Newfound River
Pemigewasset River Watershed
Merrimack River Basin
Bristol, New Hampshire

Newfound Lake

Dam-Break Flood Analysis

Jaunary 1989

US Army Corps
of Engineers
New England Division

Preface

This investigation was performed under the Corps of Engineers' Flood Plain Management Services Authority at the request of the State of New Hampshire. The Flood Plain Management Authority is contained in Section 206 of the Flood Control Act of 1960 which authorizes the U.S. Army Corps of Engineers "...to compile and disseminate information on floods and flood damages...and to provide engineering advice to local interests for their use in planning to ameliorate the flood hazard."

The Dam-Break Analysis study presented in this report was prepared under contract by Storch Associates of Boston, Massachusetts and Manchester, New Hampshire. Any questions concerning this report should be addressed to the the Chief of the Hydrology Engineering Section of the Corps of Engineers, New England Division.

NEWFOUND LAKE DAM

BRISTOL, NEW HAMPSHIRE

DAM-BREAK FLOOD ANALYSIS

TABLE OF CONTENTS

PARAGRAPH	SUBJECT	PAGE
1	INTRODUCTION AND PURPOSE	2
2	DAM DESCRIPTION	2
3	PERTINENT DATA	3
4	VALLEY DESCRIPTION	5
5	MODEL DESCRIPTION	5
6	ASSUMED DAM-BREAK CONDITIONS	6
7	RESULTS	7

PLATE	LIST OF PLATES
1	INDEX MAP
2	PROFILE
3-5	FLOOD DISCHARGE, STAGES AND TIMING

APPENDIX	TITLE
A	INPUT DATA FILE
B	OUTPUT DATA FILE
C	BREACH FORMATION AND SIZING CALCULATIONS

NEWFOUND LAKE DAM

DAM-BREAK FLOOD ANALYSIS

1. INTRODUCTION AND PURPOSE

This report presents the findings of a dam-break flood analysis performed for Newfound Lake Dam. Its purpose is to provide quantitative information for emergency planning use. The dam is owned, operated and maintained by the Water Resources Board of New Hampshire. Included in this report is a description of the pertinent features of the dam, the procedure used for the analysis, the assumed dam-break conditions and the resulting effects on downstream flooded areas. This study was not performed because of any known likelihood of a dam-break at Newfound Lake Dam.

2. DAM DESCRIPTION

Identification No.	NH00137
Name of Dam	Newfound Lake Dam
Town:	Bristol
County and State:	Grafton County, New Hampshire
Stream:	Newfound River
Watershed:	Pemigewasset River
Basin:	Merrimack River

Newfound Lake dam is located on the Newfound River impounding approximately 27,000 acre-feet of water. The dam is a concrete and masonary structure founded on a timber crib. The dam spans the Newfound River and has a length of 111.0 feet. The dam's foundation materials are believed to consist of coarse silty gravelly sands. The lake is of natural origin, but its level has been raised by the construction of the dam. The dam consists of three distinct sections: a timber dam, a sluice gate section and a stop plank section. The timber dam, approximately 48 feet long at the right abutment, terminates at a concrete or masonry abutment wingwall. The timber dam has 12 sets of stop plank openings approximately 3 ft.-6 in. wide. On the left, the timber dam is separated from an adjacent sluice gate section by a massive concrete faced masonry pier approximately 13.5 feet wide. The sluice gate section contains three 6 by 6-foot timber sluice gates operated manually or by portable electric drill. The sluice gate section is separated on the left from an adjacent newly built stop plank section by a massive

concrete faced masonry pier 11.5 feet wide on which a gate access house has been built. The stop plank section consists of 2 bays approximately 4.67 feet wide by 6.7 feet deep below the full lake elevation of 589.1. The stop plank section terminates at the left abutment wingwall.

3. PERTINENT DATA

Data is taken from "Phase I Inspection Report" for Newfound Lake Dam, dated August, 1978.

a. Drainage Area The drainage area consists of 95 square miles (60,800 acres) of predominantly wooded moderately sloped terrain with some residential areas.

b. Elevation (ft above MSL)

(1)	Top of dam:	592.1
(2)	Maximum pool design surcharge:	589.1
(3)	Recreation pool:	588.4 (Flashboards in place)
(4)	Spillway crest:	588.4
(5)	Streambed at centerline of dam:	580.0
(6)	Maximum tailwater:	Unknown

c. Spillway

(1)	Type:	Stop plank sections
(2)	Length of weir:	Timber dam length 43.5 ft., new stop plank section 13.0 ft., total length 55.5 ft.
(3)	Crest elevation:	588.4 ft. (stop planks in place)
(4)	Gates:	None
(5)	U.S. Channel:	Newfound River
(6)	D/S Channel:	Timber plank and concrete apron, Newfound River

d. Reservoir (miles)

(1) Length of maximum pool:	6.30 (estimated)
(2) Length of recreation pool:	6.16 (estimated)

e. Storage (acre-feet)

(1) Recreation pool:	24,600 (elev. 588.4)
(2) Design surcharge:	27,715 (elev. 589.1)
(3) Top of dam:	41,244

f. Reservoir Surface (acres)

(1) Top of dam:	4,670
(2) Recreation pool:	4,360
(3) Spillway crest:	4,360

g. Discharge at Dam Site

(1). Maximum known flood at dam site:	1,840 cfs in the period since the reconstruction of dam or 1977-1978
(2) Ungated spillway capacity at maximum pool elevation:	500 cfs, all stop planks in place to elev. 588. Pool at elev. 589.1
(3) Total spillway capacity at maximum pool elevation:	As above

h. Dam

(1) Type:	Masonry and concrete gravity dam with a timber section
(2) Length:	117 ft.
(3) Height:	12 ft.
(4) Top width:	Varies

i. Diversion and Regulating Tunnel - none

j. Regulating Outlets

(1) Low level outlet:	3 passes, each 6 X 6 feet
(2) Controls:	Timber sluice gates, hoist operated
(3) Emergency gate:	Provisions for stop planks on upstream side
(4) Outlet:	Concrete apron slab

4. VALLEY DESCRIPTION

Newfound Lake Dam spans the headwaters of the Newfound River. It is located about 3 miles above the Newfound River's confluence with the Pemigewasset River in the Merrimack River basin. The Newfound River Valley below the Newfound Lake Dam is a combination of predominanatly residential and lightly wooded areas having a moderate to moderately steep slope for the entire length of the study reach. The Town of Bristol is a significant population center located at mile 2.5 of the study reach. The entire Newfound River study reach is paralleled by a major state highway Route 3A and crossed by State Highway Route 104.

5. MODEL DESCRIPTION

The Newfound Lake Dam dam-break analysis was performed using the Microcomputer Version 9-86 of "DAMBRK": The National Weather Service DAM-BREAK Flood Forecasting Model 7-18-84. This microcomputer version is a transference of Dr. D. L. Fread's main frame version. The analysis option utilized was Dynamic Routing through two reaches; upstream supercritical and downstream subcritical for a single dam and input consisted of:

(a) Storage characteristics of the reservoir

(b) Selected dam breach geometry and duration

(c) Surveyed geometry and characteristics of downstream valley presented in cross-sections and by selected Mannings "n" coefficients along with initial inflows.

(d) Active and inactive flow regions of the study reach. Based on the input data, the model computes the dam-break outflow hydrograph and routes it downstream. Dynamic routing of outflow hydrograph through two reachs of downstream valley is performed by a "honing" iterative attenuation process governed by the requirements of both the principles of conservation of mass and momentum. The analysis provides output on the attenuation of the flood hydrograph, resulting flood stages, and timing of the flood wave as it progresses downstream. The downstream valley was divided into two reaches. The first reach, from the dam to mile 1.8 was run as supercritical and from mile 1.8 to the end of the study was run as subcritical.

6. ASSUMED DAM-BREAK CONDITIONS

The magnitude of a flood resulting from the hypothetical failure of Newfound Lake Dam is a function of many different parameters including size of breach, initial pool level and storage, rate of breach formation, channel and overbank roughness, and antecedent flow conditions. Engineering assumptions of conditions which could be reasonably expected to exist prior to a failure of Newfound Lake Dam, were used in the flood analysis as presented below:

(1) Initial Pool Level 594.1 feet MSL, 2.0 feet above the top of dam.

(2) Breach Invert: 580.0 feet MSL

(3) Breach Base Width 80.0 feet vertical side slopes (1.0 vertical to 0.0 horizontal)

(4) Time to Complete Formation of Breach: 0.75 hour

(5) Downstream Channel Roughness Coefficient: Manning's "n" = 0.028 to 0.05

(6) Pre-Breach Flow: The pre-breach river flow was assumed equal to the March 1936 flood of record. Inflow into Newfound Lake was estimated to be 9,975 cfs (or 105 csm). The generated outflow for the intial conditions was 2,991 cfs.

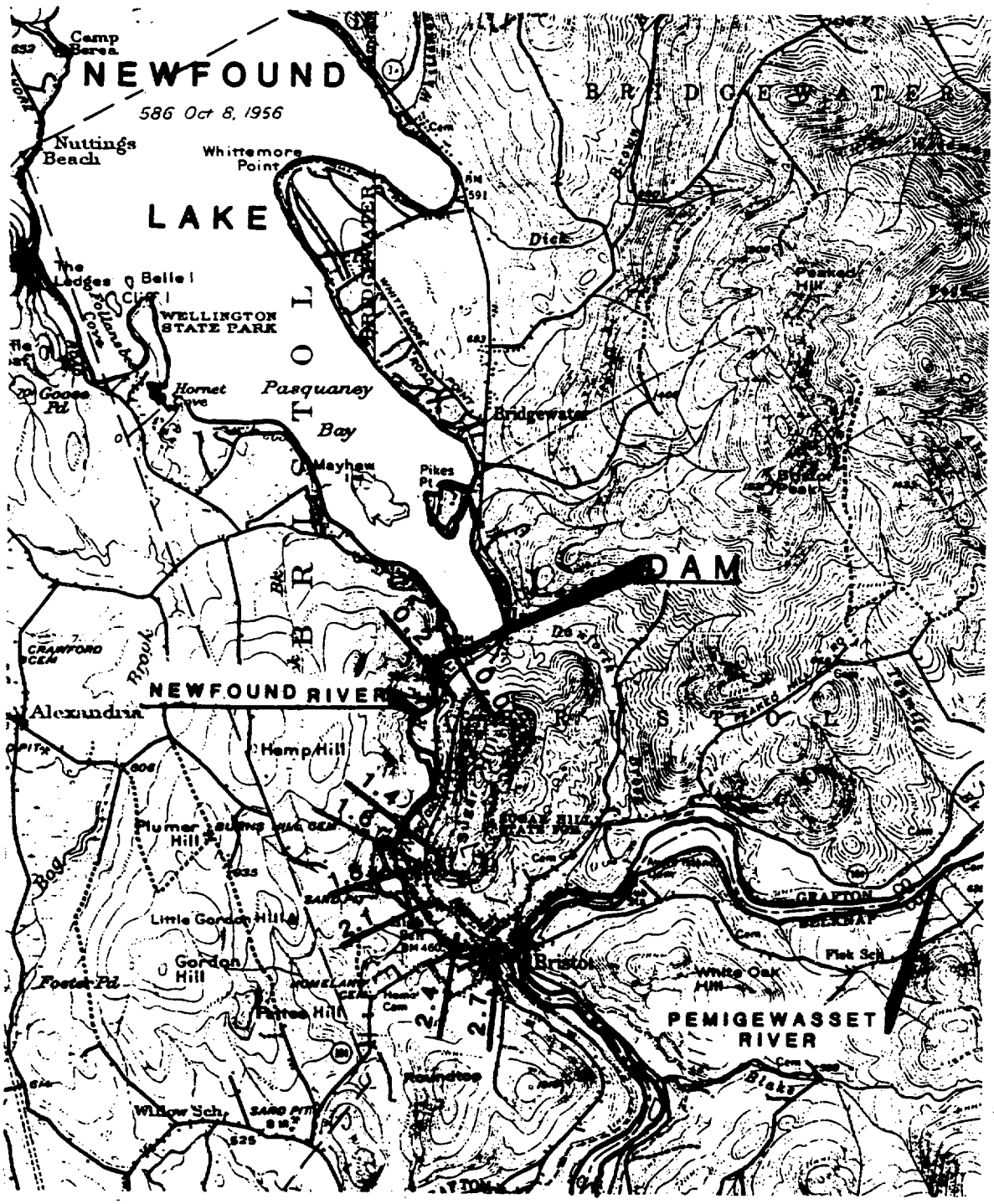
7. RESULTS

The resulting peak stage flood profiles, timing of the peak stage and leading edge of the flood wave are shown on plate no. 2. Due to the scarcity of good topographic mapping in the area, profiles are shown in feet above normal summertime (July-August) low water (NLW). Users of the information can establish the depth of flooding at particular properties by establishing its relative elevation with respect to the adjacent stream level. Variations in depth above NLW progressing downstream are attributable to changes in natural stream hydraulic capacity as well as changes in peak discharge.

The maximum dam-break water surface stages and maximum flows vs. time from start of dam failure are presented on plates 3 and 4 for selected stations of interest downstream from Newfound Lake Dam. The two stations are located 1.4 mi. and 2.7 mi. downstream from the dam.

The breach and pre-breach peak flows throughout the study reach resulting from Newfound Lake Dam breach are shown on plate no. 5.

The peak dam-break discharge from Newfound Lake Dam was computed to be 18,901 cfs. At mile 1.4 below the dam, the peak dam-break discharge was 18,872 cfs producing a rise of 10.36 feet above NLW, flooding the adjacent Route 3A by approximately 7.5 feet. Progressing downstream, the dam-break flood wave has a peak discharge of 18,140 cfs and 22.09 feet above NLW at mile 2.4. Due to the relatively short distance between Newfound Lake Dam and Bristol, as well as the minimal natural overbank storage of the Newfound River Valley, the dam-break peak and stage are progressing in almost unchanged magnitudes through the downstream study reach.



MAP BASED ON CARDIGAN AND HOLDERNESS, N.H. QUADRANGLES
U.S.G.S.TOPOGRAPHIC MAPS (1956).

CROSS-SECTION LOCATION

IN MILES BELOW DAM

CROSS-SECTIONS 1.4 AND 1.6 MI INTERPOLATED

1000 0 4000

SCALE IN FEET

1 1/2 0 1

SCALE IN MILES

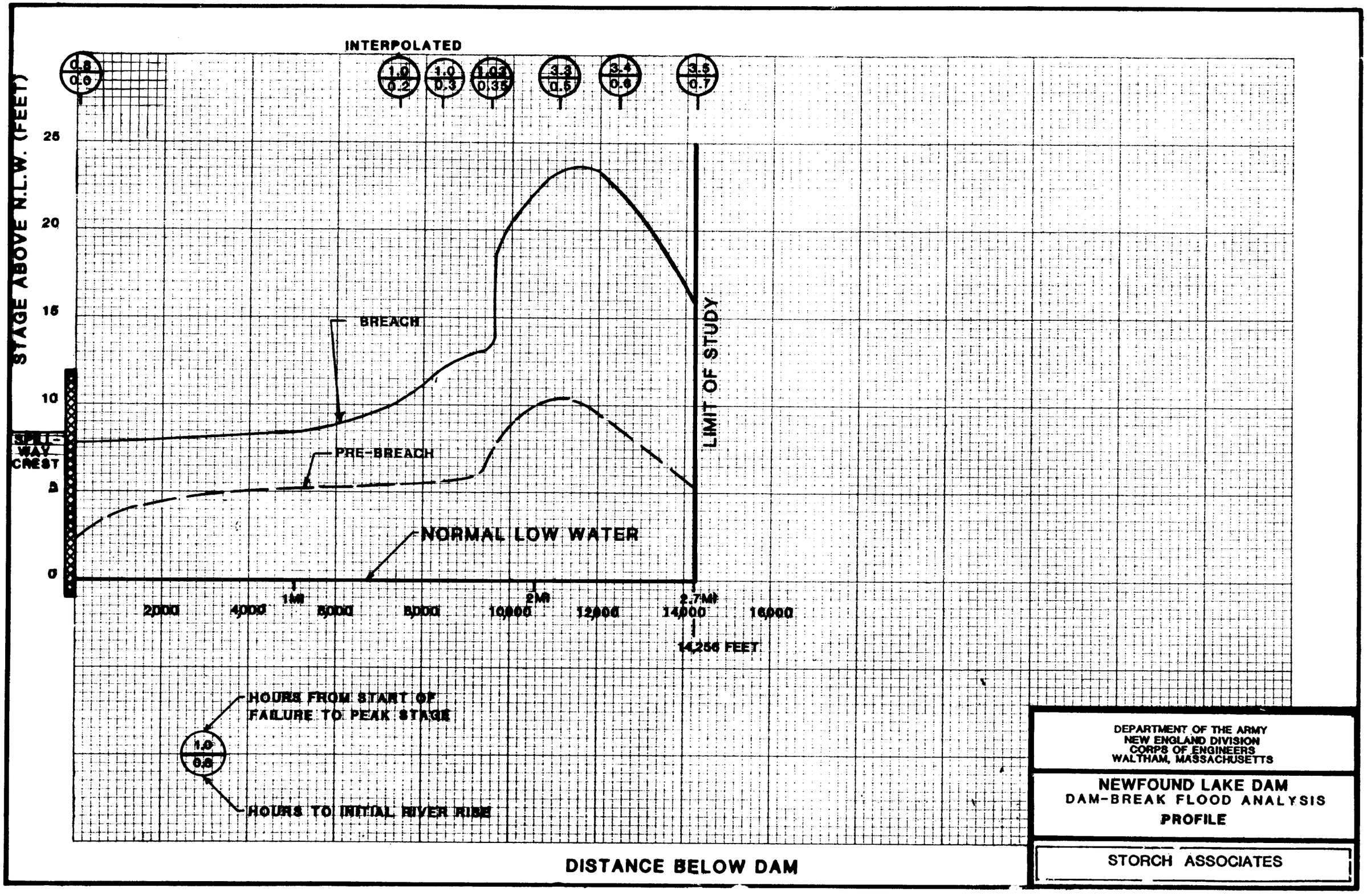
DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASSACHUSETTS

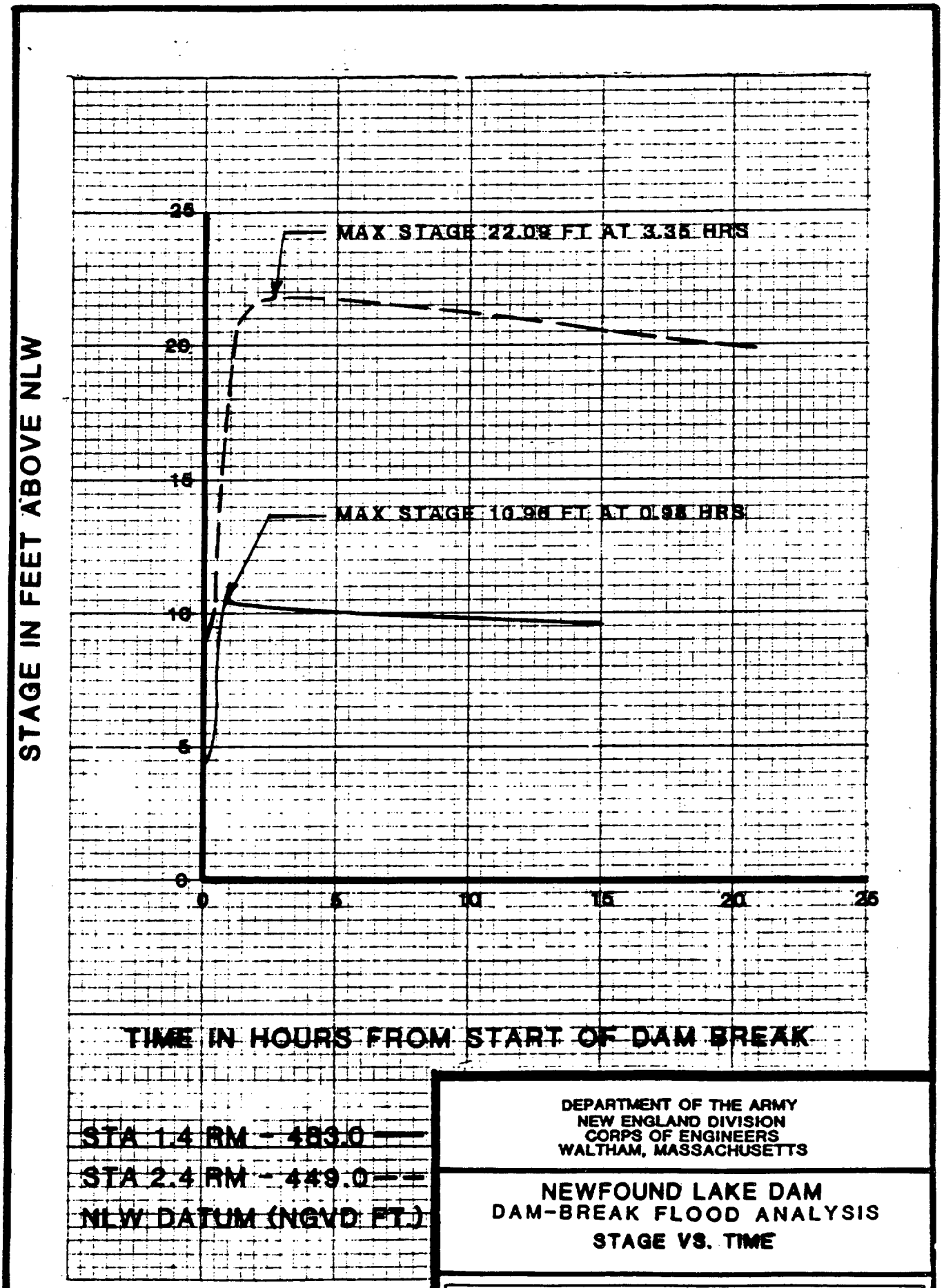
NEWFOUND LAKE DAM

DAM-BREAK FLOOD ANALYSIS

INDEX MAP

STORCH ASSOCIATES

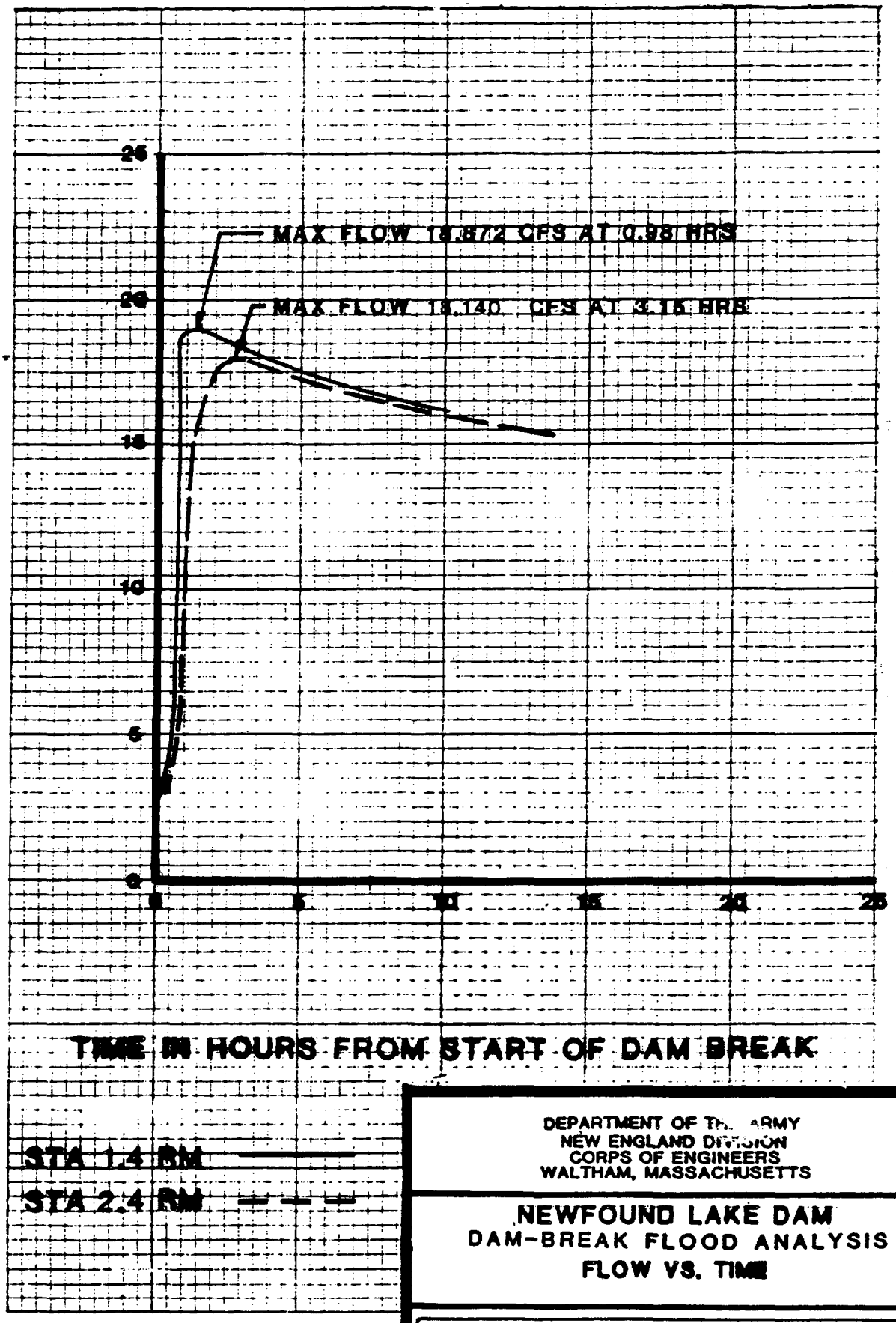

INTERPOLATED
0.8
0.6
1.0
0.2
1.0
0.3
1.05
0.35
3.3
0.5
3.4
0.6
3.5
0.7
STAGE ABOVE N.L.W. (FEET)
25
20
15
10
SPILLWAY CREST
5
0
BREACH
PRE-BREACH
NORMAL LOW WATER
LIMIT OF STUDY
2000
4000
1MI
6000
8000
10000
2MI
12000
14000
2.7MI
16000
14,256 FEET
HOURS FROM START OF FAILURE TO PEAK STAGE
1.0
0.8
HOURS TO INITIAL RIVER RISE
DISTANCE BELOW DAM
DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASSACHUSETTS
NEWFOUND LAKE DAM
DAM-BREAK FLOOD ANALYSIS
PROFILE
STORCH ASSOCIATES



DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASSACHUSETTS

NEWFOUND LAKE DAM
DAM-BREAK FLOOD ANALYSIS
STAGE VS. TIME

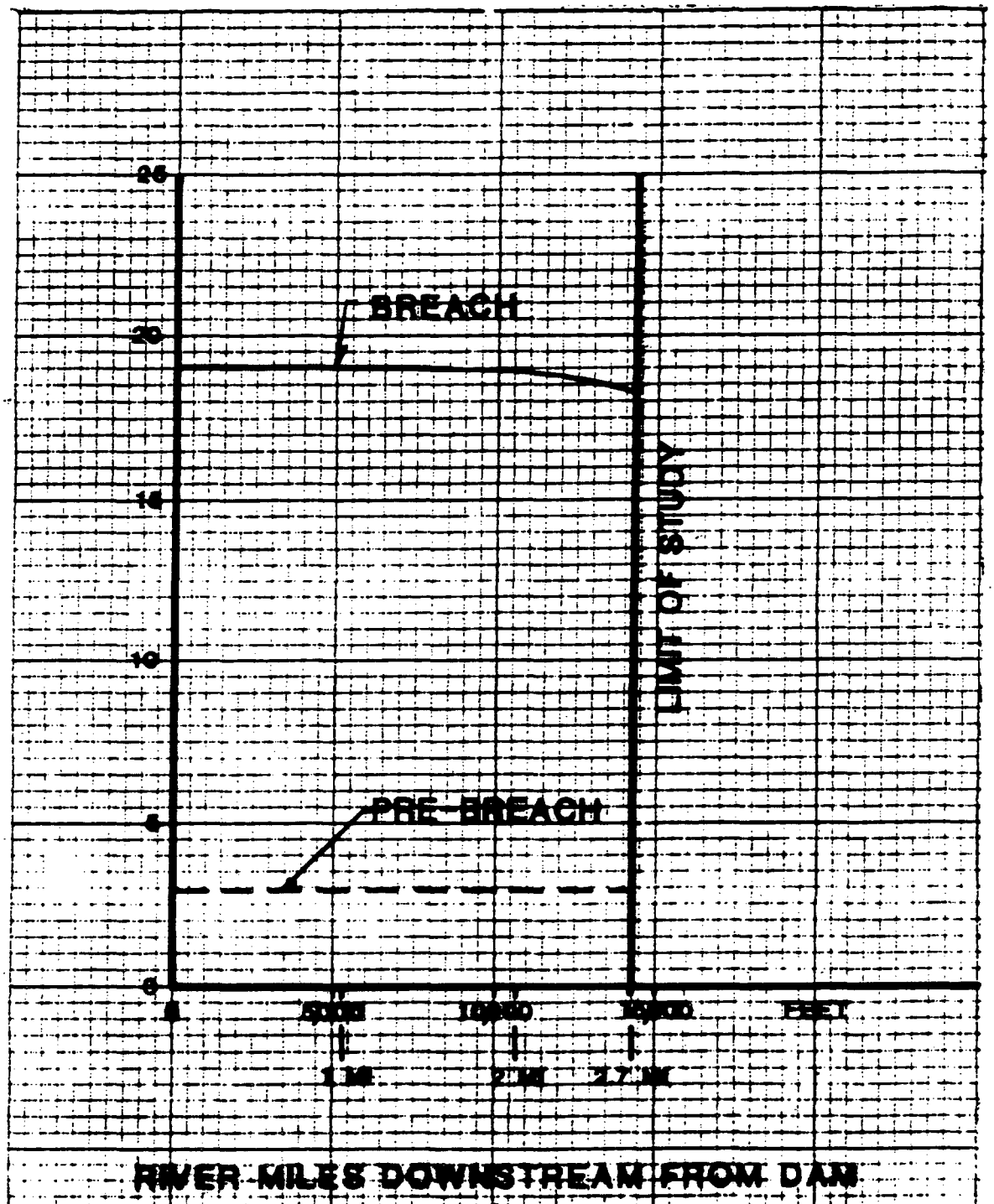
STORCH ASSOCIATES



DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASSACHUSETTS

NEWFOUND LAKE DAM
DAM-BREAK FLOOD ANALYSIS
FLOW VS. TIME

STORCH ASSOCIATES



DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASSACHUSETTS

NEWFOUND LAKE DAM
DAM-BREAK FLOOD ANALYSIS
FLOW VS. DISTANCE

STORCH ASSOCIATES

APPENDIX A

INPUT DATA FILE

```
NEWFOUND LAKE DAM    NEWOUND RIVER      STORCH ASSOCIATES
994 CANDIA ROAD, MANCHESTER, N.H. 03103
        2        0        0        5        2
         00 0
6960.    5568.    4550.    0.
610.     600.     590.     580.
6.3      594.1    0.       580.     80.0     0.75     580.     0.
594.1    592.1    588.4    0.       0.       0.       132.     0.
310.     675.     1711.    3524.    10183.   13856.
.3       1.1      3.7      7.7      16.4     17.7
0.       24.
9975.    9975.
0.       24.
        4        6        4        0        0        1        0
        1        2        3        4
.01
580.     591.     593.     596.     600.     620.
105.     115.0    115.0    115.0    115.0    115.
0.       0.       47.0     120.     145.     195.
1.4
483.     488.     489.     498.     506.     520.
40.      60.      110.     110.     110.     110.
0.       0.       45.      160.     270.     360.
1.6
469.     477.     480.     485.     490.     513.
32.      58.      115.     115.     115.     115.
0.       0.       85.      185.     284.     650.
1.8
455.     460.     466.     470.     480.     512.
28.      47.      120.     120.     120.     120.
0.       0.       95.      220.     400.     1000.
0.028    0.028    0.028    0.028    0.028    0.028
0.028    0.028    0.028    0.028    0.028    0.028
0.035    0.035    0.035    0.035    0.035    0.035
0.139    0.02     0.02
0.       0.       0.
0.       0.       0.01     0.0      70.0     0.       0.2
        4        6        3        0        0        0        0
        1        2        3
1.8
455.     460.     466.     470.     480.     512.
28.      47.      120.     120.     120.     120.
0.       0.       95.      220.     400.     1000.
2.1
450.     451.     454.     462.     470.     500.
40.      62.      120.     120.     120.     120.
0.       0.       90.0     325.0    1035.    1200.
2.4
449.     459.     460.     470.     480.     500.
35.      50.      140.     140.     140.     140.
0.       0.       353.     885.     1410.    1610.
2.7
446.     462.     465.     470.     480.     500.
55.      58.      160.     160.     160.     160.
0.       120.     282.     380.     1380.    1450.
0.04     0.04     0.04     0.04     0.04     0.04
0.05     0.05     0.05     0.05     0.05     0.05
0.04     0.04     0.04     0.04     0.04     0.04
0.01     0.1      0.1
0.       0.       0.
0.0      0.0      0.1      0.5      0.0      0.0      0.5
```

APPENDIX B

OUTPUT DATA FILE

PROGRAM DAMBRK---VERSION-07/18/84
MICROCOMPUTER VERSION - R.G. TRAVER

ANALYSIS OF THE DOWNSTREAM FLOOD HYDROGRAPH

PRODUCED BY THE DAM BREAK OF

NEWFOUND LAKE DAM

ON

NEWOUND RIVER

ANALYSIS BY

STORCH ASSOCIATES
994 CANDIA ROAD, MANCHESTER, N.H. 03103

BASED ON PROCEDURE DEVELOPED BY

DANNY L. FREAD, PH.D., RESEARCH HYDROLOGIST
HYDROLOGIC RESEARCH LABORATORY
W23, OFFICE OF HYDROLOGY
NOAA, NATIONAL WEATHER SERVICE
SILVER SPRING, MARYLAND 20910

```
******************************
******************************
***                        ***
***  SUMMARY OF INPUT DATA  ***
***                        ***
******************************
******************************
```

INPUT CONTROL PARAMETERS FOR NEWFOUND LAKE DAM

PARAMETER	VARIABLE	VALUE
NUMBER OF DYNAMIC ROUTING REACHES	KKN	2
TYPE OF RESERVOIR ROUTING	KUI	0
MULTIPLE DAM INDICATOR	MULDAM	0
PRINTING INSTRUCTIONS FOR INPUT SUMMARY	KDMP	5
NO. OF RESERVOIR INFLOW HYDROGRAPH POINTS	ITEH	2
INTERVAL OF CROSS-SECTION INFO PRINTED OUT WHEN JNK=9	NPRT	0
FLOOD-PLAIN MODEL PARAMETER	KFLP	0
LANDSLIDE PARAMETER	KSL	0

IOPUT= 0 0 0 0 0 0 0 0 0 0 0 0

NEWFOUND LAKE DAM RESERVOIR

TABLE OF ELEVATION VS SURFACE AREA

SURFACE AREA (ACRES) SA(K)	ELEVATION (FT) HSA(K)
6960.0	610.00
5568.0	600.00
4530.0	590.00
.0	580.00
.0	.00
.0	.00
.0	.00
.0	.00

NEWFOUND LAKE DAM RESERVOIR AND BREACH PARAMETERS

PARAMETER	UNITS	VARIABLE	VALUE
LENGTH OF RESERVOIR	MI	RLM	6.30
ELEVATION OF WATER SURFACE	FT	YO	594.10
SIDE SLOPE OF BREACH		Z	.00
ELEVATION OF BOTTOM OF BREACH	FT	YBMIN	580.00
WIDTH OF BASE OF BREACH	FT	BB	80.00
TIME TO MAXIMUM BREACH SIZE	HR	TFM	.75
ELEVATION (MSL) OF BOTTOM OF DAM	FT	DATUM	580.00
VOLUME-SURFACE AREA PARAMETER		VOL	.00
ELEVATION OF WATER WHEN BREACHED	FT	HF	594.10
ELEVATION OF TOP OF DAM	FT	HD	592.10
ELEVATION OF UNCONTROLLED SPILLWAY CREST	FT	HSP	588.40
ELEVATION OF CENTER OF GATE OPENINGS	FT	HGT	.00
DISCHARGE COEF. FOR UNCONTROLLED SPILLWAY		CS	.00
DISCHARGE COEF. FOR GATE FLOW		CG	.00
DISCHARGE COEF. FOR UNCONTROLLED WEIR FLOW		CDO	132.00
DISCHARGE THRU TURBINES	CFS	QT	.00

QSPILL(K,1)	HEAD(K,1)
310.	.3
675.	1.1
1711.	3.7
3524.	7.7
10183.	16.4
13856.	17.7
0.	.0
0.	.0

DHF(INTERVAL BETWEEN INPUT HYDROGRAPH ORDINATES) = .00 HRS.

TEH(TIME AT WHICH COMPUTATIONS TERMINATE) = 24.0000 HRS.

INFLOW HYDROGRAPH TO NEWFOUND LAKE DAM

****

9975.00 9975.00

TIME OF INFLOW HYDROGRAPH ORDINATES

.0000 24.0000

CROSS-SECTIONAL PARAMETERS FOR NEWOUND RIVER
BELOW NEWFOUND LAKE DAM

PARAMETER	VARIABLE	VALUE
NUMBER OF CROSS-SECTIONS	NS	4
MAXIMUM NUMBER OF TOP WIDTHS	NCS	6
NUMBER OF CROSS-SECTIONAL HYDROGRAPHS TO PLOT	NTT	4
TYPE OF OUTPUT OTHER THAN HYDROGRAPH PLOTS	JNK	0
CROSS-SECTIONAL SMOOTHING PARAMETER	KSA	0
DOWNSTREAM SUPERCRITICAL OR NOT	KSUPC	1
NO. OF LATERAL INFLOW HYDROGRAPHS	LQ	0
NO. OF POINTS IN GATE CONTROL CURVE	KCG	0

NUMBER OF CROSS-SECTION WHERE HYDROGRAPH DESIRED
(MAX NUMBER OF HYDROGRAPHS = 6)

1 2 3 4

CROSS-SECTIONAL VARIABLES FOR NEWOUND RIVER
BELOW NEWFOUND LAKE DAM

PARAMETER	UNITS	VARIABLE
LOCATION OF CROSS-SECTION	MI	XS(I)
ELEVATION (MSL) OF FLOODING AT CROSS-SECTION	FT	FSTG(I)
ELEV CORRESPONDING TO EACH TOP WIDTH	FT	HS(K,I)
TOP WIDTH CORRESPONDING TO EACH ELEV (ACTIVE FLOW PORTION)	FT	BS(K,I)
TOP WIDTH CORRESPONDING TO EACH ELEV (OFF-CHANNEL PORTION)	FT	BSS(K,I)
SURFACE AREA CORRESPONDING TO EACH ELEV (ACTIVE FLOW PORTION)	ACRES	DSA(K,I)
SURFACE AREA CORRESPONDING TO EACH ELEV (OFF-CHANNEL PORTION)	ACRES	SSA(K,I)
NUMBER OF CROSS-SECTION		I
NUMBER OF ELEVATION LEVEL		K

CROSS-SECTION NUMBER 1
****

XS(I) = .010 FSTG(I) = .00 XSL(I) = .0 XSR(I) = .0

HS ...	580.0	591.0	593.0	596.0	600.0	620.0
BS ...	105.0	115.0	115.0	115.0	115.0	115.0
BSS ...	.0	.0	47.0	120.0	145.0	195.0

CROSS-SECTION NUMBER 2
****

XS(I) = 1.400 FSTG(I) = .00 XSL(I) = .0 XSR(I) = .0

HS ...	483.0	488.0	489.0	498.0	506.0	520.0
BS ...	40.0	60.0	110.0	110.0	110.0	110.0
BSS ...	.0	.0	45.0	160.0	270.0	360.0

CROSS-SECTION NUMBER 3
****

XS(I) = 1.600 FSTG(I) = .00 XSL(I) = .0 XSR(I) = .0

HS ...	469.0	477.0	480.0	485.0	490.0	513.0
BS ...	32.0	58.0	115.0	115.0	115.0	115.0
BSS ...	.0	.0	85.0	185.0	284.0	650.0

CROSS-SECTION NUMBER 4
****

XS(I) = 1.800 FSTG(I) = .00 XSL(I) = .0 XSR(I) = .0

HS ...	455.0	460.0	466.0	470.0	480.0	512.0
BS ...	28.0	47.0	120.0	120.0	120.0	120.0
BSS ...	.0	.0	95.0	220.0	400.0	1000.0

MANNING N ROUGHNESS COEFFICIENTS FOR THE GIVEN REACHES
(CN(K,I),K=1,NCS) WHERE I = REACH NUMBER

****

REACH	1 ...	.028	.028	.028	.028	.028	.028
REACH	2 ...	.028	.028	.028	.028	.028	.028
REACH	3 ...	.035	.035	.035	.035	.035	.035

CROSS-SECTIONAL VARIABLES FOR NEWOUND RIVER
BELOW NEWFOUND LAKE DAM

PARAMETER	UNITS	VARIABLE
MINIMUM COMPUTATIONAL DISTANCE USED BETWEEN CROSS-SECTIONS	MI	DXM(I)
CONTRACTION - EXPANSION COEFFICIENTS BETWEEN CROSS-SECTIONS		FKC(I)

REACH NUMBER	DXM(I)	FKC(I)
1	.139	.000
2	.020	.000
3	.020	.000

DOWNSTREAM FLOW PARAMETERS FOR NEWOUND RIVER
BELOW NEWFOUND LAKE DAM

PARAMETER	UNITS	VARIABLE	VALUE
MAX DISCHARGE AT DOWNSTREAM EXTREMITY	CFS	QMAXD	.0
MAX LATERAL OUTFLOW PRODUCING LOSSES	CFS/FT	QLL	.000
INITIAL SIZE OF TIME STEP	HR	DTHM	.0100
INITIAL WATER SURFACE ELEVATION DOWNSTREAM	FT	YDN	.00
SLOPE OF CHANNEL DOWNSTREAM OF DAM	FT/MI	SDN	70.00
THETA WEIGHTING FACTOR		THETA	.00
CONVERGENCE CRITERION FOR STAGE	FT	EPSY	.200
TIME AT WHICH DAM STARTS TO FAIL	HR	TFI	.00

TOTAL NUMBER OF CROSS SECTIONS (ORIGINAL+INTERPOLATED) (N) = 31 (MAXIMUM ALLOWABLE = 200

TOTAL VOLUME IN RESERVOIR BEHIND
NEWFOUND LAKE DAM = 42260.5 ACRE-FEET

DEFINITION OF VARIABLES IN RESERVOIR DEPLETION TABLE

PARAMETER	UNITS	VARIABLE
TIME STEP FROM START OF ANALYSIS		I
ITERATIONS NECESSARY TO SOLVE FLOW EQUATIONS		K
ELAPSED TIME FROM START OF ANALYSIS	HRS	TTP(I)
TOTAL OUTFLOW FROM DAM	CFS	Q(I)
ELEVATION OF WATER SURFACE AT DAM	FT	H2
ELEVATION OF BOTTOM OF BREACH	FT	YB
EST DEPTH OF FLOW IMMEDIATELY DOWNSTREAM	FT	D
SUBMERGENCE COEFFICIENT		SUB

SUBMERGENCE COEFFICIENT		SUB
VELOCITY CORRECTION		VCOR
TOTAL VOLUME DISCHARGED FROM TIME OF BREACH	AC-FT	OUTVOL
BREACH WIDTH FT BB		
RECTANGULAR BREACH DISCHARGE COEFFICIENT		COFR
INFLOW TO RESERVOIR	CFS	QI(I)
BREACH OUTFLOW	CFS	QBRECH
SPILLWAY OUTFLOW	CFS	QSPIL

RESERVOIR DEPLETION TABLE

I	K	TTP(I)	Q(I)	H2	YB	D	SUB	VCOR	OUTVOL	BB	COFR	QI(I)	QBRECH	QSPIL
***	**	******	********	*******	*******	*******	****	****	*********	****	****	*****	******	*****
1	0	.000	2990	594.10	592.10	582.51	1.00	1.00	.0	.0	3.10	9975.	0.	2991.
2	1	.015	2995	594.10	591.86	582.51	1.00	1.04	3.7	1.6	3.10	9975.	17.	2979.
3	1	.030	3006	594.10	591.62	582.52	1.00	1.03	7.4	3.2	3.10	9975.	40.	2966.
4	1	.045	3023	594.11	591.37	582.52	1.00	1.03	11.2	4.8	3.10	9975.	69.	2954.
5	1	.060	3046	594.11	591.13	582.54	1.00	1.03	14.9	6.4	3.10	9975.	105.	2941.
6	1	.075	3076	594.11	590.89	582.55	1.00	1.03	18.7	8.0	3.10	9975.	147.	2929.
7	1	.090	3113	594.11	590.65	582.57	1.00	1.03	22.6	9.6	3.10	9975.	197.	2916.
8	1	.105	3158	594.11	590.41	582.59	1.00	1.03	26.4	11.2	3.10	9975.	254.	2904.
9	1	.120	3210	594.11	590.16	582.62	1.00	1.02	30.4	12.8	3.10	9975.	319.	2891.
10	1	.135	3271	594.12	589.92	582.65	1.00	1.02	34.4	14.4	3.10	9975.	393.	2879.
11	1	.150	3340	594.12	589.68	582.68	1.00	1.02	38.5	16.0	3.10	9975.	475.	2866.
12	1	.165	3418	594.12	589.44	582.72	1.00	1.02	42.7	17.6	3.10	9975.	566.	2853.
13	1	.180	3505	594.12	589.20	582.76	1.00	1.02	47.0	19.2	3.10	9975.	666.	2840.
14	1	.195	3602	594.12	588.95	582.80	1.00	1.02	51.4	20.8	3.10	9975.	775.	2828.
15	1	.210	3709	594.12	588.71	582.85	1.00	1.02	55.9	22.4	3.10	9975.	895.	2815.
16	1	.225	3826	594.13	588.47	582.91	1.00	1.02	60.6	24.0	3.10	9975.	1024.	2802.
17	1	.240	3953	594.13	588.23	582.96	1.00	1.02	65.4	25.6	3.10	9975.	1164.	2789.
18	1	.255	4091	594.13	587.99	583.03	1.00	1.03	70.4	27.2	3.10	9975.	1315.	2776.
19	1	.270	4240	594.13	587.74	583.09	1.00	1.03	75.6	28.8	3.10	9975.	1477.	2763.
20	1	.285	4400	594.13	587.50	583.16	1.00	1.03	80.9	30.4	3.10	9975.	1651.	2750.
21	1	.300	4572	594.13	587.26	583.23	1.00	1.03	86.5	32.0	3.10	9975.	1836.	2736.
22	1	.315	4756	594.13	587.02	583.31	1.00	1.03	92.3	33.6	3.10	9975.	2033.	2723.
23	1	.330	4952	594.13	586.78	583.39	1.00	1.03	98.3	35.2	3.10	9975.	2243.	2710.
24	1	.345	5162	594.14	586.53	583.48	1.00	1.03	104.6	36.8	3.10	9975.	2466.	2697.
25	1	.360	5384	594.14	586.29	583.57	1.00	1.03	111.1	38.4	3.10	9975.	2701.	2683.
26	1	.375	5620	594.14	586.05	583.66	1.00	1.04	117.9	40.0	3.10	9975.	2951.	2670.
27	1	.390	5870	594.14	585.81	583.76	1.00	1.04	125.0	41.6	3.10	9975.	3214.	2656.
28	1	.405	6134	594.14	585.57	583.86	1.00	1.04	132.5	43.2	3.10	9975.	3492.	2643.
29	1	.420	6421	594.14	585.32	583.96	1.00	1.04	140.3	44.8	3.10	9975.	3785.	2636.
30	1	.435	6730	594.14	585.08	584.08	1.00	1.05	148.4	46.4	3.10	9975.	4094.	2637.
31	1	.450	7055	594.14	584.84	584.19	1.00	1.05	157.0	48.0	3.10	9975.	4419.	2637.
32	1	.465	7398	594.14	584.60	584.31	1.00	1.05	165.9	49.6	3.10	9975.	4761.	2637.
33	1	.480	7757	594.14	584.36	584.44	1.00	1.06	175.3	51.2	3.10	9975.	5120.	2638.
34	1	.495	8135	594.14	584.11	584.56	1.00	1.06	185.2	52.8	3.10	9975.	5498.	2638.
35	1	.510	8532	594.15	583.87	584.70	1.00	1.07	195.5	54.4	3.10	9975.	5894.	2638.
36	1	.525	8948	594.15	583.63	584.83	1.00	1.07	206.3	56.0	3.10	9975.	6310.	2638.
37	1	.540	9385	594.15	583.39	584.97	1.00	1.08	217.7	57.6	3.10	9975.	6747.	2638.
38	1	.555	9843	594.15	583.15	585.11	1.00	1.08	229.6	59.2	3.10	9975.	7206.	2638.
39	1	.570	10325	594.15	582.90	585.26	1.00	1.09	242.1	60.8	3.10	9975.	7687.	2638.
40	1	.585	10830	594.15	582.66	585.42	1.00	1.10	255.2	62.4	3.10	9975.	8192.	2638.
41	1	.600	11361	594.15	582.42	585.57	1.00	1.10	269.0	64.0	3.10	9975.	8723.	2638.
42	1	.615	11919	594.14	582.18	585.73	1.00	1.11	283.4	65.6	3.10	9975.	9282.	2638.
43	1	.630	12506	594.14	581.94	585.90	1.00	1.12	298.6	67.2	3.10	9975.	9869.	2638.
44	1	.645	13123	594.14	581.69	586.07	1.00	1.13	314.4	68.8	3.10	9975.	10487.	2637.
45	1	.660	13774	594.14	581.45	586.25	1.00	1.14	331.1	70.4	3.10	9975.	11138.	2637.
46	1	.675	14461	594.14	581.21	586.43	1.00	1.15	348.6	72.0	3.10	9975.	11825.	2636.
47	1	.690	15187	594.14	580.97	586.63	1.00	1.16	367.0	73.6	3.10	9975.	12551.	2636.
48	1	.705	15955	594.14	580.73	586.82	1.00	1.18	386.3	75.2	3.10	9975.	13320.	2635.
49	1	.720	16770	594.14	580.48	587.03	1.00	1.19	406.6	76.8	3.10	9975.	14136.	2635.
50	1	.735	17637	594.14	580.24	587.24	1.00	1.21	427.9	78.4	3.10	9975.	15003.	2634.

RESERVOIR DEPLETION TABLE

I	K	TTP(I)	Q(I)	H2	YB	D	SUB	VCOR	OUTVOL	BB	COFR	QI(I)	QBRECH	QSPIL
***	**	******	********	*******	*******	*******	****	****	*********	****	****	*****	******	*****
51	1	.750	18561	594.13	580.00	587.47	1.00	1.23	450.3	80.0	3.10	9975.	15928.	2633.
52	1	.765	18801	594.13	580.00	587.52	1.00	1.23	473.5	80.0	3.10	9975.	16170.	2632.
53	1	.780	18876	594.13	580.00	587.54	1.00	1.24	496.9	80.0	3.10	9975.	16245.	2631.
54	1	.795	18897	594.13	580.00	587.54	1.00	1.24	520.3	80.0	3.10	9975.	16268.	2630.
55	1	.810	18900	594.12	580.00	587.55	1.00	1.24	543.7	80.0	3.10	9975.	16272.	2629.
56	1	.825	18898	594.12	580.00	587.54	1.00	1.24	567.1	80.0	3.10	9975.	16271.	2628.
57	1	.840	18894	594.12	580.00	587.54	1.00	1.24	590.6	80.0	3.10	9975.	16268.	2627.
58	1	.855	18890	594.12	580.00	587.54	1.00	1.24	614.0	80.0	3.10	9975.	16264.	2626.
59	1	.870	18885	594.12	580.00	587.54	1.00	1.24	637.4	80.0	3.10	9975.	16260.	2625.
60	1	.885	18880	594.11	580.00	587.54	1.00	1.24	660.8	80.0	3.10	9975.	16256.	2624.
61	1	.900	18875	594.11	580.00	587.54	1.00	1.24	684.2	80.0	3.10	9975.	16252.	2623.
62	1	.915	18870	594.11	580.00	587.54	1.00	1.24	707.6	80.0	3.10	9975.	16248.	2622.
63	1	.930	18865	594.11	580.00	587.54	1.00	1.24	731.0	80.0	3.10	9975.	16245.	2621.
64	1	.945	18860	594.10	580.00	587.54	1.00	1.24	754.4	80.0	3.10	9975.	16241.	2620.
65	1	.960	18855	594.10	580.00	587.53	1.00	1.24	777.7	80.0	3.10	9975.	16237.	2619.
66	1	.975	18850	594.10	580.00	587.53	1.00	1.24	801.1	80.0	3.10	9975.	16233.	2618.
67	1	.990	18845	594.10	580.00	587.53	1.00	1.24	824.5	80.0	3.10	9975.	16229.	2617.
68	1	1.005	18840	594.10	580.00	587.53	1.00	1.24	847.8	80.0	3.10	9975.	16225.	2616.
69	1	1.020	18835	594.09	580.00	587.53	1.00	1.24	871.2	80.0	3.10	9975.	16221.	2615.
70	1	1.035	18830	594.09	580.00	587.53	1.00	1.24	894.5	80.0	3.10	9975.	16217.	2614.
71	1	1.050	18825	594.09	580.00	587.53	1.00	1.24	917.9	80.0	3.10	9975.	16213.	2613.
72	1	1.065	18820	594.09	580.00	587.53	1.00	1.24	941.2	80.0	3.10	9975.	16209.	2612.
73	1	1.080	18815	594.09	580.00	587.53	1.00	1.24	964.5	80.0	3.10	9975.	16205.	2611.
74	1	1.095	18810	594.08	580.00	587.52	1.00	1.24	987.9	80.0	3.10	9975.	16201.	2610.
75	1	1.110	18805	594.08	580.00	587.52	1.00	1.24	1011.2	80.0	3.10	9975.	16197.	2609.
76	1	1.125	18800	594.08	580.00	587.52	1.00	1.24	1034.5	80.0	3.10	9975.	16193.	2608.
77	1	1.140	18795	594.08	580.00	587.52	1.00	1.24	1057.8	80.0	3.10	9975.	16189.	2607.
78	1	1.155	18790	594.07	580.00	587.52	1.00	1.24	1081.1	80.0	3.10	9975.	16185.	2606.
79	1	1.170	18785	594.07	580.00	587.52	1.00	1.24	1104.4	80.0	3.10	9975.	16181.	2605.
80	1	1.185	18781	594.07	580.00	587.52	1.00	1.24	1127.7	80.0	3.10	9975.	16177.	2604.
81	1	1.200	18776	594.07	580.00	587.52	1.00	1.24	1151.0	80.0	3.10	9975.	16173.	2603.
82	1	1.215	18771	594.07	580.00	587.51	1.00	1.24	1174.2	80.0	3.10	9975.	16169.	2602.
83	1	1.230	18766	594.06	580.00	587.51	1.00	1.24	1197.5	80.0	3.10	9975.	16166.	2601.
84	1	1.245	18761	594.06	580.00	587.51	1.00	1.24	1220.8	80.0	3.10	9975.	16162.	2600.
85	1	1.260	18756	594.06	580.00	587.51	1.00	1.24	1244.0	80.0	3.10	9975.	16158.	2599.
86	1	1.275	18751	594.06	580.00	587.51	1.00	1.24	1267.3	80.0	3.10	9975.	16154.	2598.
87	1	1.290	18746	594.05	580.00	587.51	1.00	1.24	1290.5	80.0	3.10	9975.	16150.	2597.
88	1	1.305	18741	594.05	580.00	587.51	1.00	1.24	1313.7	80.0	3.10	9975.	16146.	2596.
89	1	1.320	18736	594.05	580.00	587.51	1.00	1.24	1337.0	80.0	3.10	9975.	16142.	2595.
90	1	1.335	18731	594.05	580.00	587.51	1.00	1.24	1360.2	80.0	3.10	9975.	16138.	2594.
91	1	1.350	18727	594.05	580.00	587.50	1.00	1.24	1383.4	80.0	3.10	9975.	16134.	2593.
92	1	1.365	18722	594.04	580.00	587.50	1.00	1.24	1406.6	80.0	3.10	9975.	16130.	2592.
93	1	1.380	18717	594.04	580.00	587.50	1.00	1.24	1429.8	80.0	3.10	9975.	16126.	2591.
94	1	1.395	18712	594.04	580.00	587.50	1.00	1.24	1453.0	80.0	3.10	9975.	16123.	2590.
95	1	1.410	18707	594.04	580.00	587.50	1.00	1.24	1476.2	80.0	3.10	9975.	16119.	2589.
96	1	1.425	18702	594.03	580.00	587.50	1.00	1.24	1499.4	80.0	3.10	9975.	16115.	2588.
97	1	1.440	18697	594.03	580.00	587.50	1.00	1.24	1522.6	80.0	3.10	9975.	16111.	2587.
98	1	1.455	18692	594.03	580.00	587.50	1.00	1.24	1545.8	80.0	3.10	9975.	16107.	2586.
99	1	1.470	18687	594.03	580.00	587.49	1.00	1.24	1568.9	80.0	3.10	9975.	16103.	2585.
100	1	1.485	18683	594.03	580.00	587.49	1.00	1.24	1592.1	80.0	3.10	9975.	16099.	2584.

RESERVOIR DEPLETION TABLE

I	K	TTP(I)	Q(I)	H2	YB	D	SUB	VCOR	OUTVOL	BB	COFR	QI(I)	QBRECH	QSPIL
***	**	******	********	*******	*******	*******	****	****	*********	****	****	*****	******	*****
101	1	1.500	18678	594.02	580.00	587.49	1.00	1.24	1615.3	80.0	3.10	9975.	16095.	2583.
102	1	1.515	18673	594.02	580.00	587.49	1.00	1.24	1638.4	80.0	3.10	9975.	16091.	2582.
103	1	1.531	18667	594.02	580.00	587.49	1.00	1.24	1663.9	80.0	3.10	9975.	16087.	2581.
104	1	1.550	18662	594.02	580.00	587.49	1.00	1.24	1691.9	80.0	3.10	9975.	16082.	2580.
105	1	1.570	18655	594.01	580.00	587.49	1.00	1.24	1722.7	80.0	3.10	9975.	16077.	2578.
106	1	1.592	18648	594.01	580.00	587.49	1.00	1.24	1756.5	80.0	3.10	9975.	16072.	2577.
107	1	1.616	18640	594.01	580.00	587.48	1.00	1.24	1793.7	80.0	3.10	9975.	16065.	2575.
108	1	1.642	18632	594.00	580.00	587.48	1.00	1.24	1834.7	80.0	3.10	9975.	16059.	2574.
109	1	1.672	18622	594.00	580.00	587.48	1.00	1.24	1879.7	80.0	3.10	9975.	16051.	2572.
110	1	1.704	18612	593.99	580.00	587.48	1.00	1.24	1929.1	80.0	3.10	9975.	16043.	2570.
111	1	1.739	18601	593.99	580.00	587.47	1.00	1.24	1983.5	80.0	3.10	9975.	16034.	2567.
112	1	1.778	18588	593.98	580.00	587.47	1.00	1.24	2043.3	80.0	3.10	9975.	16024.	2565.
113	1	1.821	18575	593.98	580.00	587.47	1.00	1.24	2109.0	80.0	3.10	9975.	16013.	2562.
114	1	1.868	18560	593.97	580.00	587.46	1.00	1.24	2181.3	80.0	3.10	9975.	16001.	2559.
115	1	1.920	18543	593.96	580.00	587.46	1.00	1.24	2260.7	80.0	3.10	9975.	15988.	2556.
116	1	1.977	18525	593.96	580.00	587.46	1.00	1.24	2347.9	80.0	3.10	9975.	15974.	2552.
117	1	2.039	18505	593.95	580.00	587.45	1.00	1.24	2443.8	80.0	3.10	9975.	15958.	2548.
118	1	2.108	18483	593.94	580.00	587.45	1.00	1.24	2549.2	80.0	3.10	9975.	15940.	2543.
119	1	2.184	18459	593.93	580.00	587.44	1.00	1.24	2664.9	80.0	3.10	9975.	15921.	2538.
120	1	2.267	18433	593.91	580.00	587.43	1.00	1.24	2792.0	80.0	3.10	9975.	15900.	2533.
121	1	2.359	18404	593.90	580.00	587.43	1.00	1.24	2931.7	80.0	3.10	9975.	15878.	2527.
122	1	2.460	18373	593.89	580.00	587.42	1.00	1.24	3085.1	80.0	3.10	9975.	15852.	2521.
123	1	2.571	18338	593.87	580.00	587.41	1.00	1.24	3253.4	80.0	3.10	9975.	15823.	2514.
124	1	2.693	18300	593.85	580.00	587.40	1.00	1.23	3438.3	80.0	3.10	9975.	15795.	2506.
125	1	2.827	18259	593.84	580.00	587.39	1.00	1.23	3641.2	80.0	3.10	9975.	15762.	2498.
126	1	2.975	18214	593.82	580.00	587.38	1.00	1.23	3863.9	80.0	3.10	9975.	15726.	2488.
127	1	3.138	18164	593.79	580.00	587.37	1.00	1.23	4108.2	80.0	3.10	9975.	15686.	2478.
128	1	3.316	18110	593.77	580.00	587.36	1.00	1.23	4376.2	80.0	3.10	9975.	15643.	2467.
129	1	3.513	18051	593.74	580.00	587.34	1.00	1.23	4670.0	80.0	3.10	9975.	15596.	2455.
130	1	3.729	17986	593.71	580.00	587.33	1.00	1.23	4992.2	80.0	3.10	9975.	15545.	2442.
131	1	3.967	17916	593.68	580.00	587.31	1.00	1.23	5345.2	80.0	3.10	9975.	15489.	2427.
132	1	4.229	17839	593.65	580.00	587.29	1.00	1.23	5731.9	80.0	3.10	9975.	15428.	2412.
133	1	4.517	17755	593.61	580.00	587.27	1.00	1.23	6155.4	80.0	3.10	9975.	15361.	2394.
134	1	4.834	17665	593.57	580.00	587.25	1.00	1.23	6619.0	80.0	3.10	9975.	15289.	2376.
135	1	5.182	17566	593.52	580.00	587.23	1.00	1.23	7126.1	80.0	3.10	9975.	15211.	2356.
136	1	5.565	17459	593.47	580.00	587.20	1.00	1.23	7680.8	80.0	3.10	9975.	15126.	2333.
137	1	5.987	17343	593.42	580.00	587.17	1.00	1.23	8287.0	80.0	3.10	9975.	15034.	2310.
138	1	6.451	17217	593.36	580.00	587.14	1.00	1.23	8949.2	80.0	3.10	9975.	14934.	2284.
139	1	6.961	17082	593.30	580.00	587.11	1.00	1.23	9672.2	80.0	3.10	9975.	14827.	2256.
140	1	7.522	16936	593.23	580.00	587.07	1.00	1.23	10460.9	80.0	3.10	9975.	14711.	2225.
141	1	8.139	16779	593.16	580.00	587.03	1.00	1.23	11320.7	80.0	3.10	9975.	14586.	2193.
142	1	8.818	16610	593.09	580.00	586.99	1.00	1.23	12257.4	80.0	3.10	9975.	14453.	2158.
143	1	9.565	16429	593.00	580.00	586.94	1.00	1.23	13277.0	80.0	3.10	9975.	14310.	2120.
144	1	10.386	16236	592.91	580.00	586.90	1.00	1.23	14385.8	80.0	3.10	9975.	14157.	2080.
145	1	11.290	16031	592.82	580.00	586.84	1.00	1.23	15590.7	80.0	3.10	9975.	13995.	2036.
146	1	12.284	15812	592.72	580.00	586.79	1.00	1.23	16898.6	80.0	3.10	9975.	13822.	1991.
147	1	13.377	15582	592.61	580.00	586.73	1.00	1.23	18317.0	80.0	3.10	9975.	13640.	1942.
148	1	14.580	15338	592.50	580.00	586.67	1.00	1.23	19853.7	80.0	3.10	9975.	13448.	1891.
149	1	15.903	15083	592.38	580.00	586.60	1.00	1.23	21516.8	80.0	3.10	9975.	13247.	1837.
150	1	17.358	14817	592.25	580.00	586.53	1.00	1.22	23314.9	80.0	3.10	9975.	13037.	1780.

RESERVOIR DEPLETION TABLE

I	K	TTP(I)	Q(I)	H2	YB	D	SUB	VCOR	OUTVOL	BB	COFR	QI(I)	QBRECH	QSPIL
***	**	******	********	*******	*******	*******	****	****	**********	****	****	*****	******	*****
151	1	18.959	14540	592.12	580.00	586.46	1.00	1.22	25256.8	80.0	3.10	9975.	12819.	1721.
152	1	20.720	14259	591.99	580.00	586.38	1.00	1.22	27352.4	80.0	3.10	9975.	12594.	1666.
153	1	22.656	13974	591.85	580.00	586.31	1.00	1.22	29612.3	80.0	3.10	9975.	12365.	1610.
154	1	24.787	13684	591.70	580.00	586.23	1.00	1.22	32047.6	80.0	3.10	9975.	12132.	1553.

PARAMETER	UNITS	VARIABLE	VALUE
INITIAL FLOW	CFS	Q(1)	2991.
MAX FLOW	CFS	QM	18901.
FINAL FLOW	CFS	Q(NU)	13685.
TIME TO MAX FLOW	HRS	TP	.81
NUMBER OF TIME STEPS		NNU	154
TOTAL VOLUME DISCHARGED FROM RESERVOIR	AC-FT	DISVOL	32048.

TIME PARAMETERS OF OUTFLOW HYDROGRAPH IMMEDIATELY DOWNSTREAM OF DAM

PARAMETER	UNITS	VARIABLE	VALUE
TIME TO FAILURE	HR	TFH	.750
TIME TO START OF RISING LIMB OF HYDROGRAPH	HR	TFQ	.060
TIME TO PEAK	HR	TP	.810
TIME STEP SIZE	HR	DTHI	.010

ROUTING COMPLETED.

KTIME=699 ALLOWABLE KTIME= 698 TT= 7.0

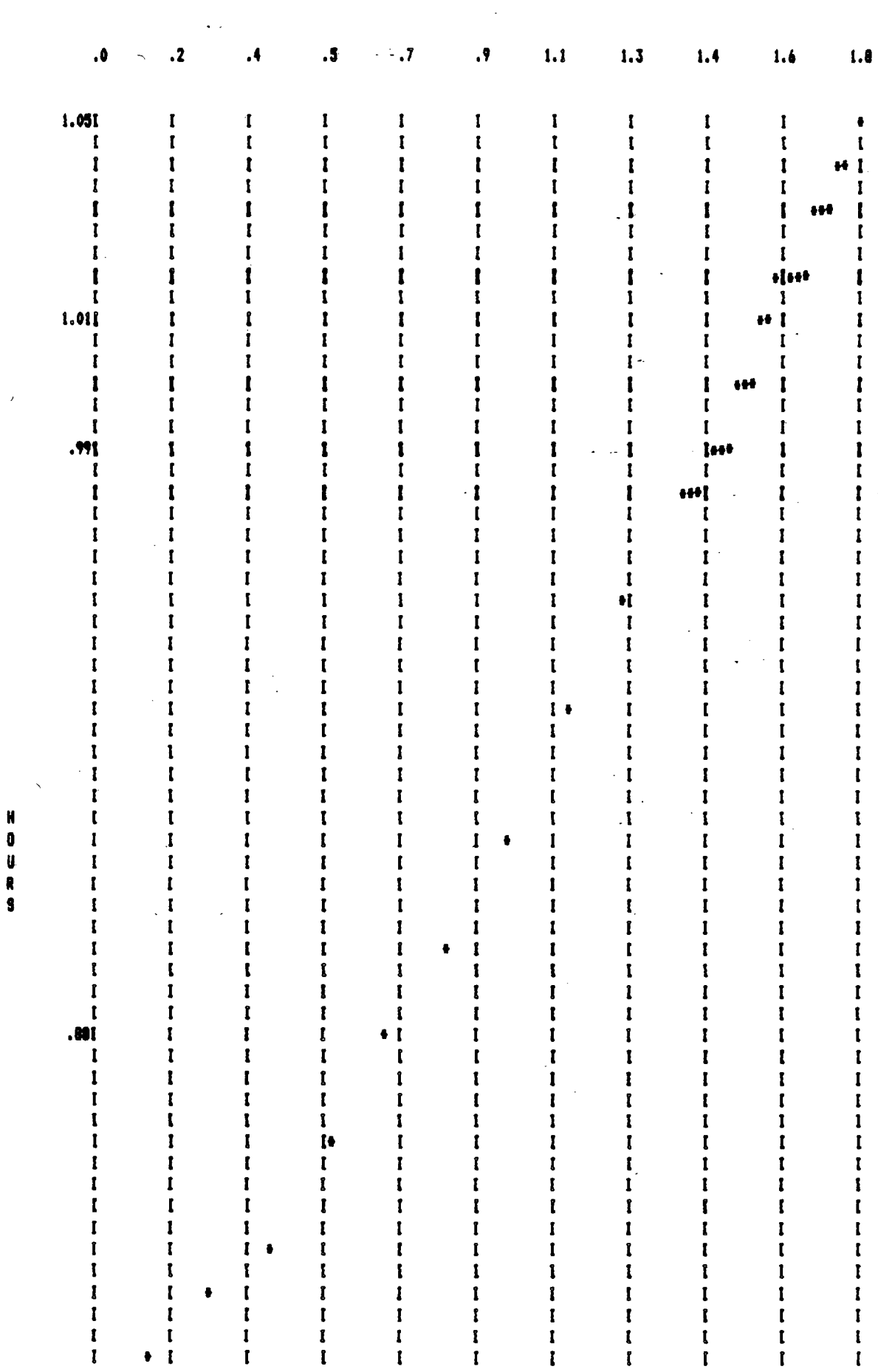
PEAK ELEVATION PROFILE

MILES

	.0	.2	.4	.5	.7	.9	1.1	1.3	1.4	1.6	1.8	ELEV FEET	MILE
587.6	*	I	I	I	I	I	I	I	I	I	I	587.6	.0
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I	I	I	I	I	I	I	I	I		
	I	* I	I	I	I	I	I	I	I	I	I	578.3	.1
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I	I	I	I	I	I	I	I	I		
	I	I *	I	I	I	I	I	I	I	I	I	568.9	.3
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I *	I	I	I	I	I	I	I	I	559.6	.4
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I	I*	I	I	I	I	I	I	I	550.4	.6
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I	I	I	I	I	I	I	I	I		
541.2	I	I	I	I	* I	I	I	I	I	I	I	541.2	.7
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I	I	I	* I	I	I	I	I	I	531.9	.8
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I	I	I	I	I	I	I	I	I		
	I	I	I	I	I	I	I	I	I	I	I		

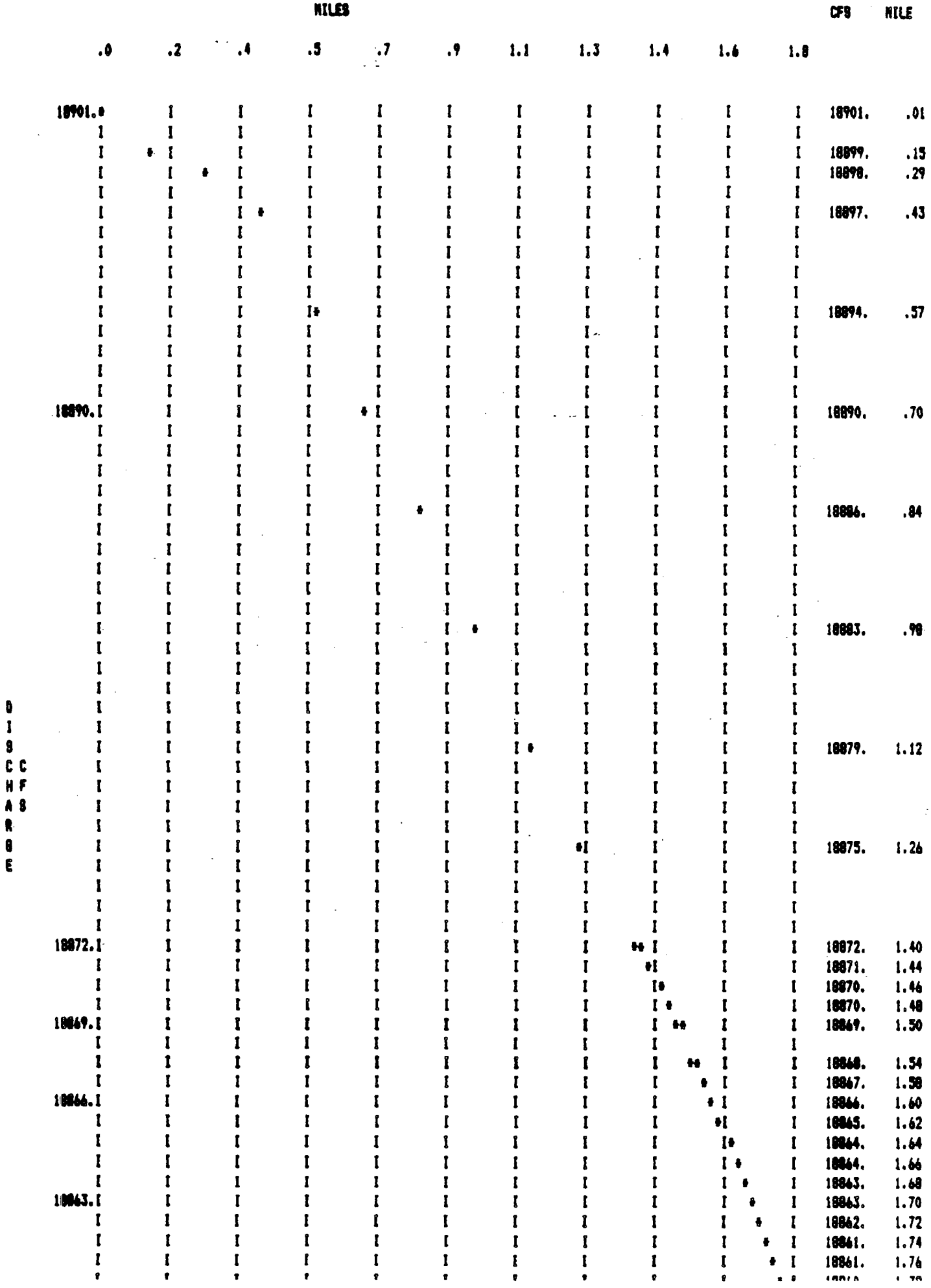
TIME TO PEAK ELEVATION PROFILE

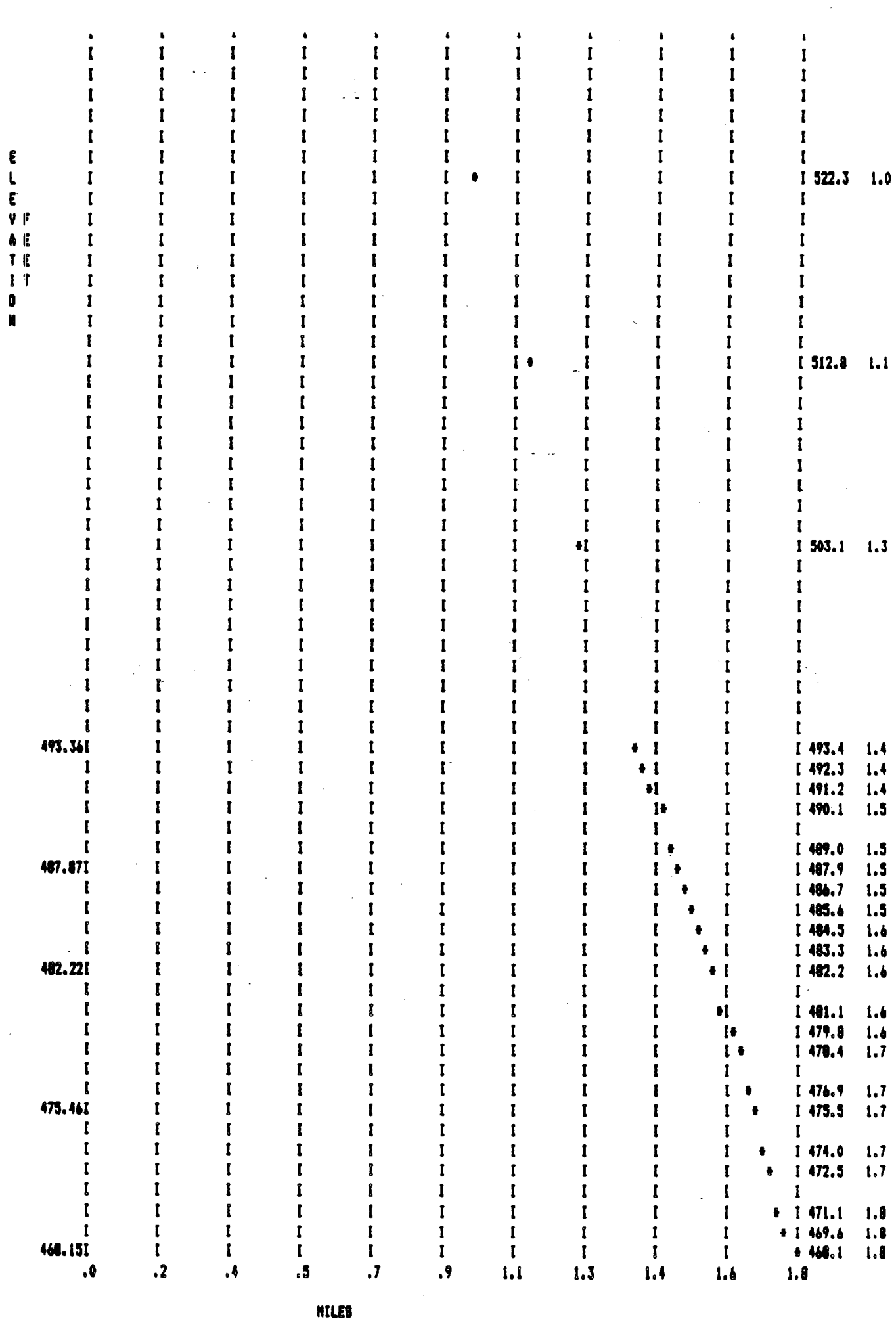
MILES



HOUR	MILE	ELEV
1.0	1.8	468.1
1.0	1.8	469.6
1.0	1.7	472.5
1.0	1.7	476.9
1.0	1.6	482.2
1.0	1.6	484.5
1.0	1.5	487.9
1.0	1.4	491.2
1.0	1.3	503.1
.9	1.1	512.8
.9	1.0	522.3
.9	.8	531.9
.9	.7	541.2
.9	.6	550.4
.8	.4	559.6
.8	.3	568.9
.8	.1	578.3

PEAK DISCHARGE PROFILE




ELEVATION FEET
522.3 1.0
512.8 1.1
503.1 1.3
493.36
493.4 1.4
492.3 1.4
491.2 1.4
490.1 1.5
489.0 1.5
487.87
487.9 1.5
486.7 1.5
485.6 1.5
484.5 1.6
483.3 1.6
482.22
482.2 1.6
481.1 1.6
479.8 1.6
478.4 1.7
476.9 1.7
475.46
475.5 1.7
474.0 1.7
472.5 1.7
471.1 1.8
469.6 1.8
468.15
468.1 1.8
.0 .2 .4 .5 .7 .9 1.1 1.3 1.4 1.6 1.8
MILES

DISCHARGE HYDROGRAPH FOR NEWOUND RIVER ... STATION NUMBER 1
BELOW NEWFOUND LAKE DAM AT MILE .01

GAGE ZERO = 580.00 MAX ELEVATION REACHED BY FLOOD WAVE = 587.60
FLOOD STAGE NOT AVAILABLE
MAX STAGE = 7.60 AT TIME = .810 HOURS
MAX FLOW = 18901 AT TIME = .810 HOURS

HR	STAGE	FLOW	0	5000	10000	15000	20000	25000
.0	2.5	2991	I	* I	I	I	I	I
.2	2.8	3638	I	* I	I	I	I	I
.4	3.8	6047	I	I *	I	I	I	I
.6	5.6	11361	I	I	I *	I	I	I
.8	7.6	18899	I	I	I	I	* I	I
1.0	7.6	18842	I	I	I	I	* I	I
1.2	7.6	18776	I	I	I	I	* I	I
1.4	7.6	18711	I	I	I	I	* I	I
1.6	7.5	18646	I	I	I	I	* I	I
1.8	7.5	18582	I	I	I	I	* I	I
2.0	7.5	18518	I	I	I	I	* I	I
2.2	7.5	18455	I	I	I	I	* I	I
2.4	7.5	18392	I	I	I	I	* I	I
2.6	7.5	18330	I	I	I	I	* I	I
2.8	7.4	18268	I	I	I	I	* I	I
3.0	7.4	18207	I	I	I	I	* I	I
3.2	7.4	18146	I	I	I	I	* I	I
3.4	7.4	18085	I	I	I	I	* I	I
3.6	7.4	18025	I	I	I	I	* I	I
3.8	7.4	17966	I	I	I	I	* I	I
4.0	7.4	17907	I	I	I	I	* I	I
4.2	7.3	17848	I	I	I	I	* I	I
4.4	7.3	17790	I	I	I	I	* I	I
4.6	7.3	17732	I	I	I	I	* I	I
4.8	7.3	17675	I	I	I	I	* I	I
5.0	7.3	17618	I	I	I	I	* I	I
5.2	7.3	17561	I	I	I	I	* I	I
5.4	7.3	17506	I	I	I	I	* I	I
5.6	7.2	17450	I	I	I	I	* I	I
5.8	7.2	17395	I	I	I	I	* I	I
6.0	7.2	17340	I	I	I	I	* I	I
6.2	7.2	17286	I	I	I	I	* I	I
6.4	7.2	17232	I	I	I	I	* I	I
6.6	7.2	17178	I	I	I	I	* I	I
6.8	7.2	17125	I	I	I	I	* I	I

DISCHARGE HYDROGRAPH FOR NEWOUND RIVER ... STATION NUMBER 11
BELOW NEWFOUND LAKE DAM AT MILE 1.40

GAGE ZERO = 483.00 MAX ELEVATION REACHED BY FLOOD WAVE = 493.36
FLOOD STAGE NOT AVAILABLE
MAX STAGE = 10.36 AT TIME = .980 HOURS
MAX FLOW = 18872 AT TIME = .960 HOURS

HR	STAGE	FLOW	0	5000	10000	15000	20000	25000
.0	4.3	2992	I	* I	I	I	I	I
.2	4.5	3162	I	* I	I	I	I	I
.4	6.1	4672	I	*I	I	I	I	I
.6	7.5	8654	I	I	* I	I	I	I
.8	9.8	16787	I	I	I	I	* I	I
1.0	10.4	18866	I	I	I	I	* I	I
1.2	10.3	18802	I	I	I	I	* I	I
1.4	10.3	18736	I	I	I	I	* I	I
1.6	10.3	18671	I	I	I	I	* I	I
1.8	10.3	18607	I	I	I	I	* I	I
2.0	10.3	18543	I	I	I	I	* I	I
2.2	10.3	18479	I	I	I	I	* I	I
2.4	10.3	18416	I	I	I	I	* I	I
2.6	10.2	18354	I	I	I	I	* I	I
2.8	10.2	18292	I	I	I	I	* I	I
3.0	10.2	18230	I	I	I	I	* I	I
3.2	10.2	18169	I	I	I	I	* I	I
3.4	10.2	18109	I	I	I	I	* I	I
3.6	10.2	18049	I	I	I	I	* I	I
3.8	10.1	17990	I	I	I	I	* I	I
4.0	10.1	17931	I	I	I	I	* I	I
4.2	10.1	17872	I	I	I	I	* I	I
4.4	10.1	17814	I	I	I	I	* I	I
4.6	10.1	17756	I	I	I	I	* I	I
4.8	10.1	17699	I	I	I	I	* I	I
5.0	10.1	17642	I	I	I	I	* I	I
5.2	10.1	17585	I	I	I	I	* I	I
5.4	10.0	17529	I	I	I	I	* I	I
5.6	10.0	17473	I	I	I	I	* I	I
5.8	10.0	17418	I	I	I	I	* I	I
6.0	10.0	17362	I	I	I	I	* I	I
6.2	10.0	17307	I	I	I	I	* I	I
6.4	10.0	17253	I	I	I	I	* I	I
6.6	10.0	17199	I	I	I	I	* I	I
6.8	9.9	17146	I	I	I	I	* I	I

DISCHARGE HYDROGRAPH FOR NEWOUND RIVER ... STATION NUMBER 21
BELOW NEWFOUND LAKE DAM AT MILE 1.60

GAGE ZERO = 469.00 MAX ELEVATION REACHED BY FLOOD WAVE = 482.22
FLOOD STAGE NOT AVAILABLE
MAX STAGE = 13.22 AT TIME = 1.010 HOURS
MAX FLOW = 18866 AT TIME = 1.000 HOURS

HR	STAGE	FLOW	0	5000	10000	15000	20000	25000
.0	5.7	3031	I	* I	I	I	I	I
.2	5.7	3160	I	* I	I	I	I	I
.4	6.1	4328	I	*I	I	I	I	I
.6	9.5	8032	I	I	* I	I	I	I
.8	12.4	16015	I	I	I	I *	I	I
1.0	13.2	18866	I	I	I	I	* I	I
1.2	13.2	18807	I	I	I	I	* I	I
1.4	13.2	18741	I	I	I	I	* I	I
1.6	13.2	18676	I	I	I	I	* I	I
1.8	13.2	18612	I	I	I	I	* I	I
2.0	13.1	18548	I	I	I	I	* I	I
2.2	13.1	18484	I	I	I	I	* I	I
2.4	13.1	18421	I	I	I	I	* I	I
2.6	13.1	18359	I	I	I	I	* I	I
2.8	13.1	18297	I	I	I	I	* I	I
3.0	13.1	18235	I	I	I	I	* I	I
3.2	13.1	18174	I	I	I	I	* I	I
3.4	13.0	18113	I	I	I	I	* I	I
3.6	13.0	18053	I	I	I	I	* I	I
3.8	13.0	17994	I	I	I	I	* I	I
4.0	13.0	17936	I	I	I	I	* I	I
4.2	13.0	17877	I	I	I	I	* I	I
4.4	13.0	17819	I	I	I	I	* I	I
4.6	13.0	17761	I	I	I	I	* I	I
4.8	12.9	17703	I	I	I	I	* I	I
5.0	12.9	17646	I	I	I	I	* I	I
5.2	12.9	17590	I	I	I	I	* I	I
5.4	12.9	17533	I	I	I	I	* I	I
5.6	12.9	17477	I	I	I	I	* I	I
5.8	12.9	17422	I	I	I	I	* I	I
6.0	12.9	17367	I	I	I	I	* I	I
6.2	12.8	17311	I	I	I	I	* I	I
6.4	12.8	17257	I	I	I	I	* I	I
6.6	12.8	17203	I	I	I	I	* I	I
6.8	12.8	17150	I	I	I	I	* I	I

DISCHARGE HYDROGRAPH FOR NEWOUND RIVER ... STATION NUMBER 31
BELOW NEWFOUND LAKE DAM AT MILE 1.80

GAGE ZERO = 455.00 MAX ELEVATION REACHED BY FLOOD WAVE = 468.15
FLOOD STAGE NOT AVAILABLE
MAX STAGE = 13.15 AT TIME = 1.050 HOURS
MAX FLOW = 18859 AT TIME = 1.030 HOURS

HR	STAGE	FLOW	0	5000	10000	15000	20000	25000
.0	6.0	3028	I	* I	I	I	I	I
.2	6.1	3142	I	* I	I	I	I	I
.4	7.1	4139	I	* I	I	I	I	I
.6	9.2	7308	I	I	* I	I	I	I
.8	12.1	15087	I	I	I	*	I	I
1.0	13.1	18852	I	I	I	I	* I	I
1.2	13.1	18813	I	I	I	I	* I	I
1.4	13.1	18748	I	I	I	I	* I	I
1.6	13.1	18682	I	I	I	I	* I	I
1.8	13.1	18618	I	I	I	I	* I	I
2.0	13.1	18554	I	I	I	I	* I	I
2.2	13.1	18490	I	I	I	I	* I	I
2.4	13.0	18427	I	I	I	I	* I	I
2.6	13.0	18365	I	I	I	I	* I	I
2.8	13.0	18303	I	I	I	I	* I	I
3.0	13.0	18241	I	I	I	I	* I	I
3.2	13.0	18180	I	I	I	I	* I	I
3.4	13.0	18119	I	I	I	I	* I	I
3.6	12.9	18059	I	I	I	I	* I	I
3.8	12.9	18000	I	I	I	I	* I	I
4.0	12.9	17942	I	I	I	I	* I	I
4.2	12.9	17883	I	I	I	I	* I	I
4.4	12.9	17824	I	I	I	I	* I	I
4.6	12.9	17766	I	I	I	I	* I	I
4.8	12.9	17709	I	I	I	I	* I	I
5.0	12.8	17652	I	I	I	I	* I	I
5.2	12.8	17595	I	I	I	I	* I	I
5.4	12.8	17539	I	I	I	I	* I	I
5.6	12.8	17483	I	I	I	I	* I	I
5.8	12.8	17427	I	I	I	I	* I	I
6.0	12.8	17372	I	I	I	I	* I	I
6.2	12.8	17317	I	I	I	I	* I	I
6.4	12.7	17263	I	I	I	I	* I	I
6.6	12.7	17209	I	I	I	I	* I	I
6.8	12.7	17155	I	I	I	I	* I	I

```
******************************
******************************
***                        ***
***  SUMMARY OF INPUT DATA ***
***                        ***
******************************
******************************
```

INPUT CONTROL PARAMETERS FOR NEWFOUND LAKE DAM

PARAMETER	VARIABLE	VALUE
NUMBER OF DYNAMIC ROUTING REACHES	KKN	2
TYPE OF RESERVOIR ROUTING	KUI	0
MULTIPLE DAM INDICATOR	MULDAM	0
PRINTING INSTRUCTIONS FOR INPUT SUMMARY	KDMP	3
NO. OF RESERVOIR INFLOW HYDROGRAPH POINTS	ITEH	2
INTERVAL OF CROSS-SECTION INFO PRINTED OUT WHEN JNK=9	NPRT	0
FLOOD-PLAIN MODEL PARAMETER	KFLP	0
LANDSLIDE PARAMETER	KSL	0

CROSS-SECTIONAL PARAMETERS FOR NEWOUND RIVER
BELOW NEWFOUND LAKE DAM

PARAMETER	VARIABLE	VALUE
NUMBER OF CROSS-SECTIONS	NS	4
MAXIMUM NUMBER OF TOP WIDTHS	NCS	6
NUMBER OF CROSS-SECTIONAL HYDROGRAPHS TO PLOT	NTT	3
TYPE OF OUTPUT OTHER THAN HYDROGRAPH PLOTS	JNK	0
CROSS-SECTIONAL SMOOTHING PARAMETER	KSA	0
DOWNSTREAM SUPERCRITICAL OR NOT	KSUPC	0
NO. OF LATERAL INFLOW HYDROGRAPHS	LQ	0
NO. OF POINTS IN GATE CONTROL CURVE	KCG	0

NUMBER OF CROSS-SECTION WHERE HYDROGRAPH DESIRED
(MAX NUMBER OF HYDROGRAPHS = 6)

1 2 3

CROSS-SECTIONAL VARIABLES FOR NEWOUND RIVER
BELOW NEWFOUND LAKE DAM

PARAMETER	UNITS	VARIABLE
LOCATION OF CROSS-SECTION	MI	XS(I)
ELEVATION (MSL) OF FLOODING AT CROSS-SECTION	FT	FSTG(I)
ELEV CORRESPONDING TO EACH TOP WIDTH	FT	HS(K,I)
TOP WIDTH CORRESPONDING TO EACH ELEV (ACTIVE FLOW PORTION)	FT	BS(K,I)
TOP WIDTH CORRESPONDING TO EACH ELEV (OFF-CHANNEL PORTION)	FT	BSS(K,I)
SURFACE AREA CORRESPONDING TO EACH ELEV (ACTIVE FLOW PORTION)	ACRES	DSA(K,I)
SURFACE AREA CORRESPONDING TO EACH ELEV (OFF-CHANNEL PORTION)	ACRES	SSA(K,I)
NUMBER OF CROSS-SECTION		I
NUMBER OF ELEVATION LEVEL		K

CROSS-SECTION NUMBER 1
****

XS(I) = 1.800 FSTS(I) = .00 XSL(I) = .0 XSR(I) = .0

HS ...	455.0	460.0	466.0	470.0	480.0	512.0
BS ...	28.0	47.0	120.0	120.0	120.0	120.0
BSS ...	.0	.0	95.0	220.0	400.0	1000.0

CROSS-SECTION NUMBER 2
****

XS(I) = 2.100 FSTS(I) = .00 XSL(I) = .0 XSR(I) = .0

HS ...	450.0	451.0	454.0	462.0	470.0	500.0
BS ...	40.0	62.0	120.0	120.0	120.0	120.0
BSS ...	.0	.0	90.0	325.0	1035.0	1200.0

CROSS-SECTION NUMBER 3
****

XS(I) = 2.400 FSTS(I) = .00 XSL(I) = .0 XSR(I) = .0

HS ...	449.0	459.0	460.0	470.0	480.0	500.0
BS ...	35.0	50.0	140.0	140.0	140.0	140.0
BSS ...	.0	.0	353.0	885.0	1410.0	1610.0

CROSS-SECTION NUMBER 4
****

XS(I) = 2.700 FSTS(I) = .00 XSL(I) = .0 XSR(I) = .0

HS ...	446.0	462.0	465.0	470.0	480.0	500.0
BS ...	55.0	58.0	160.0	160.0	160.0	160.0
BSS ...	.0	120.0	282.0	380.0	1380.0	1450.0

MANNING N ROUGHNESS COEFFICIENTS FOR THE GIVEN REACHES
(CM(K,I),K=1,NCS) WHERE I = REACH NUMBER

****

REACH	1 ...	.040	.040	.040	.040	.040	.040
REACH	2 ...	.050	.050	.050	.050	.050	.050
REACH	3 ...	.040	.040	.040	.040	.040	.040

CROSS-SECTIONAL VARIABLES FOR NEWOUND RIVER
BELOW NEWFOUND LAKE DAM

PARAMETER	UNITS	VARIABLE
MINIMUM COMPUTATIONAL DISTANCE USED BETWEEN CROSS-SECTIONS	MI	DXM(I)
CONTRACTION - EXPANSION COEFFICIENTS BETWEEN CROSS-SECTIONS		FKC(I)

REACH NUMBER	DXM(I)	FKC(I)
1	.010	.000
2	.100	.000
3	.100	.000

DOWNSTREAM FLOW PARAMETERS FOR NEWOUND RIVER
BELOW NEWFOUND LAKE DAM

PARAMETER	UNITS	VARIABLE	VALUE
MAX DISCHARGE AT DOWNSTREAM EXTREMITY	CFS	QMAXD	.0
MAX LATERAL OUTFLOW PRODUCING LOSSES	CFS/FT	QLL	.000
INITIAL SIZE OF TIME STEP	HR	DTHM	.1000
INITIAL WATER SURFACE ELEVATION DOWNSTREAM	FT	YDN	.50
SLOPE OF CHANNEL DOWNSTREAM OF DAM	FT/MI	SDM	.00
THETA WEIGHTING FACTOR		THETA	.00
CONVERGENCE CRITERION FOR STAGE	FT	EPSY	.000
TIME AT WHICH DAM STARTS TO FAIL	HR	TFI	.28

TOTAL NUMBER OF CROSS SECTIONS (ORIGINAL+INTERPOLATED) (N) = 37 (MAXIMUM ALLOWABLE = 200

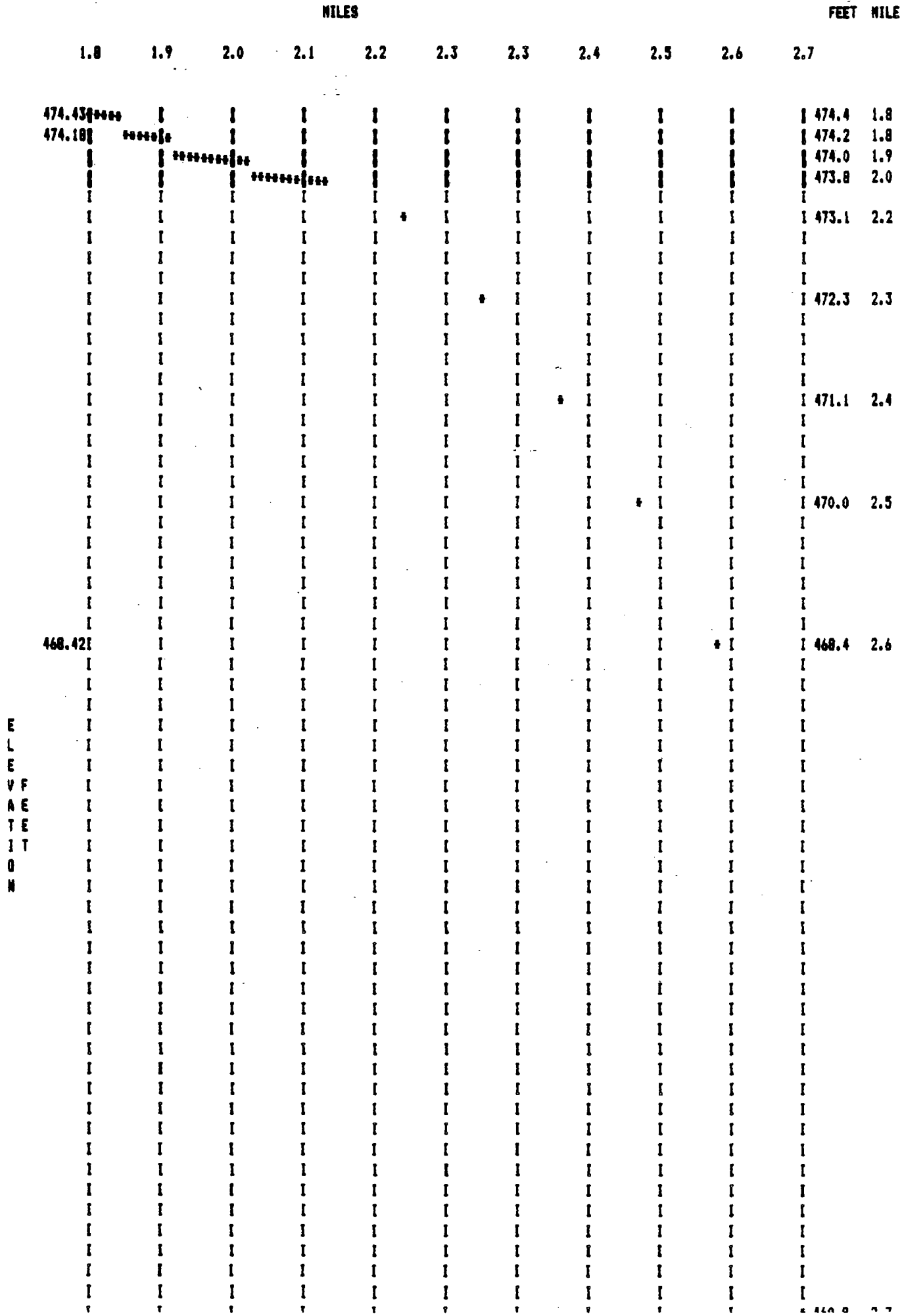
TIME PARAMETERS OF OUTFLOW HYDROGRAPH IMMEDIATELY DOWNSTREAM OF DAM

PARAMETER	UNITS	VARIABLE	VALUE
TIME TO FAILURE	HR	TFH	.750
TIME TO START OF RISING LIMB OF HYDROGRAPH	HR	TFO	.280
TIME TO PEAK	HR	TP	1.030
TIME STEP SIZE	HR	DTHI	.100

NONCONVERGENCE OCCURRED AT CROSS-SECTION NO. 32 33 34 35 36 37
TT= 1.000 DTH= .050 ITERR= 9

ROUTING COMPLETED.

KTIME=241 ALLOWABLE KTIME= 698 TT= 24.1

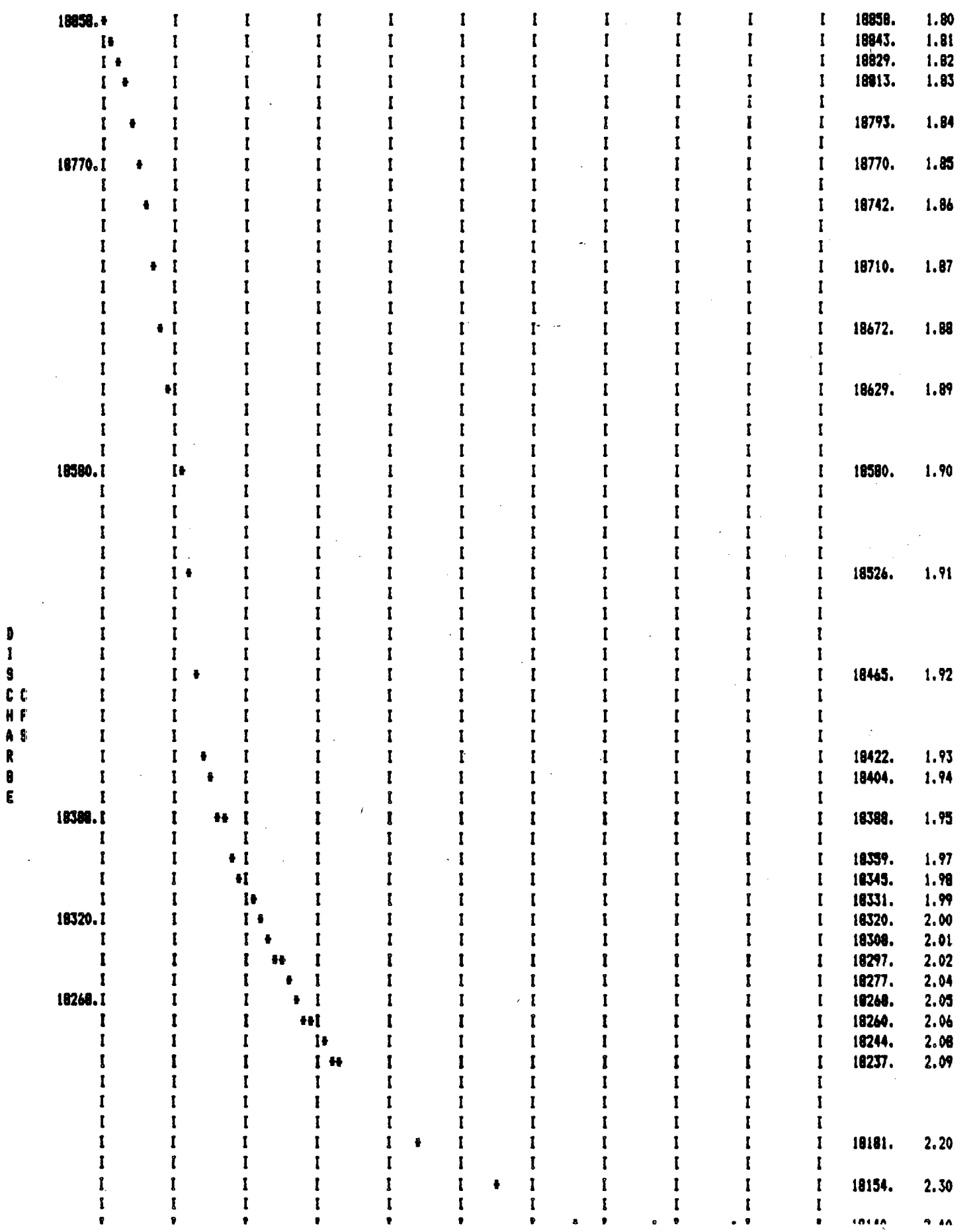

MILES
FEET MILE
1.8 1.9 2.0 2.1 2.2 2.3 2.3 2.4 2.5 2.6 2.7
474.43
474.18
474.4 1.8
474.2 1.8
474.0 1.9
473.8 2.0
473.1 2.2
472.3 2.3
471.1 2.4
470.0 2.5
468.42
468.4 2.6
ELEVATION

PEAK DISCHARGE PROFILE

MILES

1.8 1.9 2.0 2.1 2.2 2.3 2.3 2.4 2.5 2.6 2.7

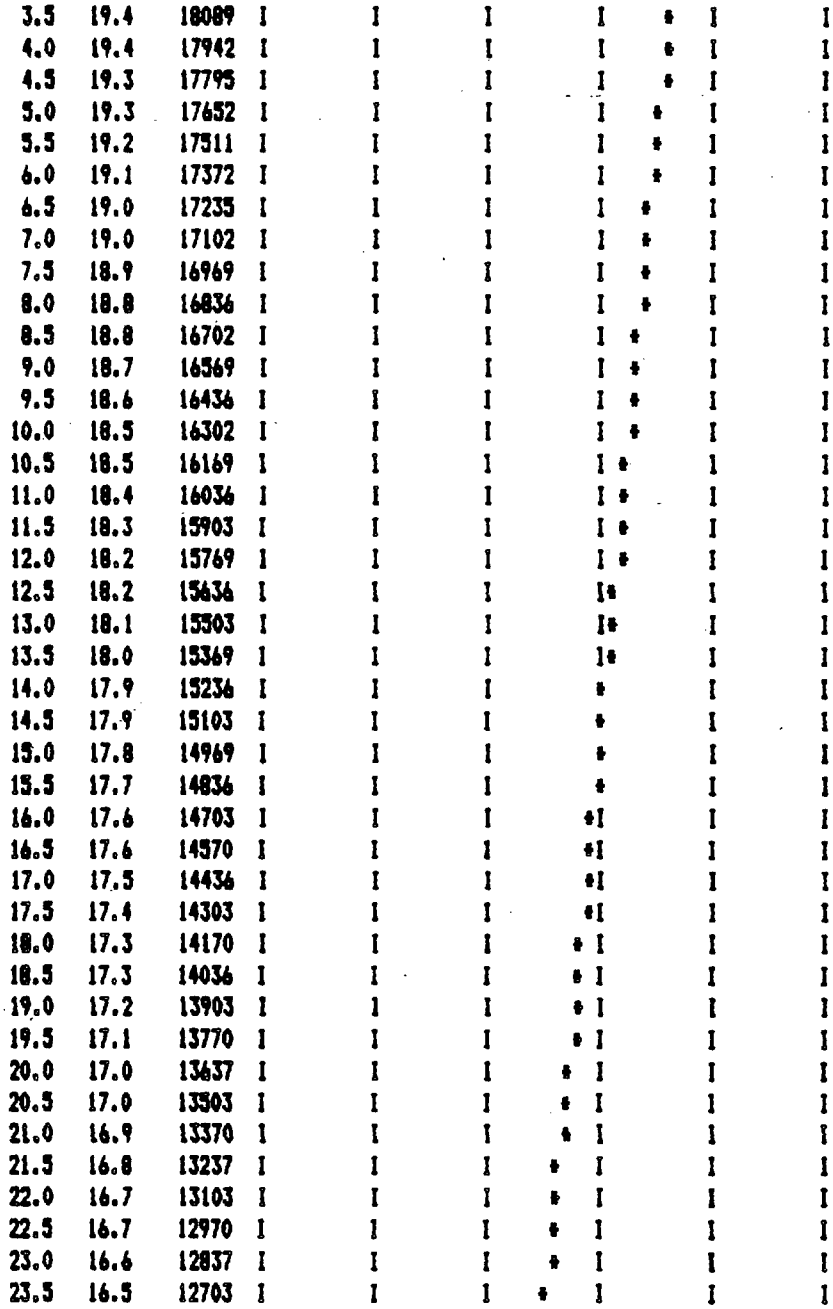
DISCHARGE CFS MILE



DISCHARGE HYDROGRAPH FOR NEWOUND RIVER ... STATION NUMBER 1
BELOW NEWFOUND LAKE DAM AT MILE 1.80

GAGE ZERO = 455.00 MAX ELEVATION REACHED BY FLOOD WAVE = 474.43
FLOOD STAGE NOT AVAILABLE
MAX STAGE = 19.43 AT TIME = 3.350 HOURS
MAX FLOW = 18858 AT TIME = 1.050 HOURS

HR	STAGE	FLOW
.0	8.4	3028
.5	10.3	5377
1.0	16.3	18852
1.5	17.9	18715
2.0	18.9	18554
2.5	19.3	18396
3.0	19.4	18241
3.5	19.4	18089
4.0	19.4	17942
4.5	19.3	17795
5.0	19.3	17652
5.5	19.2	17511
6.0	19.1	17372
6.5	19.0	17235
7.0	19.0	17102
7.5	18.9	16969
8.0	18.8	16836
8.5	18.8	16702
9.0	18.7	16569
9.5	18.6	16436
10.0	18.5	16302
10.5	18.5	16169
11.0	18.4	16036
11.5	18.3	15903
12.0	18.2	15769
12.5	18.2	15636
13.0	18.1	15503
13.5	18.0	15369
14.0	17.9	15236
14.5	17.9	15103
15.0	17.8	14969
15.5	17.7	14836
16.0	17.6	14703
16.5	17.6	14570
17.0	17.5	14436
17.5	17.4	14303
18.0	17.3	14170
18.5	17.3	14036
19.0	17.2	13903
19.5	17.1	13770
20.0	17.0	13637
20.5	17.0	13503
21.0	16.9	13370
21.5	16.8	13237
22.0	16.7	13103
22.5	16.7	12970
23.0	16.6	12837
23.5	16.5	12703



DISCHARGE HYDROGRAPH FOR NEWOUND RIVER ... STATION NUMBER 31
BELOW NEWFOUND LAKE DAM AT MILE 2.10

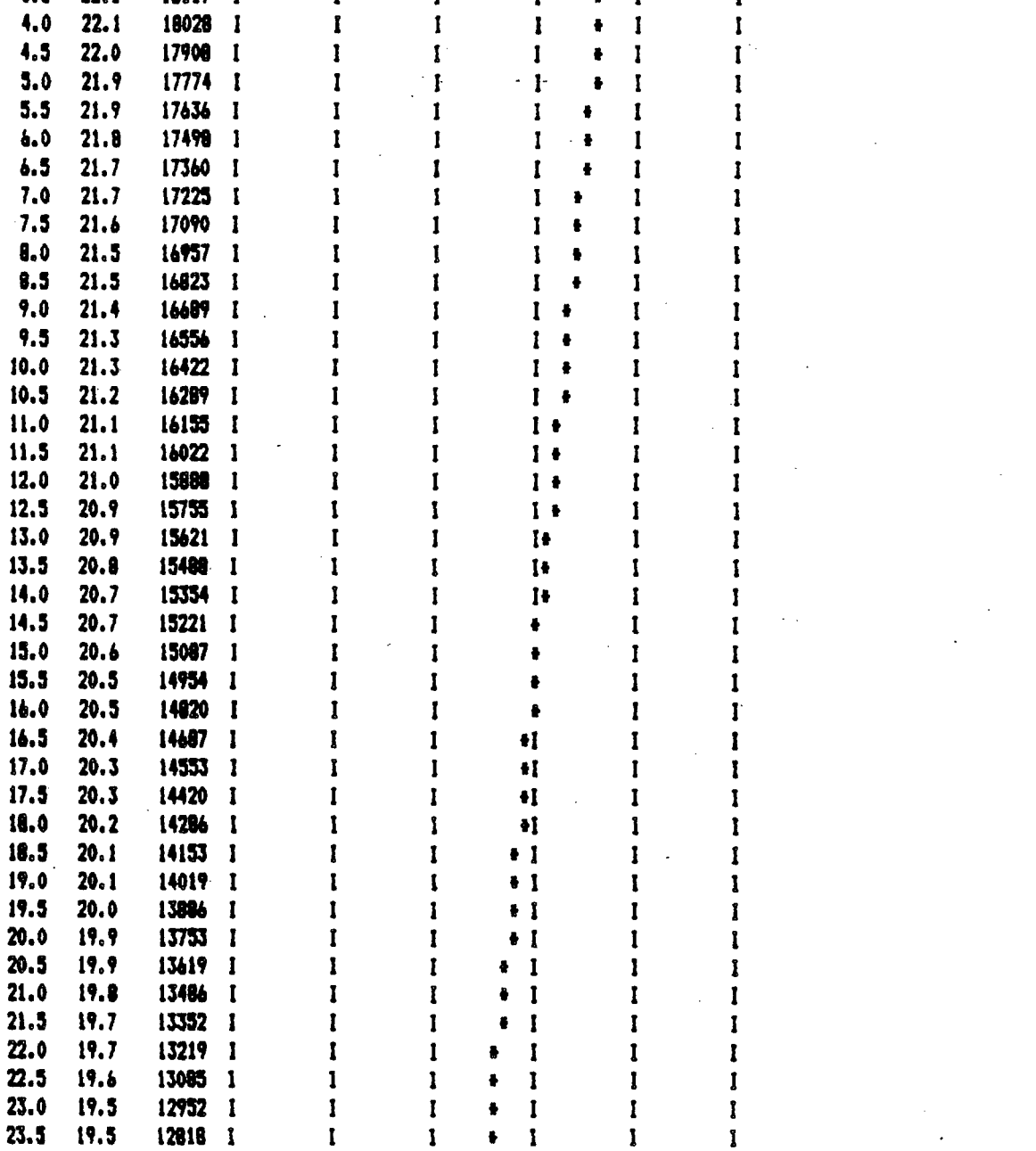
GAGE ZERO = 450.00 MAX ELEVATION REACHED BY FLOOD WAVE = 473.63
FLOOD STAGE NOT AVAILABLE
MAX STAGE = 23.63 AT TIME = 3.350 HOURS
MAX FLOW = 18230 AT TIME = 2.650 HOURS

HR	STAGE	FLOW	0	5000	10000	15000	20000	25000
.0	11.1	3028	I	* I	I	I	I	I
.5	11.9	4493	I	*I	I	I	I	I
1.0	18.8	16316	I	I	I	I *	I	I
1.5	21.9	17496	I	I	I	I *	I	I
2.0	23.1	18092	I	I	I	I *	I	I
2.5	23.5	18227	I	I	I	I *	I	I
3.0	23.6	18198	I	I	I	I *	I	I
3.5	23.6	18101	I	I	I	I *	I	I
4.0	23.6	17977	I	I	I	I *	I	I
4.5	23.5	17842	I	I	I	I *	I	I
5.0	23.5	17702	I	I	I	I *	I	I
5.5	23.4	17562	I	I	I	I *	I	I
6.0	23.3	17424	I	I	I	I *	I	I
6.5	23.2	17287	I	I	I	I *	I	I
7.0	23.2	17153	I	I	I	I *	I	I
7.5	23.1	17019	I	I	I	I *	I	I
8.0	23.0	16886	I	I	I	I *	I	I
8.5	22.9	16752	I	I	I	I *	I	I
9.0	22.9	16619	I	I	I	I *	I	I
9.5	22.8	16485	I	I	I	I *	I	I
10.0	22.7	16352	I	I	I	I *	I	I
10.5	22.6	16219	I	I	I	I *	I	I
11.0	22.6	16085	I	I	I	I *	I	I
11.5	22.5	15952	I	I	I	I *	I	I
12.0	22.4	15819	I	I	I	I *	I	I
12.5	22.3	15685	I	I	I	I*	I	I
13.0	22.3	15552	I	I	I	I*	I	I
13.5	22.2	15419	I	I	I	I*	I	I
14.0	22.1	15285	I	I	I	I*	I	I
14.5	22.0	15152	I	I	I	*	I	I
15.0	22.0	15019	I	I	I	*	I	I
15.5	21.9	14885	I	I	I	*	I	I
16.0	21.8	14752	I	I	I	*	I	I
16.5	21.7	14619	I	I	I	*I	I	I
17.0	21.7	14485	I	I	I	*I	I	I
17.5	21.6	14352	I	I	I	*I	I	I
18.0	21.5	14218	I	I	I	* I	I	I
18.5	21.4	14085	I	I	I	* I	I	I
19.0	21.4	13952	I	I	I	* I	I	I
19.5	21.3	13818	I	I	I	* I	I	I
20.0	21.2	13685	I	I	I	* I	I	I
20.5	21.1	13552	I	I	I	* I	I	I
21.0	21.1	13418	I	I	I	* I	I	I
21.5	21.0	13285	I	I	I	* I	I	I
22.0	20.9	13151	I	I	I	* I	I	I
22.5	20.8	13018	I	I	I	* I	I	I
23.0	20.7	12885	I	I	I	* I	I	I
23.5	20.7	12751	I	I	I	* I	I	I

DISCHARGE HYDROGRAPH FOR NEWOUND RIVER ... STATION NUMBER 34
BELOW NEWFOUND LAKE DAM AT MILE 2.40

GAGE ZERO = 449.00 MAX ELEVATION REACHED BY FLOOD WAVE = 471.09
FLOOD STAGE NOT AVAILABLE
MAX STAGE = 22.09 AT TIME = 3.350 HOURS
MAX FLOW = 18140 AT TIME = 3.150 HOURS

HR	STAGE	FLOW
.0	8.9	3028
.5	9.6	3493
1.0	16.7	11501
1.5	20.3	15788
2.0	21.5	17414
2.5	21.9	17976
3.0	22.1	18132
3.5	22.1	18117
4.0	22.1	18028
4.5	22.0	17908
5.0	21.9	17774
5.5	21.9	17636
6.0	21.8	17498
6.5	21.7	17360
7.0	21.7	17225
7.5	21.6	17090
8.0	21.5	16957
8.5	21.5	16823
9.0	21.4	16689
9.5	21.3	16556
10.0	21.3	16422
10.5	21.2	16289
11.0	21.1	16155
11.5	21.1	16022
12.0	21.0	15888
12.5	20.9	15755
13.0	20.9	15621
13.5	20.8	15488
14.0	20.7	15354
14.5	20.7	15221
15.0	20.6	15087
15.5	20.5	14954
16.0	20.5	14820
16.5	20.4	14687
17.0	20.3	14553
17.5	20.3	14420
18.0	20.2	14286
18.5	20.1	14153
19.0	20.1	14019
19.5	20.0	13886
20.0	19.9	13753
20.5	19.9	13619
21.0	19.8	13486
21.5	19.7	13352
22.0	19.7	13219
22.5	19.6	13085
23.0	19.5	12952
23.5	19.5	12818



APPENDIX C

BREACH FORMATION AND SIZING CALCULATION

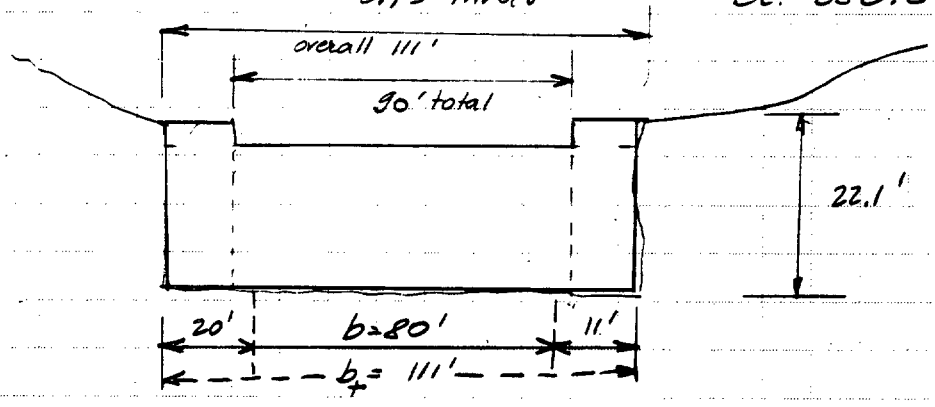
STORCH ASSOCIATES
Engineers - Surveyors - Planners
Landscape Architects
Environmental Scientists

JOB 6384 - Newfound Lake Dam
SHEET NO. ____ OF ____
CALCULATED BY JH DATE 12-14-87
CHECKED BY ____ DATE ____
SCALE #4 Breach Sizing

Breach Formation and sizing

Newfound Lake is a concrete and masonary structure having overall length of 111.0 feet

L_d = 21 LF (top of dam) EL. 592.1
L_s = 90 LF (spillway) EL. 588.4
d/s invert EL. 580.0



assuming the entire dam will have almost instantaneous failure and max. size of breach will be developed during 0.75 hr.

b = 80 LF z = 0 vertical side slope

Reservoir length during 1/2 PMF estimated 6.3 Mi

W.S. 588.4 (crest)

Test flood PMF 93,500 cfs
discharge 16,161 cfs W.S. 604.8

Elevation 580.0 was taken as controlling elevation for total drawdown.

PRODUCT 204-1 NEBS Inc., Groton, Mass. 01471.