	0	2	2	209				
GR	-1.96	0.00	-2.02	2.42	-2.44	18.13	-2.54	30.86	-2.7	35.1
GR	-3.87	53.61	-4.12	54.86	-4.52	60.19	-5.18	83.94	-5.36	90.39
GR	-6.42	119.91	-6.58	125.27	-6.55	154.27	-6.55	161.32	-6.39	168.55
GR	-5.91	197.54	-3.97	205.81	-0.02	221.01	4.35	228.11	5.52	229.69
GR	4.44	238.03	3.84	238.87						
X1	2300	30	105.72	296.77	46	57	50			
CI	197	-8	0	2	2	152				
GR	0.76	0.00	1.26	0.54	2.52	1.25	3.5	35.48	3.56	40.33
GR	3.60	44.00	3.48	66.51	4.07	87.68	4.23	92.52	3.94	95.38
GR	2.91	105.72	-1.22	118.2	-1.84	120.17	-4.41	153.15	-5.02	160.91
GR	-5.15	164.40	-5.36	169.99	-6.24	198.23	-6.16	209.46	-6.16	234.09
GR	-6.06	250.27	-5.68	269.15	-1.65	285.95	-0.22	291.04	4.76	296.77
GR	5.03	297.72	5.64	297.84	4.87	300.89	4.08	307.26	3.6	307.93
X1	2350	30	45.49	228.59	50	50	50			
CI	130	-8	0	2	2	149				
GR	5.61	0.00	4.76	11.25	4	16.22	4.17	23.96	1.5	40.72
GR	0.91	45.49	-2	54.71	-2.46	55.35	-3.56	66.8	-3.89	68.88
GR	-4.04	71.76	-4.49	83.36	-5.01	96.77	-5.28	105.52	-6.12	129.72
GR	-6.33	148.08	-6.24	164.27	-5.78	192.21	-5.72	201.54	-4.19	207.05
GR	1.67	226.94	1.96	228.01	4.79	228.59	5.5	228.73	4.52	229.17
GR	5.27	230.27	4.98	232.14	4.41	234.29	3.79	239.3	3.41	239.82
X1	2400	30	75.78	263.9	50	50	50			
CI	160	-8	0	2	2	142				
GR	6.14	0.00	6.12	18.31	6.14	38.79	4.92	53.47	3.95	59.04
GR	3.99	63.25	4.11	72.79	3.29	75.78	-1.46	80.47	-3.45	94.97
GR	-4.48	112.70	-4.88	119.57	-5.44	132.41	-5.93	145.99	-6.4	168.96
GR	-6.53	176.09	-6.34	206.23	-6.28	209.95	-5.06	229.43	-3.86	243.8
GR	-3.51	244.40	0.78	255.77	2.22	257.34	1.82	258.37	2.57	259.35
GR	2.69	261.14	4.57	263.9	4.36	265.26	3.95	266.83	3.5	270.46
X1	2450	45	144.64	349.65	50	50	50			
CI	234	-8	0	2	2	147				
GR	-0.58	0.00	0.64	2.72	3.21	7.99	3.55	18.43	4.09	33.11
GR	4.08	37.53	4.07	48.32	4.01	54.61	4.09	56.19	3.99	62.99
GR	4.55	74.91	4.56	79.37	3.84	94.44	3.87	99.05	3.8	101.62
GR	3.78	103.04	3.78	106.29	4.17	128.55	4.19	131.48	3.5	144.64
GR	1.46	147.85	-0.87	151.67	-2.01	157.02	-2.72	160.55	-3.75	177.09
GR	-4.87	190.06	-5.17	193.54	-5.61	204.25	-5.91	220.6	-6.24	242.37
GR	-6.49	257.68	-6.29	279.5	-5.81	292.02	-3.77	314.88	-0.99	327.3
GR	-0.71	328.96	1.97	331.59	2.55	333.88	2.76	335.53	2.47	340.51
GR	2.70	343.84	3.87	345.56	3.74	346.41	3.49	347.38	3.2	349.65
X1	2500	35	86.2	297.26	50	50	50			
CI	186	-8	0	2	2	164				
GR	0.09	0.00	0.02	8.76	0.17	24.64	-0.41	27.75	-0.2	44.75
GR	0.44	48.23	1.76	54.31	3.66	68.46	3.63	84.12	3.55	86.2
GR	2.49	92.90	0.85	97.62	-0.93	104.23	-1.56	110.7	-3.68	117.45
GR	-4.72	143.15	-5.32	152.68	-4.94	178.04	-5.13	188.53	-6.33	216.16
GR	-6.45	223.54	-6.12	241.54	-5.73	251.79	-2.72	278.98	-1.25	288.21
GR	0.15	289.44	0.49	291.29	3.02	297.26	2.92	303.39	2.84	308.7
GR	2.62	310.58	2.71	311.87	3.17	312.54	3.02	313.25	2.91	314.13

X1	2550	27	9.26	261.98	46	57	50			
CI	152	-8	0	2	2	166				
GR	1.05	0.00	1.03	3.34	1.09	9.26	-1.67	24.49	-1.75	26.14
GR	-2.16	43.27	-2.12	44.83	-3.32	61.01	-3.67	76.27	-4	79.41
GR	-4.16	83.28	-5.55	113.94	-5.57	117.73	-5.68	146.3	-5.63	149.79
GR	-5.80	176.70	-6.17	184.76	-5.48	216.44	-5.45	218.17	-4.93	222.38
GR	-1.83	247.87	-1.28	249.35	0.47	260.07	2.68	261.98	2.98	276.59
GR	2.96	280.87	2.91	282.28						

X1	2600	28	34.51	249.76	48	57	50			
CI	127	-8	0	2	2	158				
GR	2.73	0.00	2.31	5.76	2.49	8.38	2.11	11.87	3.61	19.14
GR	3.57	24.37	1.92	29.71	3.39	34.51	-2	39.36	-2.58	40.15
GR	-2.62	41.94	-3.38	44.59	-4.36	64.27	-5.3	75.6	-5.33	91.03
GR	-5.36	103.14	-5.52	114.99	-5.73	135.9	-5.94	150.71	-6	169.33
GR	-5.92	186.65	-4.55	200.64	-2.7	222.45	1.19	235.21	2.75	240.31
GR	3.24	249.76	3.39	258.64	3.3	259.41				

X1	2650	27	13.11	236.51	48	56	50			
CI	119	-8	0	2	2	160				
GR	5.26	0.00	5.13	1.82	5.93	13.11	5.59	16.63	4.58	19.91
GR	4.01	22.08	-1.56	36	-3.75	53.63	-4.83	66.35	-5.08	76.9
GR	-5.41	91.27	-5.44	92.87	-6.02	132.4	-6.07	136.11	-6.26	149.22
GR	-6.25	152.36	-5.81	173.27	-5.6	183.52	-5.59	184.26	-5.3	187.71
GR	-3.50	208.79	-1.04	214.95	1.49	223.21	2.92	227.89	3.51	236.51
GR	3.66	245.89	3.56	246.73						

X1	2700	25	13.26	218.05	48	54	50			
CI	112	-8	0	2	2	157				
GR	6.37	0.00	5.93	9.18	5.67	13.26	4.61	15.83	0.1	30.3
GR	-1.80	35.41	-2.61	41.78	-4.53	68.51	-4.98	74.75	-4.99	75.33
GR	-5.62	104.74	-5.72	114.76	-5.85	137.39	-5.73	167.72	-5.66	172.89
GR	-4.57	188.77	-3.36	203.24	0.37	212.69	1.99	216.74	3.53	218.05
GR	3.71	228.54	3.7	229.83	3.72	230.9	3.74	234.91	3.5	236.79

X1	2750	28	14.21	211.2	49	54	50			
CI	113	-8	0	2	2	147				
GR	6.24	0.00	5.45	8.73	4.99	14.21	-0.73	31.75	-0.98	32.35
GR	-2.47	39.40	-4.04	53.71	-4.53	59.08	-4.71	64.73	-5.23	82.83
GR	-5.48	91.53	-5.51	93.14	-5.88	126.38	-5.85	130.32	-5.85	162.04
GR	-4.96	164.34	-4.72	180.81	-3.57	198.2	-3.42	198.96	-0.88	203.49
GR	2.42	211.20	2.4	212.51	2.45	213.32	2.59	221.61	3.74	225
GR	3.76	226.75	3.28	230.62	3.56	231.59				

X1	2800	25	15.66	215.14	49	54	50			
CI	116	-8	0	2	2	130				
GR	6.04	0.00	5.8	3.37	5.67	6.37	5.28	8.47	4.82	15.66
GR	2.85	19.32	-0.69	31.98	-1.37	33.81	-1.75	35.77	-3.72	48.55
GR	-3.91	54.33	-4.28	63.06	-5.15	83.33	-5.7	111.06	-5.89	119.76
GR	-5.82	126.80	-5.6	155.53	-4.84	173.29	-4.28	186.92	-1.44	196.82
GR	3.02	215.14	3.36	223.63	3.27	227.83	3.25	228.86	3.51	229.76

X1	2850	27	17.33	207.51	49	54	50			
CI	108	-8	0	2	2	144				
GR	5.87	0.00	5.6	3.77	5.96	6.5	5.65	7.98	4.23	14.95
GR	2.23	16.10	1.1	17.33	-2.3	34.7	-4.02	46.66	-4.44	62.57
GR	-4.48	64.18	-5.02	81.22	-5.58	101.5	-5.94	118.16	-5.73	142.41
GR	-5.64	150.65	-3.97	179.43	-3.65	186.33	-1.39	198.55	-1.01	200.63
GR	-0.75	201.15	-0.67	201.95	3.06	207.51	3.01	211.17	3.04	213.07
GR	3.14	223.00	3.18	227.9						

X1	2900	32	17.28	209.23	49	54	50			
CI	102	-8	0	2	2	143				
GR	5.70	0.00	5.64	0.83	5.73	1.4	5.49	2.37	5.29	5.03
GR	2.96	11.08	2.43	12.02	3.81	15.35	3.87	17.28	2.41	18.65
GR	1.41	20.30	0.52	26.43	-0.89	29.33	-3.61	42.09	-4.24	46.32
GR	-4.52	60.65	-4.8	74.62	-4.96	80.78	-5.09	85.73	-5.93	117
GR	-5.62	140.20	-5.44	151.2	-5.34	154.01	-2.89	185.46	-1.51	192.36
GR	0.14	200.48	0.52	201.08	2.25	209.23	2.28	215.14	2.33	218.2
GR	2.50	221.66	2.92	222.48						

X1	2950	26	16.33	201.94	49	54	50			
CI	100	-8	0	2	2	143				

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GR  5.82    0.00    5.55    4.77    5.16    7.45    4.22    14.3    3.95   15.26
GR  3.32   16.33    1.03   20.01   -2.46   26.96    -3.3   39.58   -3.65   45.56
GR -4.00   56.21   -4.09   59.39   -4.77   81.32   -4.96   90.53   -5.41  116.39
GR -5.39  126.81   -5.15   150.5   -4.72  161.81   -3.84  177.47   -1.08  189.93
GR  0.71  193.06    1.45  199.04    2.09  201.94    2.27  203.87    2.13  217.94
GR  2.51  218.92

X1 3000       28   15.02  195.06      49      54      50
CI   99       -8       0       2       2     133
GR  5.97    0.00    5.94     0.8    5.88    1.87    5.59    4.06    5.51   10.56
GR  5.15   14.10    4.48   15.02    2.48   19.64    1.69   20.64    1.16    21.5
GR  0.14   25.25   -2.32   32.71   -3.84   58.63   -3.99   61.27   -4.53   66.73
GR -4.83   89.49   -4.97   99.74   -4.98  100.57   -5.44  121.82   -5.73  135.25
GR -5.74  136.05   -3.83  172.08    -2.4  179.76    0.21  192.05    1.07  193.06
GR  2.39  195.06    1.73  211.02    1.72  217.07

X1 3050       16       8  183.52      49      54      50
CI  104       -8       0       2       2     154
GR  5.77    0.00    5.25    5.67    5.05       8    1.81   15.87   -3.77   45.14
GR -4.28   56.13   -4.46   60.03   -4.94    80.5   -5.16    95.1   -5.18  115.73
GR -5.39  129.18   -4.78   153.5   -4.08  164.52   -3.76  175.48   -3.05  180.21
GR -2.94  183.52

X1 3100       23    2.19  235.66      49      54      50
CI  117       -8       0       2       2     184
GR  5.05    0.00       5    2.19     4.2    4.71    3.39    5.63   -4.63   71.83
GR -5.17   90.13   -5.18   96.91   -5.19  103.15   -5.41  116.78   -5.44   136.6
GR -5.30  147.97   -4.77  170.34   -4.53  179.31   -2.98  198.79   -1.61  209.87
GR -2.20  217.89   -2.07  221.21     0.5   234.4    0.67  235.39    2.18  235.66
GR  0.19  252.13   -0.37  268.83   -0.43  271.34

X1 3150       24   13.71  198.92      50      50      50
CI  123       -8       0       2       2     184
X2 2639
GR  5.68    0.00     5.6    0.33    5.59    0.71     5.5    2.14     5.5    2.34
GR  5.26    2.95    5.12    3.56    5.06    5.57    6.78    6.23    5.37   11.74
GR  4.45   13.71    2.56   14.49    1.14   16.12   -2.48   29.88   -3.81   35.83
GR -4.40   56.02   -4.78   69.14   -4.96    72.6   -4.88   76.53   -4.93  136.24
GR -4.98  141.50   -5.23     168   -4.05  173.53   -2.92  198.92

X1 3200       24   22.51  166.96      50      50      50
CI  125       -8       0       2       2     184
GR  5.73    0.00    5.66    0.28    5.62     1.4    5.37    5.68    5.35    6.28
GR  4.72    7.91    4.67       8    4.47    9.55    3.77   15.03    3.58   16.61
GR  2.89   22.51    0.68   26.77   -3.17   35.67   -4.13   57.64   -4.35   62.48
GR -4.82   71.72   -4.17   97.25   -3.97  107.89    -2.3  116.35   -4.18  134.26
GR -4.22  140.03   -4.26  143.49    0.74  166.96    1.18  176.79

X1 3250       38   10.69  124.51      50      50      50
CI   59       -8       0       3       3      40
GR  5.78    0.00    5.72    0.22    5.65     2.1    5.33    7.48    5.44    9.18
GR  5.44    9.25   10.04   10.69    7.44   12.49    5.46   13.09    4.45   17.58
GR  3.92   19.82    3.03   20.75    1.38   22.29     1.1   23.11    0.62   24.42
GR -0.50   28.36   -2.45   33.79   -3.52   43.55   -4.15   55.32   -3.98   59.26
GR -3.41   72.57   -3.18   79.92   -3.13  100.24   -2.16  104.83    4.63  116.62
GR  5.25  117.34    5.27  118.91    6.45  122.91    6.69  123.96    6.84  124.51
GR  6.16  128.64    6.09  129.62    6.34   139.8     5.4  146.05    4.77   151.4
GR  4.65  152.79    4.42  156.46    4.15  159.31

X1 3300       31   16.75  112.17      50      50      50
CI   60       -8       0       3       3      39
GR  5.82    0.00    5.78    0.18    5.69    2.81    5.46    6.62    5.74   11.21
GR  5.54   12.04    5.66   12.43    5.37   12.71    5.14   13.81    5.03   14.34
GR  3.78   16.75   -1.12   27.28    -0.9   30.13   -3.37   49.09   -4.58   51.71
GR -4.75   54.94   -4.56   60.89   -4.02    77.3   -3.91   80.67   -2.96   99.32
GR  0.25  107.09    7.13  112.17    7.32  112.38     7.3  113.34    6.98  115.09
GR  6.05  122.38    6.12  122.51    7.11  124.71    7.03  125.59    6.19  139.22
GR  5.18  149.81

X1 3350       30    8.46  128.02      50      50      50
CI   59       -8       0       3       3      40
GR  5.87    0.00    5.84    0.13    5.72     3.5    5.59    5.75    5.75    8.46
GR  4.88   12.05    4.82   13.48    4.83   13.89    3.71   18.47     3.7   19.57
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GR	3.32	21.09	2.37	21.79	-0.58	30.91	-2.19	45.34	-5.83	57.55
GR	-5.60	62.51	-5.49	64.77	-5.05	77.21	-3.88	92.49	-3.4	98.42
GR	1.02	109.69	1.33	110.63	2.02	111.37	2.98	114.45	3.66	117.03
GR	6.60	124.37	6.64	124.97	6.66	125.23	7.38	128.02	6.2	140.31
X1	3400	33	22.94	130.8	50	50	50			
CI	63	-8	0	3	3	39				
GR	5.92	0.00	5.9	0.08	5.75	4.2	5.71	4.89	5.76	5.72
GR	5.49	6.81	5.47	7.43	5.65	7.94	5.35	10.19	5.06	18.69
GR	5.06	18.84	4.92	19.14	3.24	22.94	2.87	23.41	1.05	26.66
GR	-4.07	37.33	-5.24	54.95	-5.82	61.16	-5.74	64.13	-5.49	72.91
GR	-5.31	77.04	-4.94	81.48	-2.46	100.41	-1.57	104.85	0.69	108.18
GR	3.05	115.59	5.85	120.09	7.12	129.8	7.36	129.94	7.21	130.05
GR	7.24	130.40	7.26	130.48	7.23	130.8				
X1	3450	29	13.6	131.3	50	50	50			
CI	63	-8	0	3	3	38				
GR	5.97	0.00	5.97	0.02	5.89	2	6.15	9.75	6.06	11.82
GR	5.47	13.60	4.3	18.84	2.62	23.46	-0.16	29.17	-1.82	33.13
GR	-3.22	47.85	-5.57	55.31	-5.89	60.29	-5.5	65.75	-4.33	82.24
GR	-4.07	84.80	-2.85	88.77	-0.12	104.27	-0.07	108.29	1.09	109.89
GR	2.17	113.72	3.23	115.25	4.03	116.86	4.72	118.72	5.65	121.69
GR	6.26	124.04	6.66	127.24	7.3	131.3	7.27	134.69		
X1	3500	27	13.29	121.27	50	50	50			
CI	63	-8	0	3	3	32				
GR	6.02	0.00	6.22	0.05	5.97	0.9	5.86	3.42	5.77	4.53
GR	5.79	10.16	5.42	13.29	3.59	20.55	2.71	22.79	0.3	33.16
GR	-1.41	42.80	-5.55	51.81	-5.92	57.78	-5.57	66.45	-5.2	75.29
GR	-4.82	79.22	-2.64	96.67	-1.25	102.87	0.64	110.91	0.81	111.76
GR	2.82	115.42	3.13	115.95	5.16	121.21	5.16	121.27	6.69	132.22
GR	6.80	134.10	6.99	137.4						
X1	3550	27	18.45	137.14	50	50	50			
CI	66	-8	0	3	3	46				
GR	6.07	0.00	6.63	0.16	5.94	2.54	5.64	9.51	5.65	9.57
GR	5.66	9.61	5.62	9.99	5.22	15.32	5.19	15.62	5.17	17.16
GR	4.90	17.70	4.72	18.45	2.47	26.41	1.16	28.58	-3.75	36.41
GR	-4.52	43.94	-6.13	59.25	-5.69	66.42	-5.61	67.63	-5	78.23
GR	-3.56	91.17	-2.84	98.53	1.32	112	4.93	123.62	6.59	133.44
GR	6.86	136.39	6.81	137.14						
X1	3600	24	24.06	137.96	50	50	50			
CI	64	-8	0	3	3	38				
GR	6.13	0.00	7.04	0.26	5.9	4.17	5.72	8.31	6.21	11.89
GR	6.24	11.99	5.86	18.92	5.05	23.62	4.94	24.06	2.4	27.08
GR	-2.90	36.62	-4.54	42.41	-5.71	60.56	-5.57	63.26	-5.47	66.38
GR	-4.99	80.96	-4.37	87.27	1.95	109.62	3.64	116.53	4.11	118.26
GR	4.25	119.51	4.73	122.79	6.61	136.69	6.71	137.96		
X1	3650	26	9.8	118.84	50	50	50			
CI	64	-8	0	3	3	38				
GR	6.18	0.00	7.45	0.36	5.87	5.8	5.81	7.12	5.98	8.35
GR	6.35	9.80	2.92	20.53	2.87	21.2	2.7	21.53	-1.71	32.6
GR	-3.09	36.77	-5.82	64.75	-5.91	66.09	-5.89	66.34	-4.16	86.26
GR	-4.04	87.26	-3.07	90.93	2.84	114.2	4.03	118.84	5.65	126.75
GR	5.85	134.68	5.89	135.49	5.9	136.26	5.93	136.64	6.45	140.65
GR	6.54	141.76								
X1	3700	25	19.97	115.43	50	50	50			
CI	64	-8	0	3	3	38				
GR	6.23	0.00	7.87	0.47	6.83	4.03	6.3	4.43	5.93	5.69
GR	5.68	12.12	5.01	16.3	3.56	19.97	-0.73	33.32	-3.84	41.52
GR	-4.34	48.95	-5.53	66.38	-5.72	69.14	-5.03	78.87	-3.39	93.31
GR	4.43	115.43	4.51	115.65	4.54	116.02	4.67	118.89	5.41	133.69
GR	5.43	134.38	5.52	135.21	6.03	138.45	6.41	143.57	6.46	145.29
X1	3750	23	24.67	116.17	53	48	50			
CI	67	-8	0	3	3	38				
GR	6.29	0.00	7.61	0.38	7.17	2.55	5.7	15.57	5.52	19.06
GR	6.36	24.67	5.05	26.44	4.05	30.05	-4.08	41.01	-4.62	58.89
GR	-5.26	68.78	-5.27	68.83	-4.44	80.6	-3.46	94.35	1.36	107.61
GR	4.46	116.17	5.07	123.28	5.19	126.29	5.36	129.17	6.31	139.17

GR	6.39	140.18	6.41	140.51	6.63	148.35				
X1	3800	30	21.81	126.57	52	48	50			
CI	68	-8	0	3	3	38				
GR	6.37	0.00	6.33	0.05	6.34	0.1	6.34	0.15	7.4	0.29
GR	5.95	7.12	5.94	9.66	5.59	18.59	5.4	21.81	3.43	24.45
GR	1.42	26.95	-1.13	33.96	-2.18	39.56	-4.1	43.06	-5.38	62.92
GR	-5.49	66.44	-5.29	70.39	-4.53	85.4	-4.18	90.05	-2.11	98.57
GR	-0.68	111.44	0.81	120.23	4.8	126.57	4.87	126.9	6.43	144.52
GR	6.60	147.09	6.79	148.03	6.69	148.63	6.72	149.17	6.75	150.43
X1	3850	32	25.94	122.27	52	48	50			
CI	62	-8	0	3	3	31				
GR	6.50	0.00	6.32	0.21	6.36	0.41	6.39	0.64	10.71	1.2
GR	10.25	3.32	9.56	5.28	13.01	14.27	11.94	16.16	9.74	20.72
GR	8.38	25.94	-4.68	43.13	-5.4	55.34	-5.59	66.44	-5.63	68.61
GR	-4.81	80.03	-3.7	89	-0.39	104.44	0.1	106.33	1.35	110.5
GR	1.91	112.45	4.35	119.58	5.21	122.27	5.32	123.87	5.63	130.21
GR	5.66	130.72	5.96	134.56	6.02	135.5	6.94	139.95	6.46	142.84
GR	6.61	145.35	6.73	151.27						
X1	3900	27	21.26	107.7	52	48	50			
CI	59	-8	0	3	3	24				
GR	6.62	0.00	6.32	0.38	6.33	0.46	8.24	21.26	7.51	22.46
GR	2.07	23.81	-1.47	31.47	1.12	39.27	1.33	48.83	-5.49	59.16
GR	-5.60	65.03	-5.55	65.95	-4.73	82.66	-4.3	86.24	0.54	97.72
GR	3.33	104.53	4.1	107.7	2.37	109.07	6.35	114.26	6.38	115.62
GR	5.16	118.07	5.18	119.99	6.82	131.24	7.01	132.86	6.22	137.62
GR	6.49	142.14	6.71	152.7						
X1	3950	23	3.21	106.93	52	48	50			
CI	67	-8	0	3	3	32				
GR	6.75	0.00	6.69	0.07	6.66	0.24	7.24	3.21	7.43	4.89
GR	3.55	21.70	2.73	25.64	2.34	26.49	-3.59	42.02	-4.55	44.76
GR	-4.71	46.81	-5.5	68.89	-5.72	75.24	-5.67	76.05	-4.28	89.07
GR	-2.48	93.40	3.54	106.93	4.37	111.5	5.44	117.73	5.78	124.79
GR	6.25	137.30	6.38	139.44	6.69	154.73				
X1	4000	27	17.85	111.24	52	48	50			
CI	61	-8	0	3	3	24				
GR	6.23	0.00	6.89	0.47	6.42	2.86	6.49	3.56	5.95	12.71
GR	5.75	15.36	4.28	17.85	0.23	25.62	-1.14	31.46	-4.44	42.94
GR	-5.48	55.79	-5.8	64.64	-5.6	67.55	-4.55	82.86	-4.13	87.09
GR	-1.11	94.19	3.46	106.15	4.99	111.24	4.61	112.14	5.73	114.08
GR	5.54	114.58	6.13	129.54	6.33	132.15	6.37	134.13	6.3	135.05
GR	6.42	137.41	6.67	149.64						
X1	4050	27	16.84	113.26	53	49	50			
CI	62	-8	0	3	3	30				
GR	5.53	0.00	7.02	1.09	6.8	2.22	6.92	3.43	6.58	4.38
GR	6.16	7.03	5.97	8.51	5.76	15.8	5.76	16.48	5.27	16.84
GR	0.80	23.22	-1.66	31.78	-4.44	42.93	-4.75	52.05	-5.73	67.42
GR	-5.74	67.59	-5.31	78.82	-4.54	86.44	0.94	101.86	2.66	107.32
GR	4.49	112.47	4.73	113.26	6.11	125.56	6.3	131.58	6.29	131.95
GR	6.51	136.16	6.65	142.84						
X1	4100	28	20.34	116.94	50	50	50			
CI	61	-8	0	3	3	28				
GR	4.87	0.00	7.09	1.63	7.12	1.78	7.18	1.89	7.14	2.08
GR	6.31	9.13	6.23	17.7	4.91	20.34	2.2	23.94	-1.25	31.82
GR	-2.60	40.60	-5.5	56.03	-5.72	69.8	-5.75	71.42	-5.51	77.46
GR	-4.52	86.62	-1.92	94.71	1.08	104.29	1.85	106.18	3.85	107.39
GR	3.54	110.38	4.32	112.86	6.03	116.94	6.32	128.56	6.6	134.36
GR	6.59	134.58	6.61	134.97	6.62	135.58				
X1	4150	31	19.58	99.06	50	50	50			
CI	63	-8	0	3	3	28				
GR	4.22	0.00	5.9	1.23	6.62	4.89	7.39	6.3	6.04	6.72
GR	5.95	7.40	5.34	14.91	5.27	19.58	3.07	22.53	-2.37	35.51
GR	-2.08	35.72	-2.47	36.35	-2.83	37.02	-2.89	37.44	-6.23	64.69
GR	-6.24	65.84	-5.83	72.29	-4.98	85.58	-3.4	88.55	3.3	99.06
GR	4.10	107.67	4.1	108.96	4.01	109.53	5.78	115.58	6.19	116.39
GR	6.29	123.99	6.35	127.78	6.34	129.51	6.44	132.89	6.49	135.12

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GR  6.57  137.58

X1 4200     30    25.63  110.92     50      50      50
CI   71     -8        0       3      3      17
X2 2129
GR  3.57    0.00   4.71    0.83   5.99    7.32    6.12    8.25    4.87   11.12
GR  4.86   24.47   4.78   25.57   4.74   25.63    0.91   33.18    0.87   33.34
GR -5.11   57.07  -5.07   67.59  -5.86   74.78   -5.86   74.79   -5.29   83.63
GR -4.41   89.29    0.9  101.63   1.24  103.11    1.67  107.05    4.46  110.92
GR  5.13  112.33   5.79  117.53   6.25  120.91    6.22  121.87    6.25     124
GR  6.60  132.33   6.56  133.15   6.32  134.02    6.35  135.45    6.52  140.62

X1 4250     30    31.33  114.43     50      50      50
CI   73     -8        0       3      3      17
GR  2.93    0.00   3.53    0.44    4.2    3.86    4.59    6.75    5.27   25.49
GR  5.08   27.83   4.81   30.87   4.82   31.33    3.22   37.01    2.88   37.87
GR  1.04   41.74  -0.25   45.44  -4.08   58.57    -5.5   69.38   -6.05   74.36
GR -5.60   77.27  -5.41   78.48  -4.25   91.91   -1.29  104.03     1.8     110
GR  2.34  111.61   4.82   114.1   4.93  114.43    6.05  121.34    5.98  123.32
GR  5.99  124.49   6.05  129.31   6.15  133.29    6.31  138.89    6.46  143.67

X1 4300     34    34.18  125.27     50      50      50
CI   72     -8        0       3      3      18
GR  2.28    0.00   2.34    0.04   2.41    0.39    2.45    0.69    2.54    3.16
GR  2.65    4.22   5.43   16.14   5.61   17.13    5.36   28.53    5.32   28.72
GR  5.29   28.85   4.43   34.18   1.89   38.64    1.26   39.72    1.34   39.77
GR  1.16   41.48  -1.44   61.62  -2.18   62.55   -2.23   62.99   -4.87   79.76
GR -4.91   80.04  -4.85   80.74  -4.68   96.38   -4.27   97.95   -4.11   98.42
GR -0.43  111.47   3.61  120.54   4.42   122.2    4.93  122.43    5.46  125.27
GR  5.73  131.37   6.28  142.38   6.39  146.04    6.41  146.72

X1 4350     31    10.56  126.19     50      50      50
CI   65     -8        0       3      3      40
GR  4.66    0.00   5.61    9.84   5.03   10.56    2.09   14.24    0.99   15.53
GR  0.61   15.98   0.44   16.48   0.25    18.2   -1.31   33.57   -3.04   41.75
GR -3.74   51.53  -3.98   56.44  -4.98   71.93   -5.23   79.55   -5.11   81.77
GR -4.29   97.60  -2.19  108.52   0.07  110.84    2.03  115.94    3.07  119.78
GR  3.28  120.81   4.22  122.62   5.04  126.19    5.53  128.33    5.84  132.63
GR  6.02  137.23   6.22  141.66   6.25  144.09    6.33   144.9    6.19  145.92
GR  6.41  147.53

X1 4400     35     31.7  112.25     50      50      50
CI   71     -8        0       3      3      36
GR  5.51    0.00   5.56    0.03   5.56    0.04    5.52    0.55    5.47    2.16
GR  5.74    3.68   0.42    6.08   0.52    6.44    0.77    6.85    1.66    8.54
GR  5.09   10.36   4.91   14.46   3.64    31.7    1.63   32.73    -0.2   41.24
GR -2.04   45.24  -3.17   52.39  -4.35   70.46   -4.57   77.32   -4.41   80.91
GR -3.86   93.73   -3.4   99.17   1.31  107.56    3.37  112.25    3.25  113.34
GR  3.00  118.26   3.13  119.13   3.38  121.64    4.91  127.19    5.27  129.14
GR  6.43  137.47   6.43  137.55   6.06  140.73    5.94  141.59    6.43  145.14

X1 4450     37    32.13   124.7     50      50      50
CI   72     -8        0       3      3      32
GR  5.45    0.00   5.57    0.07   5.57    0.11    5.48    1.37    5.35    5.35
GR  6.02    9.12   3.73   10.16   4.29   12.12    5.57   14.18    5.55   14.86
GR  5.54   15.03   5.03   26.97   4.88   28.71    4.55   32.13    1.42   34.63
GR -2.37   47.29  -3.32   48.52  -3.71   50.22   -3.16   72.38   -3.23   73.43
GR -3.14   74.65  -3.09    78.7  -2.98   88.15   -2.87  102.55   -2.75  103.34
GR -2.29  104.26  -2.19  104.59   2.91  117.98    3.51  119.51    3.57  119.68
GR  6.20  124.70   6.65  130.12   6.77  132.28    6.86  133.96    6.81  135.04
GR  5.94  137.77   6.44  141.39

X1 4500     36    28.11  114.83     50      50      50
CI   63     -8        0       3      3      26
GR  5.38    0.00   5.57     0.1   5.57    0.17    5.43    2.17    5.23    8.54
GR  5.89   12.30   5.42   14.77   5.39   15.24    5.31   16.19    5.11   20.44
GR  4.60   28.11    0.7   32.95  -0.46   35.47   -3.97   49.12   -4.83   60.13
GR -5.38   68.69  -4.85   76.48  -4.33   84.15   -3.66   93.66   -1.81  101.56
GR  0.86  105.92   2.23  110.96   2.48  112.38    2.97  113.53    3.69  113.92
GR  5.28  114.83    6.3   120.8   6.43  121.44    6.43  121.66    6.64  125.23
GR  6.85  129.15   6.86  129.65   6.86  129.71    6.57  135.68     6.3  136.52
GR  6.45  137.64
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X1	4550	31	11.35	104.45	50	50	50			
CI	61	-8	0	3	3	26				
GR	5.31	0.00	5.58	0.14	5.58	0.24	5.38	2.99	5.24	7.63
GR	6.12	11.08	6.16	11.35	6.01	13.73	5	17.82	5.05	19.43
GR	4.45	21.89	3.31	24.28	0.19	30.95	-3.77	40.86	-5.27	58.39
GR	-5.59	63.41	-5.07	70.76	-4.85	74.27	-3.83	90.81	0.57	99.19
GR	3.52	104.45	3.21	111.27	3.18	112.1	5.86	118.95	6.42	120.78
GR	6.44	121.83	6.67	127.45	6.67	127.69	6.47	132.4	6.49	133.7
GR	6.39	135.39								

X1	4600	32	27.12	115.39	50	50	50			
CI	59	-8	0	3	3	26				
GR	5.25	0.00	5.59	0.18	5.58	0.3	5.38	3.12	5.72	3.49
GR	5.04	12.58	2.24	16.97	2.66	17.81	2.25	20.36	0.22	21.24
GR	1.99	25.55	4.07	27.12	-1.38	37.62	-3.5	41	-4.44	42.25
GR	-5.96	67.96	-5.98	68.31	-5.85	69.47	-5.58	72.05	-4.09	86.04
GR	-2.02	91.56	2.92	104.85	6.04	115.39	6.37	116.49	6.41	116.81
GR	6.51	124.16	6.44	125.58	6.61	125.79	6.57	125.92	6.49	126.19
GR	6.54	129.59	6.26	134.32						

X1	4650	32	19.2	99.28	50	50	50			
CI	57	-8	0	3	3	26				
GR	5.18	0.00	5.59	0.22	5.59	0.37	5.49	1.75	5.77	2.07
GR	5.12	2.69	5.41	3.59	5.25	9.84	4.63	17.8	4.69	19.2
GR	2.83	19.96	1.06	27.05	-4.17	36.72	-4.88	53.85	-5.6	63.66
GR	-5.02	69.84	-4.34	77.22	-3.79	86.64	2.81	97.43	3.3	99.28
GR	4.56	104.69	4.26	106.18	4.53	108.78	4.83	113.01	6.09	115.83
GR	6.23	116.14	6.26	116.22	6.27	116.25	7.05	122.88	6.57	124.37
GR	6.59	125.49	6.13	133.27						

X1	4700	26	16.92	101.24	50	50	50			
CI	55	-8	0	3	3	26				
GR	5.12	0.00	5.6	0.26	5.59	0.4	5.04	6.72	4.29	15.63
GR	2.57	16.43	1.72	16.92	-1	26.93	-4.06	37.23	-4.56	43.29
GR	-5.13	63.56	-4.9	67.63	-4.38	76.62	-3.7	85.32	0.74	98.04
GR	3.50	101.24	5.65	110.8	5.73	110.91	5.81	111.09	5.86	111.68
GR	5.87	113.25	6.03	115.92	6.17	122.18	6.24	122.76	6.45	124.58
GR	6.00	132.21								

X1	4750	26	17.65	90.82	50	50	50			
CI	57	-8	0	3	3	28				
GR	5.25	0.00	5.38	0.16	4.96	1.87	5.01	3.82	4.78	7.03
GR	4.32	14.53	4.07	15.85	3.5	17.65	1.73	22.76	-3.76	38.36
GR	-4.25	45.38	-5.58	64.15	-5.59	64.21	-5.05	70.47	-3.41	85.43
GR	0.63	90.82	3.45	101.54	3.44	101.92	3.71	103.26	5.9	109.34
GR	6.05	118.64	6.06	119.53	6.1	120.03	5.89	123.43	6.13	125.47
GR	5.87	129.89								

X1	4800	26	13.51	108.34	50	50	50			
CI	54	-8	0	3	3	20				
GR	5.52	0.00	5.88	0.44	4.74	5	4.74	5.23	4.56	6.81
GR	3.74	13.51	1.63	17.27	1.2	18.09	1.64	19.22	-0.31	23.42
GR	-4.97	41.82	-5.06	53.05	-5.21	59.83	-5.35	66.65	-4.62	73.25
GR	-3.78	81.71	2.56	97.05	3.31	98.92	5.18	108.34	5.35	109.28
GR	5.79	117.47	5.88	120.43	5.81	123.81	5.75	124.83	5.81	125.41
GR	5.74	126.67								

X1	4850	31	23.66	97.32	53	48	50			
CI	54	-8	0	3	3	28				
GR	5.80	0.00	6.31	0.61	5.94	1.2	6.34	4.13	7.71	8.55
GR	7.75	10.47	6.76	12.61	0.13	16.32	3.18	19.63	3.03	22.47
GR	3.00	23.66	-0.8	30.96	-3.46	34.22	-5.08	51.8	-5.43	56.76
GR	-5.44	57.60	-5.41	58.01	-4.08	76.49	-3.95	77.75	-1.79	87.7
GR	0.31	95.02	3.35	97.32	3.88	99.84	5.33	108.74	5.36	110.62
GR	5.78	120.32	5.81	120.44	5.8	120.72	5.75	125.8	5.73	128.08
GR	5.71	128.44								

X1	4900	33	28.37	106.62	53	48	50			
CI	58	-8	0	3	3	22				
GR	6.09	0.00	6.22	0.15	5.82	0.79	6.09	1.56	6.25	5.43
GR	6.14	6.40	5.83	7.77	5.61	9.21	5.36	10.15	4.61	13.78
GR	2.94	17.09	2.38	18.11	3.28	24.79	3.24	28.37	-0.04	33.78
GR	-1.52	48.96	-4.97	60.56	-4.98	60.77	-5.13	64.33	-3.65	79.1

GR	-3.49	81.58	-2.48	85.57	-0.41	94.23	1.93	96.61	4.1	102.21
GR	5.15	106.62	5.3	107.72	5.87	112.85	6.11	116.97	5.89	124.49
GR	5.86	127.59	5.8	133.93	5.76	134.9				
X1	4950	27	14.02	99.87	52	48	50			
CI	59	-8	0	3	3	24				
GR	6.63	0.00	6.63	1.59	6.6	5.15	6.08	13.87	6.04	14.02
GR	4.12	19.28	3.16	21.87	3.11	22.01	3.08	22.11	-4.21	40.48
GR	-4.62	48.86	-5.18	61.02	-3.73	64.1	-0.65	70.66	-0.64	80.48
GR	0.75	90.85	1.04	95.93	0.87	98.01	3.31	99.87	4.59	107.25
GR	5.37	110.74	5.53	113.5	6.06	122.42	5.98	125.1	5.97	126.22
GR	5.87	136.67	5.81	138.27						
X1	5000	27	14.25	101.68	52	48	50			
CI	58	-8	0	3	3	18				
GR	5.97	0.00	6.22	0.6	6.17	2.05	6.43	13.57	6.45	13.95
GR	6.43	14.09	6.35	14.25	0.02	25.55	-1.15	29.52	-1.79	37.45
GR	-5.41	62.43	-4.99	66.46	-4.29	72.98	-1.53	91.08	-1.22	95.02
GR	2.65	99.79	4.53	101.68	5.65	105.02	5.65	111.4	6.33	114.12
GR	5.77	116.49	6.01	120.99	5.99	122.19	6.05	123.21	6.05	123.56
GR	5.95	134.76	5.85	136.99						
X1	5050	26	17.31	107.63	50	50	50			
CI	63	-8	0	3	3	26				
GR	6.25	0.00	6.63	0.94	6.24	3.13	5.13	15.88	5.16	16.8
GR	4.76	17.31	3.83	20.12	-1.24	31.65	-1.73	37.14	-5.99	62.67
GR	-5.72	68.94	-5.65	69.87	-4.84	80.31	-1.61	95.87	-2.5	101.19
GR	0.35	102.91	5.6	107.63	5.79	112.64	5.95	117.32	5.99	119.4
GR	6.03	120.02	5.98	120.25	6.1	122.55	6.1	123.73	6.03	130.9
GR	5.91	133.85								
X1	5100	31	21.86	104.91	50	50	50			
CI	63	-8	0	3	3	22				
GR	6.52	0.00	6.75	0.57	6.5	1.99	6.79	6.22	6.72	6.39
GR	6.71	7.00	6.24	15.22	6.13	17.21	6.05	19.36	5.81	21.86
GR	4.49	28.09	3.98	30.08	1.51	33.2	1.1	36.26	-4.88	52.1
GR	-5.72	61.28	-4.98	73.27	-4.79	76.29	-4.47	83.58	0.78	98.84
GR	3.93	104.91	3.88	107.87	5.59	110.85	5.3	111.79	5.55	114.44
GR	6.21	121.14	6.14	121.45	6.16	121.82	6.14	123.85	6.11	126.94
GR	5.96	130.61								
X1	5150	24	24.64	110.05	50	50	50			
CI	66	-8	0	3	3	22				
GR	6.79	0.00	6.88	0.21	6.78	0.73	6.89	2.27	6.73	2.68
GR	5.84	20.05	5.47	22.97	5.15	24.64	4.27	26.6	3.15	30.54
GR	0.34	36.21	-3.22	44.97	-4.39	48.19	-5.84	64.39	-5.02	76.67
GR	-4.36	86.51	-4.25	88.4	0.62	92.62	13.2	110.05	14.55	112.96
GR	5.03	116.53	5.97	122.58	6.12	124.91	6.02	127.37		
X1	5200	30	24.8	127.19	50	50	50			
CI	67	-8	0	3	3	22				
GR	7.17	0.00	6.84	0.34	6.79	0.48	6.79	1.56	6.76	2.4
GR	6.56	4.99	6.13	8.29	6.31	21.53	6.18	23.95	6.28	24.8
GR	4.39	28.12	1.91	34.62	0.41	36.82	-1.84	44.32	-3.56	49.62
GR	-5.02	63.29	-5.43	69.71	-3.63	77.96	-0.42	92.64	0.51	101.97
GR	1.76	108.30	1.84	112.2	1.8	113.1	4.54	121.45	4.91	122.9
GR	5.91	125.49	6.16	126.35	6.26	126.72	6.3	127.17	6.29	127.19
X1	5250	31	34.82	111.93	50	50	50			
CI	68	-8	0	3	3	27				
GR	7.71	0.00	6.57	1.15	6.42	1.63	6.41	5.27	6.32	8.09
GR	5.67	16.46	5.63	16.57	5.56	17.64	4.95	24.63	4.08	27.71
GR	4.04	30.33	4.13	32.22	3.57	34.82	1.11	37.53	-0.52	44.82
GR	-4.33	50.42	-4.86	67.73	-5.38	76.02	-5.34	76.39	-4.06	89.48
GR	-3.25	96.91	-0.66	104.61	4.22	111.93	4.46	112.69	4.14	114.64
GR	5.23	119.67	5.6	120.92	6.29	123.41	6.37	125.96	6.66	128.84
GR	6.47	129.13								
X1	5300	29	24.46	123.94	50	50	50			
CI	70	-8	0	3	3	26				
GR	8.25	0.00	6.31	1.96	6.05	2.78	6.04	8.98	5.96	11.36
GR	5.89	16.18	5.31	24.46	4.27	29.32	3.55	32.13	-4.63	50.8
GR	-4.67	50.85	-4.7	50.96	-5.19	72.19	-5.2	72.35	-5.02	74.82

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GR -3.56   95.28   -3.53   95.54   -3.34      96   -2.99   96.85    3.48  112.46
GR  4.02  113.70    4.15  114.93     4.2  116.44    5.59  120.87    6.43  123.94
GR  6.09  124.56    6.24  125.75     6.3  128.38    6.46  129.51

X1 5350      25   15.54  111.56      50      50      50
CI    68      -8       0       3       3      26
GR  8.79    0.00    6.05    2.77    5.69    3.92    5.67    7.99     5.6   12.66
GR  5.50   13.89    5.48   15.54    5.16   18.06     4.7   21.24    1.19   33.14
GR  1.26   33.77    0.44    34.4   -0.54   37.87   -3.72    48.4   -4.22   53.62
GR -5.03   73.24   -5.08   74.64   -4.71   81.09   -3.64   92.16     3.5  108.72
GR  4.70  111.56    4.79  112.66    6.05  123.37    5.83   125.1    6.11   127.1

X1 5400      26   29.49  104.97      50      50      50
CI    66      -8       0       3       3      20
GR  9.33    0.00    5.79    3.58    5.32    5.07    5.32    5.63    5.31    6.28
GR  5.23    7.19    4.87   13.02    4.82   14.75     4.8   15.26    4.25   29.35
GR  4.24   29.49   -0.04   33.77   -0.07   33.89   -4.22   57.34   -5.16   67.06
GR -4.89   71.67    -4.5   78.21   -3.64   89.62    3.58  104.97     4.6  107.21
GR  4.80  108.44    5.22  114.16    5.73  119.03     5.7  119.64    5.95  123.96
GR  6.15  124.50

X1 5450      24   17.94   99.53      50      50      50
CI    64      -8       0       3       3      20
GR  9.87    0.00    5.53    4.39    5.48    4.54    5.54    5.05    5.44    8.19
GR  5.53   17.89    5.53   17.91    5.52   17.94    1.81   30.88   -1.66    38.4
GR -2.81   48.16   -5.18   58.83   -5.49   63.17   -4.96    70.1    -3.5   89.31
GR -3.27   92.29   -1.33      97    2.32   99.53    2.31  104.96     2.5  105.38
GR  4.16  108.68    5.29  116.36    5.57  118.23    5.92  120.74

X1 5500      35   22.67  101.13      50      50      50
CI    63      -8       0       3       3      20
GR 10.40    0.00    7.63    2.82    6.51    4.95    5.84    6.58     5.7     9.7
GR  5.34   11.48    7.37   11.78    7.37   16.36    9.52   20.99    9.64   22.13
GR  9.51   22.67    6.96   24.63       5   26.38    1.85   31.37   -0.11   34.41
GR -1.16   36.84   -2.52   41.71   -3.38   43.42   -4.67      47   -5.03   68.53
GR -5.05   69.65   -4.82   72.99   -3.46   87.76   -2.38   91.78    2.05  101.13
GR  2.21  101.49    2.24   101.7    2.65  104.44    3.42  105.37    2.01  107.31
GR  1.58  110.32    1.54  111.34    4.87  112.94    5.35  114.97     5.5  116.62

X1 5550      22   18.35  108.33      50      50      50
CI    59      -8       0       3       3      25
GR 10.94    0.00    9.96    0.99    9.56    1.75    7.66    6.38    6.26    7.24
GR  6.11    8.02    5.68   11.04     5.1   18.35    2.15   25.36   -0.64   29.01
GR -3.75   36.52   -4.18   48.12   -5.21   60.97   -4.78   66.95   -4.09   76.81
GR -3.11   85.78    1.27   97.56    2.13   99.39    2.77  101.35    4.85  108.33
GR  4.81  109.26     5.1  112.46

X1 5600      23       0  103.87      50      50      50
CI    54      -8       0       3       3      26
GR  9.95    0.00    9.41    0.51    8.61    1.43    6.85    4.01    5.57    6.54
GR  5.43    7.62    1.39   12.46    1.39   12.64    2.26    12.9     1.6   14.32
GR -4.10   30.92   -4.82   42.19   -5.28   56.99   -4.72   62.59   -3.63   73.41
GR -3.04   78.83   -1.31   83.59    2.19   95.48    3.44  100.83    3.67  102.71
GR  4.51  103.87    4.63  105.14    4.74  108.14

X1 5650      21    12.4  100.74      54      47      50
CI    51      -8       0       3       3      26
GR  6.84    0.00    5.81    0.98    5.38    2.52    3.59   10.54    3.05    12.4
GR  0.39   17.96   -3.59    25.1   -4.29   29.05   -5.05   57.93   -5.03   58.24
GR -5.00   58.53   -3.37   75.43   -3.16   76.69   -0.88   89.79    0.82   95.57
GR  0.98   96.56    1.34   97.05    4.19  100.74    4.24  101.28    4.79  105.85
GR  4.92  107.26

X1  5700      23   15.09   95.33      54      47      50
CI    47      -8       0       3       3      26
GR  6.11       0    5.88    1.04    5.79    1.48    5.55    2.13    3.58    5.71
GR  3.05    6.82     1.1    9.59    1.03   12.19    3.01   15.09     1.4   21.42
GR -5.23   40.56   -5.37   50.91   -4.79   58.53   -4.31   64.91   -3.86   69.77
GR  1.36   81.68    3.61   92.15    4.86   95.33    4.39   101.6     4.4   101.8
GR  4.98  103.39    5.26   106.3    5.17  106.91

X1 5750      24    2.79  103.47      54      47      50
CI    51      -8       0       3       3      32
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GR	7.19	0.00	6.7	0.75	6.08	1.08	6.02	2.79	5.86	4.94
GR	4.94	7.44	4.83	8.44	3	9.81	1.77	11.67	-1.05	19.94
GR	-0.75	23.87	-4.06	33.3	-0.2	41.57	1.04	58.88	1.38	61.18
GR	2.30	67.57	2.76	73.98	-0.6	88.68	1.49	90.55	-0.15	91.49
GR	1.54	93.66	5.47	103.47	5.6	104.86	5.15	107.84		

X1	5800	19	17.83	107.37	55	47	50			
CI	54	-8	0	3	3	26				
GR	7.86	0.00	7.14	0.84	8.06	0.94	7.99	7.58	7.88	7.82
GR	2.41	13.06	4.78	17.83	-0.62	29.05	-4.76	44.23	-5.01	56.38
GR	-4.78	59.95	-4.3	66.72	-3.59	76.91	-1.59	87.92	-0.64	92.83
GR	-0.37	94.22	0.57	96.13	5.18	107.37	4.93	108.68		

X1	5850	24	20.85	94.65	55	47	50			
CI	54	-8	0	3	3	22				
GR	7.41	0.00	6.34	1.26	6.06	3.26	5.45	5.09	5.49	5.28
GR	5.14	6.76	3.84	8.18	0.9	13.07	2.83	17.86	4.61	20.85
GR	-2.27	38.41	-5.54	44.67	-5.78	47.87	-3.63	64.2	-3.4	66.06
GR	-3.06	68.88	-2.64	71.04	0.44	88.98	3.92	93.69	5.59	94.65
GR	5.58	99.22	4.85	103.31	4.29	105.56	4.04	106.89		

X1	5900	25	5.66	111.61	56	47	50			
CI	58	-8	0	3	3	26				
GR	6.96	0.00	6.95	0.02	6.94	0.07	6.93	0.09	6.87	0.42
GR	8.29	5.66	1.54	15.19	1.21	15.51	1.18	15.88	1.06	16.31
GR	-4.37	38.98	-5.24	46.61	-5.35	58.67	-4.66	65.97	-3.3	72.77
GR	-1.67	80.88	-1.18	84.38	-0.41	87.62	0.63	94.84	0.84	95.83
GR	1.60	96.38	1.75	98.62	5.7	111.61	5.64	112.02	4.95	113.66

X1	5950	24	2.08	96.61	56	47	50			
CI	57	-8	0	3	3	20				
GR	6.81	0.00	6.76	0.35	6.85	1.06	6.93	2.08	6.89	2.56
GR	6.50	4.01	4.61	12.95	3.96	14.4	-0.26	26.83	-2.6	32.61
GR	-3.51	36.81	-4.26	43.65	-5.03	50.68	-5.53	55.92	-5.34	57.39
GR	-3.95	73.41	-3.68	76.54	-0.61	83.7	1.91	94.38	5.07	96.61
GR	5.40	97.87	5.89	103.52	5.95	104.43	6.75	111.93		

X1	6000	13	0	95	56	48	50			
CI	44	-8	0	3	3	26				
GR	6.6	0	5	7	4.4	8	-0.6	8.1	-1	11
GR	-4	32	-5	41	-5.6	51	-5	57	-4	66
GR	-3	71	6	90	6.8	95				

X1	6050	12	0	97	53	49	50			
CI	52	-8	0	3	3	24				
GR	6.4	0	5	7	0.2	10	0	11	-4	29
GR	-5	39	-5.7	48	-5	57.5	-4	66	1.1	90
GR	5	95	6.5	97						

X1	6100	13	13	105	50	50	50			
CI	61	-8	0	3	3	24				
X3	10									
GR	10.7	0	11	12	11.5	12	11.5	13	7.3	13
GR	2	19	2	21	-1	24	-4	52	-3	83
GR	1	101	5.5	105	8.5	111				

NC	.04	.04	.03	.1	.3					
SB	1.05	1.56	2.6	0	55	5	900	1	0	0
X1	6110	12	0	117	10	10	10			
X2			1	6.5	10	0	0	0		
X3	10									
BT	-10	0	10	10	0	10	8	14.5	10	6
BT		57	10	6	57	10	-11	60	10	-11
BT		60	10	6	103	10	6	117	10	8
BT		117	10	10						
GR	10	0	3	14.5	3	17	2	17	2	20
GR	-4	28.5	-4	88.5	2	97	2	100	3	100
GR	3	102.5	10	117						

NC	.04	.04	.03	.1	.3					
SB	1.05	1.56	2.6	0	55	5	900	1	0	0
X1	6191	12	0	117	81	81	81			
X2			1	6.5	10	0	0	0		

X3	10									
BT	-10	0	10	10	0	10	8	14.5	10	6
BT		57	10	6	57	10	-11	60	10	-11
BT		60	10	6	103	10	6	117	10	8
BT		117	10	10						
GR	10	0	3	14.5	3	17	2	17	2	20
GR	-4	28.5	-4	88.5	2	97	2	100	3	100
GR	3	102.5	10	117						
NC	.04	.04	.03	.1	.3					
X1	6201	14	0	90	10	10	10			
CI	52	-8	0	3	3	20				
GR	7.3	0	2.0	0.1	0	9	-1	13	-2	19
GR	-3	22	-4	30	-5	39	-5	48	-4	56
GR	-3	65	0	83	5.1	90	7.1	96		
X1	6250	13	22	124	49	49	49			
CI	44	-8	0	3	3	26				
GR	7.9	0	5.5	22	1	24	0	26	-3	42
GR	-4	50	-4.7	62	-4	80	-3	85	0	95
GR	1	98	2.6	110	7.7	124				
X1	6300	11	13	102.1	48	51	50			
CI	61	-8	0	3	3	34				
GR	7.6	0	5	12	4.4	13	1	15	-4.9	42
GR	-4.6	64	-4	69	0	102	5.5	102.1	6	105
GR	6.6	115								
X1	6350	28	34.24	119.35	46	52	50			
CI	77	-8	0	3	3	32				
GR	7.38	0.00	7.36	13.99	7.4	14.55	7.28	16.49	6.97	18.19
GR	5.74	27.79	4.99	28.8	5.82	32.4	4.7	34.24	2.27	36.29
GR	1.70	38.67	-4.49	55.78	-4.58	65.85	-4.62	72.68	-4.07	75.99
GR	-2.82	87.49	-2.05	94.57	-1.29	100.91	2.51	112.97	4.99	119.35
GR	5.89	124.57	6.06	127.21	6.73	132.22	6.63	136.22	7.01	140.52
GR	7.16	144.24	7.04	144.95	7.07	145.41				
X1	6400	23	19.9	140.81	47	52	50			
CI	75	-8	0	3	3	38				
GR	7.38	0.00	7.37	7.85	7.38	10.23	7.22	12.5	7.21	15.63
GR	6.79	19.27	5.93	19.9	2.98	27.5	-0.68	39.69	-3.85	50.12
GR	-4.31	62.04	-4.34	68.05	-3.48	84.99	-3.46	85.42	-2.89	93.37
GR	-2.66	95.25	-0.86	110.38	2.29	119.22	6.51	138.94	6.63	140.81
GR	6.65	141.37	6.44	142.62	6.5	143.42				
X1	6450	25	8.46	122.7	46	52	50			
CI	72	-8	0	3	3	42				
GR	7.37	0.00	7.37	0.1	7.5	0.35	7.62	0.82	7.61	1.35
GR	8.41	8.46	6.36	13.11	6.01	16.42	3.75	18.62	2.99	19.65
GR	2.34	20.18	-1.2	36.24	-3.09	43.05	-3.2	46.03	-3.92	73.2
GR	-3.82	75.28	-3.61	79.24	-2.67	97.74	-1.9	100.77	3.02	119.02
GR	5.72	122.70	6.34	125.92	6.68	131.46	6.92	138.06	6.46	141.73
X1	6500	21	15.73	127.81	47	53	50			
CI	77	-8	0	3	3	48				
GR	6.99	0.00	6.86	4.16	7	4.44	6.87	4.67	6.58	7.28
GR	5.82	15.73	3.87	17.42	2.91	18.24	-2.19	42.7	-2.89	46.27
GR	-3.98	66.56	-4.01	70.9	-3.75	76.18	-3.13	88.42	-2.89	95.8
GR	1.14	119.00	2.97	123.98	5.58	127.81	5.93	128.94	6.28	137.46
GR	6.59	145.51								
X1	6550	19	20.93	115.12	47	53	50			
CI	65	-8	0	3	3	48				
GR	4.92	0.00	2.47	11.91	2.38	18.36	1.75	20.93	-2.91	38.73
GR	-3.52	58.46	-3.56	64.03	-3.62	70.27	-3.28	80.71	-2.71	100.73
GR	-1.13	106.34	1.92	115.12	3.43	124.69	4.04	126.89	4.82	127.33
GR	6.83	130.57	7.44	131.48	7.55	132.01	7.56	136.68		
X1	6600	11	0	127	47	53	50			
CI	59	-8	0	3	3	48				
GR	11.4	0	1.2	0	1.2	2	-0.1	2	0	5
GR	-2	25	-3	59	-3.6	76	-3	103	-0.3	127
GR	7.1	127								

X1	6650	10	0	135	48	52	50			
CI	60	-8	0	3	3	48				
GR	7.1	0	-0.1	0	-1	11	-2	22.5	-3	61
GR	-3	103	-2	119	-1	126	0.2	135	4.7	135
X1	6700	12	0	142	48	52	50			
CI	71	-8	0	3	3	86				
GR	3.3	0	0.4	0	0	4	-1	15	-2	25
GR	-3	68	-3.1	93	-3	108	-2	127	0	139
GR	0.5	142	4.7	142						
X1	6750	11	0	152.5	48	53	50			
CI	71	-8	0	3	3	86				
GR	3.5	0	0	0	-2	29	-3	67	-2.5	92
GR	-2.3	120	-2	123	-1	130	0	137	1	145
GR	6.6	152.5								
X1	6800	12	0	164	48	53	50			
CI	75	-8	0	3	3	86				
GR	9.5	0	8	0	0.9	11	0	17	-1	30
GR	-2	47	-2	116	-2	146	-1	153	0	160
GR	0.4	164	6	164						
X1	6850	21	0	157.40	47	53	50			
CI	74	-8	0	3	3	86				
GR	5.84	0.00	4.98	2.78	-1.75	24.55	-2.06	43	-2.27	47.11
GR	-2.27	50.85	-2.4	64.27	-2.44	68.19	-2.22	81.76	-1.95	93.77
GR	-1.70	106.61	-1.49	119.63	-2.12	128.68	-2.54	136.83	6.51	155.81
GR	7.31	157.40	7.12	166.46	7.07	167.18	7.07	167.49	7.11	168.65
GR	5.70	169.00								
X1	6900	35	14.77	179.81	47	54	50			
CI	82	-8	0	3	3	86				
GR	5.81	0.00	5.68	0.26	5.64	0.4	3.26	6.38	2.71	7.74
GR	2.41	9.06	3.12	10.34	3.14	14.77	-0.61	26.31	-1.81	30.2
GR	-2.19	51.34	-2.18	53.97	-2.13	55.79	-2.15	58.35	-2.15	71.72
GR	-2.14	83.23	-2.44	97.34	-2.23	106.98	-1.74	122.51	-1.63	129.43
GR	1.73	139.69	-1.52	149.5	-1.03	156.07	-0.75	158.22	1.78	166.52
GR	2.32	168.35	3.2	171.73	3.59	173.21	3.28	174.41	4.72	176.37
GR	6.88	179.62	6.85	179.81	4.37	179.98	4.19	180.07	4.58	180.25
X1	6950	25	21.37	192.36	47	54	50			
CI	91	-8	0	3	3	86				
GR	4.52	0.00	2.63	14.68	2.22	17.98	2.08	18.56	2.09	19.53
GR	1.88	20.19	1.76	21.37	-2	36.92	-1.97	43.15	-2.42	63.33
GR	-2.31	68.17	-2.26	81.49	-2.21	93.55	-2.27	98.83	-2.4	104.41
GR	-1.87	132.00	-1.75	135.41	-1.55	162.23	-1.48	162.69	1.62	178.44
GR	1.62	178.58	2.07	179.51	7.3	192.33	7.25	192.36	7.26	192.36

EJ

ER

THIS RUN EXECUTED 22APR93 10:29:14

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

T1 KAELEPULU STREAM ORIGINAL CHANNEL FILE: KKDORIG2.DAT
T2 STREAM HYDRAULICS, NOT OBSTRUCTED DATE: 3/31/93
T3 SUBCRITICAL FLOW (STA. -800 TO STA. 69+50)

	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
J1										
	-10				0		.1	2325	1.76	

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

J3 VARIABLE CODES FOR SUMMARY PRINTOUT

150

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

-10 -10

THIS RUN EXECUTED 22APR93 10:29:51

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**************************************
HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
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NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

SUBCRITICAL FLOW (STA

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	800.000	0.00	0.00	0.00	-6.00	2325.00	1.76	-3.22	1.82	1.27	1.94	1199.39	2062.93
	750.000	50.00	0.00	0.00	-6.00	2325.00	1.77	-2.74	1.83	1.35	1.88	1236.28	1999.20
	700.000	50.00	0.00	0.00	-4.00	2325.00	1.78	-2.26	1.83	1.48	1.86	1250.01	1909.29
	650.000	50.00	0.00	0.00	-5.50	2325.00	1.80	-2.95	1.84	1.05	1.59	1463.06	2263.89
	600.000	50.00	0.00	0.00	-4.00	2325.00	1.82	-2.77	1.85	0.68	1.28	1814.61	2809.47
*	550.000	50.00	0.00	0.00	-4.00	2325.00	1.81	-2.31	1.86	1.48	1.73	1341.34	1912.86
	500.000	50.00	0.00	0.00	-4.00	2325.00	1.78	-2.05	1.88	2.90	2.57	903.87	1364.16
	450.000	50.00	0.00	0.00	-4.00	2325.00	1.79	-1.98	1.90	3.24	2.74	847.72	1292.61
	400.000	50.00	0.00	0.00	-4.00	2325.00	1.80	-1.97	1.92	3.27	2.76	842.98	1286.14
	350.000	50.00	0.00	0.00	-4.00	2325.00	1.82	-1.97	1.94	3.26	2.76	842.44	1287.92
	300.000	50.00	0.00	0.00	-4.00	2325.00	1.85	-2.02	1.95	2.87	2.59	898.97	1372.15
	250.000	50.00	0.00	0.00	-4.00	2325.00	1.84	-1.79	1.98	3.96	3.00	773.77	1168.07
	200.000	50.00	0.00	0.00	-4.00	2325.00	1.89	-1.98	2.00	3.10	2.71	857.34	1320.93
*	150.000	50.00	0.00	0.00	-4.00	2325.00	1.83	-1.10	2.07	10.31	3.98	583.50	723.99
*	100.000	50.00	0.00	0.00	-4.00	2325.00	2.02	-2.10	2.11	2.41	2.44	954.38	1498.85
	50.000	63.00	0.00	0.00	-4.00	2325.00	2.03	-1.93	2.13	2.91	2.60	894.40	1362.32
	36.000	14.00	0.00	0.00	-4.00	2325.00	2.01	-1.50	2.14	4.46	2.98	781.24	1101.04

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	26.000	10.00	8.00	6.00	-4.00	2325.00	2.13	0.00	2.23	2.54	2.48	937.67	1458.30
	8.000	34.00	8.00	6.00	-4.00	2325.00	2.21	0.00	2.29	2.11	2.31	1007.17	1601.99
*	18.000	10.00	0.00	0.00	-4.00	2325.00	2.19	-1.54	2.30	6.31	2.74	848.83	925.30
*	50.000	50.00	0.00	0.00	-1.48	2325.00	2.34	2.34	3.57	186.15	8.88	261.71	170.41
*	100.000	50.00	0.00	0.00	-0.67	2325.00	3.62	1.90	3.84	19.91	3.92	640.20	521.04
	150.000	50.00	0.00	0.00	-0.28	2325.00	3.72	2.29	3.95	25.23	3.87	607.95	462.88
	200.000	50.00	0.00	0.00	-0.53	2325.00	3.87	2.44	4.08	25.83	3.66	634.48	457.46
*	250.000	50.00	0.00	0.00	-1.67	2325.00	4.04	1.23	4.16	7.59	2.72	878.46	843.76
*	300.000	50.00	0.00	0.00	-2.94	2325.00	4.12	-0.38	4.18	2.91	2.04	1176.73	1362.15
	350.000	50.00	0.00	0.00	-2.76	2325.00	4.14	-0.33	4.20	2.82	1.97	1201.12	1384.64
	400.000	50.00	0.00	0.00	-2.72	2325.00	4.15	-0.30	4.22	3.22	2.07	1137.85	1295.39
	450.000	50.00	0.00	0.00	-5.61	2325.00	4.18	-1.25	4.23	2.27	1.88	1240.03	1543.65
	500.000	50.00	0.00	0.00	-4.54	2325.00	4.19	-1.34	4.24	2.03	1.82	1278.45	1631.56
	550.000	50.00	0.00	0.00	-6.10	2325.00	4.21	-2.34	4.25	1.21	1.54	1507.71	2117.24
	600.000	50.00	0.00	0.00	-6.49	2325.00	4.22	-3.11	4.26	0.95	1.44	1620.18	2383.08
	650.000	50.00	0.00	0.00	-7.91	2325.00	4.24	-4.22	4.26	0.69	1.29	1803.16	2789.55
	700.000	50.00	0.00	0.00	-8.19	2325.00	4.24	-4.56	4.26	0.56	1.22	1919.02	3101.02
	750.000	50.00	0.00	0.00	-7.12	2325.00	4.25	-4.61	4.27	0.51	1.18	1992.86	3242.23
	800.000	50.00	0.00	0.00	-5.65	2325.00	4.24	-2.68	4.27	1.02	1.44	1622.92	2304.36
	850.000	50.00	0.00	0.00	-4.00	2325.00	4.24	-1.46	4.28	1.40	1.58	1478.85	1962.83
	900.000	50.00	0.00	0.00	-5.00	2325.00	4.26	-2.35	4.29	0.96	1.38	1684.81	2369.01
*	950.000	50.00	0.00	0.00	-7.71	2325.00	4.27	-4.40	4.29	0.46	1.10	2109.94	3416.87
	1000.000	50.00	0.00	0.00	-6.80	2325.00	4.28	-4.60	4.30	0.47	1.12	2076.21	3380.75
	1050.000	50.00	0.00	0.00	-9.34	2325.00	4.28	-5.21	4.30	0.46	1.13	2057.79	3415.22
	1100.000	50.00	0.00	0.00	-9.83	2325.00	4.28	-5.37	4.30	0.44	1.10	2121.87	3508.55
	1150.000	50.00	0.00	0.00	-9.31	2325.00	4.28	-5.74	4.30	0.41	1.09	2139.25	3638.20

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
1200.000	50.00	0.00	0.00	-8.72	2325.00	4.28	-5.17	4.30	0.46	1.14	2037.80	3430.09
1250.000	50.00	0.00	0.00	-8.42	2325.00	4.29	-5.03	4.31	0.46	1.15	2025.68	3418.73
1300.000	50.00	0.00	0.00	-7.71	2325.00	4.29	-4.85	4.31	0.47	1.14	2034.09	3388.52
1350.000	50.00	0.00	0.00	-7.81	2325.00	4.29	-4.89	4.31	0.53	1.20	1952.30	3204.09
1400.000	50.00	0.00	0.00	-8.93	2325.00	4.29	-4.85	4.32	0.49	1.18	1985.22	3324.18
1450.000	50.00	0.00	0.00	-8.93	2325.00	4.30	-5.05	4.32	0.55	1.22	1908.05	3122.65
1500.000	50.00	0.00	0.00	-8.87	2277.00	4.30	-5.31	4.32	0.42	1.11	2051.39	3501.05
1550.000	50.00	0.00	0.00	-9.23	2277.00	4.30	-5.42	4.32	0.42	1.10	2075.48	3522.23
1600.000	50.00	0.00	0.00	-9.27	2277.00	4.31	-5.50	4.33	0.43	1.11	2061.85	3452.94
1650.000	50.00	0.00	0.00	-8.57	2277.00	4.31	-5.39	4.33	0.41	1.10	2075.53	3569.82
1700.000	50.00	0.00	0.00	-8.46	2277.00	4.31	-5.24	4.33	0.44	1.13	2014.30	3422.86
1750.000	50.00	0.00	0.00	-8.59	2277.00	4.31	-4.88	4.33	0.55	1.20	1900.65	3070.06
1800.000	50.00	0.00	0.00	-8.41	2277.00	4.32	-5.08	4.34	0.45	1.15	1999.12	3406.27
1850.000	50.00	0.00	0.00	-8.87	2277.00	4.32	-5.47	4.34	0.37	1.05	2178.64	3762.45
1900.000	50.00	0.00	0.00	-8.71	2277.00	4.32	-4.76	4.34	0.45	1.08	2102.01	3395.40
1950.000	50.00	0.00	0.00	-8.17	2277.00	4.33	-4.64	4.34	0.40	1.05	2175.86	3600.58
2000.000	50.00	0.00	0.00	-8.20	2277.00	4.33	-4.64	4.35	0.38	1.00	2271.62	3702.17
2050.000	50.00	0.00	0.00	-8.30	2277.00	4.33	-4.77	4.35	0.34	0.96	2372.64	3906.76
2100.000	50.00	0.00	0.00	-7.54	2277.00	4.34	-4.43	4.35	0.31	0.91	2508.16	4087.24
2150.000	50.00	0.00	0.00	-7.09	2277.00	4.34	-4.06	4.35	0.33	0.92	2487.40	3950.83
2200.000	50.00	0.00	0.00	-6.81	2277.00	4.34	-3.98	4.35	0.43	1.04	2185.15	3457.40
2250.000	50.00	0.00	0.00	-6.58	2277.00	4.34	-3.94	4.36	0.51	1.12	2036.37	3178.09
2300.000	50.00	0.00	0.00	-6.24	2277.00	4.33	-3.56	4.36	0.77	1.36	1752.37	2598.48
2350.000	50.00	0.00	0.00	-6.33	2277.00	4.34	-3.56	4.37	0.76	1.38	1680.50	2603.75
2400.000	50.00	0.00	0.00	-6.53	2277.00	4.34	-3.63	4.37	0.75	1.36	1679.29	2622.66
2450.000	50.00	0.00	0.00	-6.49	2277.00	4.35	-3.62	4.37	0.77	1.32	1786.21	2592.77

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	2500.000	50.00	0.00	0.00	-6.45	2277.00	4.36	-3.35	4.38	0.63	1.21	2052.19	2862.20
	2550.000	50.00	0.00	0.00	-6.17	2277.00	4.36	-3.47	4.38	0.48	1.06	2191.32	3291.28
	2600.000	50.00	0.00	0.00	-6.00	2277.00	4.36	-3.47	4.39	0.64	1.23	1899.12	2835.57
	2650.000	50.00	0.00	0.00	-6.26	2277.00	4.36	-3.54	4.39	0.72	1.28	1788.55	2682.74
	2700.000	50.00	0.00	0.00	-5.85	2277.00	4.37	-3.27	4.39	0.79	1.35	1701.94	2566.86
	2750.000	50.00	0.00	0.00	-5.88	2277.00	4.37	-3.26	4.40	0.81	1.38	1675.34	2523.94
	2800.000	50.00	0.00	0.00	-5.89	2277.00	4.37	-3.13	4.40	0.90	1.41	1628.04	2405.25
	2850.000	50.00	0.00	0.00	-5.94	2277.00	4.38	-3.06	4.41	0.83	1.40	1651.24	2504.65
	2900.000	50.00	0.00	0.00	-5.93	2277.00	4.38	-2.97	4.41	0.91	1.43	1615.13	2385.52
	2950.000	50.00	0.00	0.00	-5.41	2277.00	4.38	-2.69	4.42	0.98	1.49	1559.20	2294.94
	3000.000	50.00	0.00	0.00	-5.74	2277.00	4.39	-2.58	4.42	1.11	1.55	1499.80	2163.59
	3050.000	50.00	0.00	0.00	-5.39	2277.00	4.39	-2.67	4.43	1.13	1.60	1423.37	2138.18
	3100.000	50.00	0.00	0.00	-5.44	2277.00	4.41	-2.80	4.44	0.79	1.26	1879.99	2560.81
	3150.000	50.00	0.00	0.00	-5.23	1769.00	4.42	-3.06	4.44	0.52	1.11	1588.80	2451.13
*	3200.000	50.00	0.00	0.00	-4.82	1769.00	4.41	-1.97	4.45	1.22	1.58	1150.43	1604.10
*	3250.000	50.00	0.00	0.00	-4.15	1769.00	4.37	-0.70	4.48	4.59	2.73	648.10	825.78
	3300.000	50.00	0.00	0.00	-4.75	1769.00	4.39	-0.77	4.51	4.42	2.75	644.28	841.09
	3350.000	50.00	0.00	0.00	-5.83	1769.00	4.42	-1.31	4.53	4.19	2.61	678.16	864.50
	3400.000	50.00	0.00	0.00	-5.82	1769.00	4.45	-1.82	4.55	3.12	2.47	718.77	1001.25
	3450.000	50.00	0.00	0.00	-5.89	1769.00	4.46	-1.06	4.57	4.39	2.68	659.91	844.41
	3500.000	50.00	0.00	0.00	-5.92	1769.00	4.49	-1.34	4.59	4.34	2.65	668.07	849.55
	3550.000	50.00	0.00	0.00	-6.13	1769.00	4.52	-1.85	4.62	3.35	2.44	724.57	965.87
	3600.000	50.00	0.00	0.00	-5.71	1769.00	4.53	-1.69	4.64	3.97	2.63	672.74	887.66
	3650.000	50.00	0.00	0.00	-5.91	1769.00	4.56	-1.42	4.66	3.89	2.56	692.43	897.42
	3700.000	50.00	0.00	0.00	-5.72	1769.00	4.57	-1.46	4.68	3.91	2.64	671.11	895.00
	3750.000	50.00	0.00	0.00	-5.27	1769.00	4.58	-1.28	4.71	4.59	2.84	622.64	825.79

Run Date: 22APR93 Run Time: 10:29:14 HMVersion: 6.51 Data File: C:\KKD\HEC2\KKDORIG2.DAT Page 9

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	3800.000	50.00	0.00	0.00	-5.49	1769.00	4.64	-1.39	4.73	3.11	2.38	742.99	1002.97
	3850.000	50.00	0.00	0.00	-5.63	1769.00	4.64	-1.54	4.75	4.12	2.73	647.74	871.40
	3900.000	50.00	0.00	0.00	-5.60	1769.00	4.63	-0.42	4.80	7.51	3.30	539.55	645.43
	3950.000	50.00	0.00	0.00	-5.72	1769.00	4.71	-1.59	4.83	4.13	2.74	649.57	870.51
	4000.000	50.00	0.00	0.00	-5.80	1769.00	4.74	-1.57	4.85	3.79	2.64	669.72	908.35
	4050.000	50.00	0.00	0.00	-5.74	1769.00	4.77	-1.60	4.87	3.47	2.54	697.29	950.02
	4100.000	50.00	0.00	0.00	-5.75	1769.00	4.78	-1.43	4.89	3.79	2.62	675.22	909.26
	4150.000	50.00	0.00	0.00	-6.24	1769.00	4.79	-1.63	4.91	3.95	2.82	636.04	890.34
	4200.000	50.00	0.00	0.00	-5.86	1431.00	4.85	-1.66	4.94	2.99	2.33	615.59	827.57
	4250.000	50.00	0.00	0.00	-6.05	1431.00	4.86	-1.43	4.95	3.39	2.44	591.67	777.13
	4300.000	50.00	0.00	0.00	-4.91	1431.00	4.88	-0.63	4.97	3.82	2.47	594.91	732.09
*	4350.000	50.00	0.00	0.00	-5.23	1431.00	4.94	-1.79	4.99	1.66	1.74	823.93	1111.22
	4400.000	50.00	0.00	0.00	-4.57	1431.00	4.93	-1.05	5.01	2.93	2.34	645.57	836.62
	4450.000	50.00	0.00	0.00	-3.71	1431.00	4.94	-0.50	5.03	3.40	2.37	607.37	775.66
	4500.000	50.00	0.00	0.00	-5.38	1431.00	4.97	-1.54	5.04	2.46	2.18	658.35	911.53
	4550.000	50.00	0.00	0.00	-5.59	1431.00	4.98	-1.79	5.06	2.47	2.20	663.05	910.28
	4600.000	50.00	0.00	0.00	-5.98	1431.00	4.99	-1.97	5.07	2.61	2.22	668.16	886.48
	4650.000	50.00	0.00	0.00	-5.60	1431.00	5.00	-1.80	5.08	2.52	2.25	644.24	900.60
	4700.000	50.00	0.00	0.00	-5.13	1431.00	5.03	-1.66	5.09	2.06	2.10	691.07	997.65
	4750.000	50.00	0.00	0.00	-5.59	1431.00	5.03	-1.59	5.11	2.56	2.34	639.56	894.98
	4800.000	50.00	0.00	0.00	-5.35	1431.00	5.05	-1.71	5.12	2.50	2.13	678.76	904.83
	4850.000	50.00	0.00	0.00	-5.44	1431.00	5.06	-1.48	5.14	2.59	2.34	635.86	889.84
	4900.000	50.00	0.00	0.00	-5.13	1431.00	5.05	-0.20	5.17	4.60	2.73	542.86	666.91
	4950.000	50.00	0.00	0.00	-5.18	1431.00	5.08	-0.08	5.19	4.71	2.68	539.69	659.62
	5000.000	50.00	0.00	0.00	-5.41	1431.00	5.13	-0.78	5.21	2.97	2.32	617.23	829.91
	5050.000	50.00	0.00	0.00	-5.99	1431.00	5.16	-1.50	5.23	2.22	2.07	691.74	960.40

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	5100.000	50.00	0.00	0.00	-5.72	1431.00	5.15	-1.43	5.25	3.31	2.46	586.28	786.83
	5150.000	50.00	0.00	0.00	-5.84	1431.00	5.17	-1.75	5.27	3.36	2.52	568.34	780.18
	5200.000	50.00	0.00	0.00	-5.43	1431.00	5.20	-0.59	5.29	3.79	2.39	599.64	735.21
	5250.000	50.00	0.00	0.00	-5.38	1431.00	5.22	-1.53	5.30	2.52	2.29	638.82	901.64
	5300.000	50.00	0.00	0.00	-5.20	1431.00	5.24	-1.58	5.32	2.81	2.20	651.93	853.02
	5350.000	50.00	0.00	0.00	-5.08	1431.00	5.25	-1.35	5.33	2.84	2.21	649.14	849.83
	5400.000	50.00	0.00	0.00	-5.16	1431.00	5.26	-0.97	5.35	3.00	2.44	601.84	826.17
	5450.000	50.00	0.00	0.00	-5.49	1431.00	5.28	-1.22	5.36	2.81	2.31	635.92	854.27
	5500.000	50.00	0.00	0.00	-5.05	1431.00	5.30	-1.39	5.38	2.52	2.30	642.02	900.96
	5550.000	50.00	0.00	0.00	-5.21	1431.00	5.32	-1.38	5.39	2.58	2.18	657.25	890.93
	5600.000	50.00	0.00	0.00	-5.28	1431.00	5.34	-1.55	5.40	2.18	2.01	712.73	970.01
	5650.000	50.00	0.00	0.00	-5.05	1431.00	5.35	-1.55	5.41	1.83	1.98	733.98	1057.04
	5700.000	50.00	0.00	0.00	-5.37	1431.00	5.35	-1.10	5.44	3.32	2.44	610.86	785.41
*	5750.000	50.00	0.00	0.00	-4.06	1431.00	5.32	2.15	5.48	10.57	3.20	447.31	440.08
*	5800.000	50.00	0.00	0.00	-5.01	1431.00	5.44	-1.07	5.51	2.53	2.17	668.73	900.44
	5850.000	50.00	0.00	0.00	-5.78	1431.00	5.44	-0.42	5.54	3.94	2.63	570.19	720.48
	5900.000	50.00	0.00	0.00	-5.35	1431.00	5.50	-1.23	5.56	2.25	2.00	715.13	954.19
	5950.000	50.00	0.00	0.00	-5.53	1431.00	5.50	-1.24	5.58	2.80	2.25	635.92	855.91
	6000.000	50.00	0.00	0.00	-5.60	1431.00	5.52	-1.39	5.59	2.41	2.16	663.51	921.63
	6050.000	50.00	0.00	0.00	-5.70	1431.00	5.54	-1.50	5.60	1.99	1.99	718.33	1015.25
	6100.000	50.00	0.00	0.00	-4.00	1431.00	5.54	-0.49	5.62	2.55	2.16	661.81	895.41
	6110.000	10.00	10.00	6.50	-4.00	1431.00	5.54	0.00	5.62	2.09	1.96	731.86	988.75
	6191.000	81.00	10.00	6.50	-4.00	1431.00	5.56	0.00	5.62	2.10	1.96	731.73	988.51
	6201.000	10.00	0.00	0.00	-5.00	1431.00	5.56	-0.98	5.62	2.15	2.05	699.71	975.25
	6250.000	49.00	0.00	0.00	-4.70	1431.00	5.56	-0.90	5.63	2.45	2.09	686.07	914.17
	6300.000	50.00	0.00	0.00	-4.90	1431.00	5.58	-1.13	5.64	1.84	1.94	738.29	1054.98

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
6350.000	50.00	0.00	0.00	-4.62	1431.00	5.58	-0.60	5.66	2.97	2.33	617.06	830.23
6400.000	50.00	0.00	0.00	-4.34	1431.00	5.62	-0.84	5.68	2.17	1.90	753.33	970.47
6450.000	50.00	0.00	0.00	-3.92	1431.00	5.63	-0.73	5.69	1.97	1.89	756.17	1019.15
6500.000	50.00	0.00	0.00	-4.01	1431.00	5.65	-0.66	5.70	1.84	1.82	787.79	1053.78
6550.000	50.00	0.00	0.00	-3.62	1431.00	5.66	-0.77	5.71	1.53	1.82	839.39	1155.30
6600.000	50.00	0.00	0.00	-3.60	1431.00	5.68	-0.87	5.72	1.04	1.42	1008.58	1404.15
6650.000	50.00	0.00	0.00	-3.00	1431.00	5.69	-0.83	5.72	0.92	1.34	1068.16	1491.78
6700.000	50.00	0.00	0.00	-3.10	1431.00	5.70	-0.88	5.72	0.84	1.28	1117.28	1563.37
6750.000	50.00	0.00	0.00	-3.00	1431.00	5.70	-0.64	5.73	0.88	1.28	1118.27	1525.93
6800.000	50.00	0.00	0.00	-2.00	1431.00	5.71	-0.28	5.73	0.91	1.26	1131.98	1503.43
6850.000	50.00	0.00	0.00	-2.54	1431.00	5.71	-0.36	5.74	1.13	1.39	1032.15	1347.10
6900.000	50.00	0.00	0.00	-2.44	1431.00	5.72	-0.28	5.75	0.97	1.29	1129.05	1450.44
6950.000	50.00	0.00	0.00	-2.42	1431.00	5.73	-0.50	5.75	0.76	1.19	1237.91	1640.19

SUBCRITICAL FLOW (STA

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	800.000	2325.00	1.76	0.00	0.00	0.00	179.00	0.00
	750.000	2325.00	1.77	0.00	0.01	0.00	203.50	50.00
	700.000	2325.00	1.78	0.00	0.01	0.00	226.50	50.00
	650.000	2325.00	1.80	0.00	0.02	0.00	263.00	50.00
	600.000	2325.00	1.82	0.00	0.02	0.00	327.88	50.00
*	550.000	2325.00	1.81	0.00	-0.01	0.00	272.98	50.00
	500.000	2325.00	1.78	0.00	-0.03	0.00	164.70	50.00
	450.000	2325.00	1.79	0.00	0.01	0.00	151.78	50.00
	400.000	2325.00	1.80	0.00	0.02	0.00	150.48	50.00
	350.000	2325.00	1.82	0.00	0.02	0.00	150.01	50.00
	300.000	2325.00	1.85	0.00	0.03	0.00	162.38	50.00
	250.000	2325.00	1.84	0.00	-0.01	0.00	142.10	50.00
	200.000	2325.00	1.89	0.00	0.05	0.00	150.29	50.00
*	150.000	2325.00	1.83	0.00	-0.04	0.00	145.83	50.00
*	100.000	2325.00	2.02	0.00	0.06	0.00	162.70	50.00
	50.000	2325.00	2.03	0.00	0.01	0.00	161.43	63.00
	36.000	2325.00	2.01	0.00	-0.02	0.00	161.26	14.00
	26.000	2325.00	2.13	0.00	0.12	0.00	163.11	10.00
	8.000	2325.00	2.21	0.00	0.08	0.00	168.93	34.00
*	18.000	2325.00	2.19	0.00	-0.02	0.00	167.02	10.00
*	50.000	2325.00	2.34	0.00	0.27	0.00	109.59	50.00
*	100.000	2325.00	3.62	0.00	0.06	0.00	228.67	50.00
	150.000	2325.00	3.72	0.00	0.11	0.00	229.92	50.00
	200.000	2325.00	3.87	0.00	0.15	0.00	233.30	50.00

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	250.000	2325.00	4.04	0.00	0.17	0.00	233.58	50.00
*	300.000	2325.00	4.12	0.00	0.08	0.00	261.31	50.00
	350.000	2325.00	4.14	0.00	0.02	0.00	258.95	50.00
	400.000	2325.00	4.15	0.00	0.01	0.00	235.47	50.00
	450.000	2325.00	4.18	0.00	0.03	0.00	200.30	50.00
	500.000	2325.00	4.19	0.00	0.01	0.00	197.66	50.00
	550.000	2325.00	4.21	0.00	0.02	0.00	206.36	50.00
	600.000	2325.00	4.22	0.00	0.01	0.00	213.33	50.00
	650.000	2325.00	4.24	0.00	0.01	0.00	208.92	50.00
	700.000	2325.00	4.24	0.00	0.01	0.00	223.33	50.00
	750.000	2325.00	4.25	0.00	0.00	0.00	236.69	50.00
	800.000	2325.00	4.24	0.00	0.00	0.00	243.40	50.00
	850.000	2325.00	4.24	0.00	0.00	0.00	248.81	50.00
	900.000	2325.00	4.26	0.00	0.02	0.00	234.55	50.00
*	950.000	2325.00	4.27	0.00	0.02	0.00	228.45	50.00
	1000.000	2325.00	4.28	0.00	0.00	0.00	230.43	50.00
	1050.000	2325.00	4.28	0.00	0.00	0.00	217.64	50.00
	1100.000	2325.00	4.28	0.00	0.00	0.00	233.67	50.00
	1150.000	2325.00	4.28	0.00	0.00	0.00	214.62	50.00
	1200.000	2325.00	4.28	0.00	0.00	0.00	212.44	50.00
	1250.000	2325.00	4.29	0.00	0.00	0.00	207.47	50.00
	1300.000	2325.00	4.29	0.00	0.00	0.00	209.62	50.00
	1350.000	2325.00	4.29	0.00	0.00	0.00	211.17	50.00
	1400.000	2325.00	4.29	0.00	0.00	0.00	208.58	50.00
	1450.000	2325.00	4.30	0.00	0.00	0.00	207.68	50.00
	1500.000	2277.00	4.30	0.00	0.01	0.00	208.25	50.00

SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
1550.000	2277.00	4.30	0.00	0.00	0.00	208.45	50.00
1600.000	2277.00	4.31	0.00	0.00	0.00	214.66	50.00
1650.000	2277.00	4.31	0.00	0.00	0.00	206.50	50.00
1700.000	2277.00	4.31	0.00	0.00	0.00	215.94	50.00
1750.000	2277.00	4.31	0.00	0.00	0.00	209.30	50.00
1800.000	2277.00	4.32	0.00	0.00	0.00	215.95	50.00
1850.000	2277.00	4.32	0.00	0.01	0.00	227.47	50.00
1900.000	2277.00	4.32	0.00	0.00	0.00	228.53	50.00
1950.000	2277.00	4.33	0.00	0.00	0.00	233.80	50.00
2000.000	2277.00	4.33	0.00	0.00	0.00	243.15	50.00
2050.000	2277.00	4.33	0.00	0.00	0.00	257.67	50.00
2100.000	2277.00	4.34	0.00	0.00	0.00	279.18	50.00
2150.000	2277.00	4.34	0.00	0.00	0.00	286.96	50.00
2200.000	2277.00	4.34	0.00	0.00	0.00	239.51	50.00
2250.000	2277.00	4.34	0.00	0.00	0.00	228.79	50.00
2300.000	2277.00	4.33	0.00	0.00	0.00	299.00	50.00
2350.000	2277.00	4.34	0.00	0.00	0.00	219.42	50.00
2400.000	2277.00	4.34	0.00	0.00	0.00	211.90	50.00
2450.000	2277.00	4.35	0.00	0.01	0.00	336.44	50.00
2500.000	2277.00	4.36	0.00	0.01	0.00	314.13	50.00
2550.000	2277.00	4.36	0.00	0.01	0.00	282.28	50.00
2600.000	2277.00	4.36	0.00	0.00	0.00	259.41	50.00
2650.000	2277.00	4.36	0.00	0.00	0.00	226.00	50.00
2700.000	2277.00	4.37	0.00	0.00	0.00	220.18	50.00
2750.000	2277.00	4.37	0.00	0.00	0.00	215.48	50.00
2800.000	2277.00	4.37	0.00	0.00	0.00	213.26	50.00

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	2850.000	2277.00	4.38	0.00	0.00	0.00	213.68	50.00
	2900.000	2277.00	4.38	0.00	0.00	0.00	215.11	50.00
	2950.000	2277.00	4.38	0.00	0.00	0.00	205.81	50.00
	3000.000	2277.00	4.39	0.00	0.00	0.00	201.84	50.00
	3050.000	2277.00	4.39	0.00	0.00	0.00	173.92	50.00
	3100.000	2277.00	4.41	0.00	0.02	0.00	267.30	50.00
	3150.000	1769.00	4.42	0.00	0.01	0.00	185.20	50.00
*	3200.000	1769.00	4.41	0.00	-0.01	0.00	166.79	50.00
*	3250.000	1769.00	4.37	0.00	-0.04	0.00	100.57	50.00
	3300.000	1769.00	4.39	0.00	0.02	0.00	94.58	50.00
	3350.000	1769.00	4.42	0.00	0.03	0.00	103.38	50.00
	3400.000	1769.00	4.45	0.00	0.03	0.00	97.66	50.00
	3450.000	1769.00	4.46	0.00	0.01	0.00	99.90	50.00
	3500.000	1769.00	4.49	0.00	0.02	0.00	102.47	50.00
	3550.000	1769.00	4.52	0.00	0.04	0.00	103.16	50.00
	3600.000	1769.00	4.53	0.00	0.01	0.00	96.88	50.00
	3650.000	1769.00	4.56	0.00	0.03	0.00	106.00	50.00
	3700.000	1769.00	4.57	0.00	0.01	0.00	99.31	50.00
	3750.000	1769.00	4.58	0.00	0.01	0.00	89.45	50.00
	3800.000	1769.00	4.64	0.00	0.06	0.00	103.49	50.00
	3850.000	1769.00	4.64	0.00	0.00	0.00	89.62	50.00
	3900.000	1769.00	4.63	0.00	-0.01	0.00	88.84	50.00
	3950.000	1769.00	4.71	0.00	0.09	0.00	96.85	50.00
	4000.000	1769.00	4.74	0.00	0.03	0.00	93.89	50.00
	4050.000	1769.00	4.77	0.00	0.03	0.00	96.06	50.00
	4100.000	1769.00	4.78	0.00	0.01	0.00	93.46	50.00

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	4150.000	1769.00	4.79	0.00	0.01	0.00	92.40	50.00
	4200.000	1431.00	4.85	0.00	0.06	0.00	88.71	50.00
	4250.000	1431.00	4.86	0.00	0.01	0.00	98.17	50.00
	4300.000	1431.00	4.88	0.00	0.02	0.00	104.81	50.00
*	4350.000	1431.00	4.94	0.00	0.06	0.00	118.02	50.00
	4400.000	1431.00	4.93	0.00	-0.01	0.00	119.46	50.00
	4450.000	1431.00	4.94	0.00	0.01	0.00	97.85	50.00
	4500.000	1431.00	4.97	0.00	0.03	0.00	92.10	50.00
	4550.000	1431.00	4.98	0.00	0.01	0.00	96.99	50.00
	4600.000	1431.00	4.99	0.00	0.01	0.00	99.20	50.00
	4650.000	1431.00	5.00	0.00	0.01	0.00	100.38	50.00
	4700.000	1431.00	5.03	0.00	0.02	0.00	101.16	50.00
	4750.000	1431.00	5.03	0.00	0.00	0.00	105.32	50.00
	4800.000	1431.00	5.05	0.00	0.03	0.00	103.97	50.00
	4850.000	1431.00	5.06	0.00	0.00	0.00	93.51	50.00
	4900.000	1431.00	5.05	0.00	0.00	0.00	94.59	50.00
	4950.000	1431.00	5.08	0.00	0.03	0.00	92.79	50.00
	5000.000	1431.00	5.13	0.00	0.05	0.00	87.04	50.00
	5050.000	1431.00	5.16	0.00	0.03	0.00	91.71	50.00
	5100.000	1431.00	5.15	0.00	-0.01	0.00	85.14	50.00
	5150.000	1431.00	5.17	0.00	0.01	0.00	75.32	50.00
	5200.000	1431.00	5.20	0.00	0.03	0.00	96.94	50.00
	5250.000	1431.00	5.22	0.00	0.02	0.00	98.10	50.00
	5300.000	1431.00	5.24	0.00	0.02	0.00	94.97	50.00
	5350.000	1431.00	5.25	0.00	0.01	0.00	99.28	50.00
	5400.000	1431.00	5.26	0.00	0.00	0.00	107.64	50.00

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	5450.000	1431.00	5.28	0.00	0.03	0.00	97.54	50.00
	5500.000	1431.00	5.30	0.00	0.01	0.00	88.63	50.00
	5550.000	1431.00	5.32	0.00	0.02	0.00	96.85	50.00
	5600.000	1431.00	5.34	0.00	0.02	0.00	100.41	50.00
	5650.000	1431.00	5.35	0.00	0.01	0.00	104.62	50.00
	5700.000	1431.00	5.35	0.00	-0.01	0.00	104.41	50.00
*	5750.000	1431.00	5.32	0.00	-0.02	0.00	97.96	50.00
*	5800.000	1431.00	5.44	0.00	0.12	0.00	98.53	50.00
	5850.000	1431.00	5.44	0.00	-0.01	0.00	95.93	50.00
	5900.000	1431.00	5.50	0.00	0.06	0.00	102.64	50.00
	5950.000	1431.00	5.50	0.00	0.00	0.00	90.24	50.00
	6000.000	1431.00	5.52	0.00	0.02	0.00	84.25	50.00
	6050.000	1431.00	5.54	0.00	0.02	0.00	91.42	50.00
	6100.000	1431.00	5.54	0.00	0.00	0.00	90.10	50.00
	6110.000	1431.00	5.54	0.00	0.00	0.00	98.56	10.00
	6191.000	1431.00	5.56	0.00	0.01	0.00	98.56	81.00
	6201.000	1431.00	5.56	0.00	0.00	0.00	91.34	10.00
	6250.000	1431.00	5.56	0.00	0.01	0.00	96.72	49.00
	6300.000	1431.00	5.58	0.00	0.02	0.00	93.29	50.00
	6350.000	1431.00	5.58	0.00	-0.01	0.00	93.31	50.00
	6400.000	1431.00	5.62	0.00	0.04	0.00	114.10	50.00
	6450.000	1431.00	5.63	0.00	0.01	0.00	105.79	50.00
	6500.000	1431.00	5.65	0.00	0.01	0.00	112.15	50.00
	6550.000	1431.00	5.66	0.00	0.01	0.00	128.68	50.00
	6600.000	1431.00	5.68	0.00	0.03	0.00	127.00	50.00
	6650.000	1431.00	5.69	0.00	0.01	0.00	135.00	50.00

SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
6700.000	1431.00	5.70	0.00	0.01	0.00	142.00	50.00
6750.000	1431.00	5.70	0.00	0.00	0.00	151.30	50.00
6800.000	1431.00	5.71	0.00	0.01	0.00	160.45	50.00
6850.000	1431.00	5.71	0.00	0.00	0.00	153.72	50.00
6900.000	1431.00	5.72	0.00	0.01	0.00	178.06	50.00
6950.000	1431.00	5.73	0.00	0.01	0.00	188.49	50.00

SUMMARY OF ERRORS AND SPECIAL NOTES

```
WARNING SECNO=    550.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
CAUTION SECNO=    150.000  PROFILE=  1  INTERPOLATED X-SECTIONS USED
CAUTION SECNO=    100.000  PROFILE=  1  INTERPOLATED X-SECTIONS USED
WARNING SECNO=     18.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
CAUTION SECNO=     50.000  PROFILE=  1  INTERPOLATED X-SECTIONS USED
CAUTION SECNO=    100.000  PROFILE=  1  INTERPOLATED X-SECTIONS USED
WARNING SECNO=    250.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    300.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    950.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=   3200.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=   3250.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=   4350.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=   5750.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=   5800.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
```

Bridge Scour Analysis
Appendix G

Kaelepulu Stream Drainage Study

SCOUR CALCULATIONS FOR EXISTING STREAM CONDITION

KAELEPULU BRIDGE

HYDRAULICS UPSTREAM OF BRIDGE

$v_1 := 2.31 \cdot \frac{ft}{sec}$ $\qquad y_1 := 6.21 \cdot ft$

$Fr := \frac{v_1}{\sqrt{g \cdot y_1}}$ $\qquad Fr = 0.163$

PIER "A" DESCRIPTION

$K_1 := 0.9$ SHARP NOSE PIER

$K_2 := 3.5$ 34 DEGREE SKEW

$a := 3 \cdot ft$ PIER WIDTH

$L := 33 \cdot ft$ PIER LENGTH

PIER "A" SCOUR

$$y_s := y_1 \cdot 2.0 \cdot K_1 \cdot K_2 \cdot \left(\frac{a}{y_1}\right)^{0.65} \cdot Fr^{0.43} \qquad y_s = 11.189 \cdot ft$$

PIER "B" DESCRIPTION

$K_1 := 1.1$ SQUARE NOSE PIER

$K_2 := 1.0$ NO SKEW

$a := 1 \cdot ft$ PIER WIDTH

$L := 29 \cdot ft$ PIER LENGTH

PIER "B" SCOUR

$$y_s := y_1 \cdot 2.0 \cdot K_1 \cdot K_2 \cdot \left(\frac{a}{y_1}\right)^{0.65} \cdot Fr^{0.43} \qquad y_s = 1.913 \cdot ft$$

KEOLU DRIVE BRIDGE

HYDRAULICS UPSTREAM OF BRIDGE

$v_1 := 2.0 \cdot \frac{ft}{sec}$ $\qquad y_1 := 10.55 \cdot ft$

$Fr := \frac{v_1}{\sqrt{g \cdot y_1}}$ $\qquad Fr = 0.109$

PIER DESCRIPTION

$K_1 := 0.9$ SHARP NOSE PIER

$K_2 := 1.0$ NO SKEW

$a := 3 \cdot ft$ PIER WIDTH

$L := 33 \cdot ft$ PIER LENGTH

PIER SCOUR

$$y_s := y_1 \cdot 2.0 \cdot K_1 \cdot K_2 \cdot \left(\frac{a}{y_1}\right)^{0.65} \cdot Fr^{0.43} \qquad y_s = 3.228 \cdot ft$$

SCOUR CALCULATIONS FOR IMPROVED STREAM CONDITION

KAELEPULU BRIDGE

HYDRAULICS UPSTREAM OF BRIDGE

$v_1 := 3.27 \cdot \frac{ft}{sec} \qquad y_1 := 6.94 \cdot ft$

$Fr := \frac{v_1}{\sqrt{g \cdot y_1}} \qquad Fr = 0.219$

PIER "A" DESCRIPTION

$K_1 := 0.9$ SHARP NOSE PIER

$K_2 := 3.5$ 34 DEGREE SKEW

$a := 3 \cdot ft$ PIER WIDTH

$L := 33 \cdot ft$ PIER LENGTH

PIER "A" SCOUR

$y_s := y_1 \cdot 2.0 \cdot K_1 \cdot K_2 \cdot \left(\frac{a}{y_1}\right)^{0.65} \cdot Fr^{0.43} \qquad y_s = 13.188 \cdot ft$

PIER "B" DESCRIPTION

$K_1 := 1.1$ SQUARE NOSE PIER

$K_2 := 1.0$ NO SKEW

$a := 1 \cdot ft$ PIER WIDTH

$L := 29 \cdot ft$ PIER LENGTH

PIER "B" SCOUR

$y_s := y_1 \cdot 2.0 \cdot K_1 \cdot K_2 \cdot \left(\frac{a}{y_1}\right)^{0.65} \cdot Fr^{0.43} \qquad y_s = 2.255 \cdot ft$

KEOLU DRIVE BRIDGE

HYDRAULICS UPSTREAM OF BRIDGE

$v_1 := 2.78 \cdot \frac{ft}{sec} \qquad y_1 := 12.34 \cdot ft$

$Fr := \frac{v_1}{\sqrt{g \cdot y_1}} \qquad Fr = 0.14$

PIER DESCRIPTION

$K_1 := 0.9$ SHARP NOSE PIER

$K_2 := 1.0$ NO SKEW

$a := 3 \cdot ft$ PIER WIDTH

$L := 33 \cdot ft$ PIER LENGTH

PIER SCOUR

$y_s := y_1 \cdot 2.0 \cdot K_1 \cdot K_2 \cdot \left(\frac{a}{y_1}\right)^{0.65} \cdot Fr^{0.43} \qquad y_s = 3.798 \cdot ft$

Stream Photographs
Appendix H

Kaelepulu Stream Drainage Study

Photograph No. 1 : Sand Berm at Kailua Beach

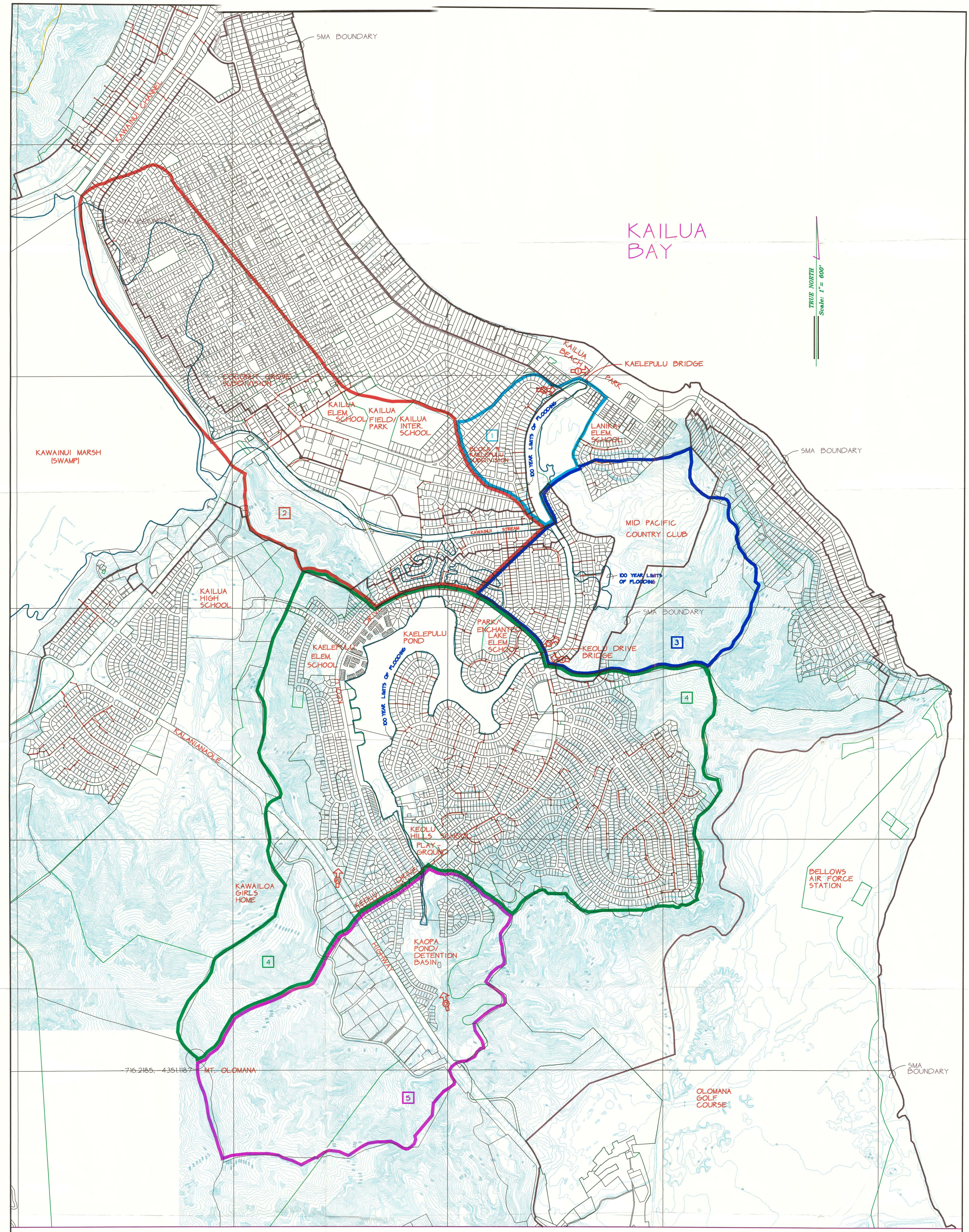
Photograph No. 2 : Kaelepulu Bridge Piers

Photograph No. 3 : Kaelepulu & Kawainui Stream Confluence

Photograph No. 4 : Kaelepulu Stream

Photograph No. 5 : Ditch Connecting Kaopa Basin to Enchanted Lake

Photograph No. 6 : Enchanted Lake



LEGEND

- PARCELS
- 400 TOPO – 5' CONTOURS
- FLOOD LIMITS – 100 yr. Storm
- SMA BOUNDARY
- STORM DRAINS
- PHOTOGRAPH LOCATIONS

- 1 Drainage Basin No. 1
- 2 Drainage Basin No. 2
- 3 Drainage Basin No. 3
- 4 Drainage Basin No. 4
- 5 Drainage Basin No. 5

EXHIBIT 2

600 0 600 1200
Graphic Scale

Prepared by:
ParEn, Inc.
dba Park Engineering

KAELEPULU / KAWAINUI STREAMS
DRAINAGE BASIN

Scale : 1" = 600'

October 22, 1993

Division of Engineering
Department of Public Works
City & County Of Honolulu