HOADLEY POND DAM
CT 00090

NAUGATUCK RIVER BASIN
SEYMOUR, CONNECTICUT

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PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

49-016

7/80

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19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

DAMS, INSPECTION, DAM SAFETY,

Hoadley Pond Dam,
Naugatuck River Basin
Seymour, Conn.

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The Hoadley Pond Dam consists of a stone masonry structure with a maximum height of 19 ft., and an overall length of 145 ft., including a 67 ft. long overflow spillway at the right end of the dam. A stone masonry wall with a top width of 4 ft. connects the right end of the spillway to the right abutment. To the left of the spillway there is a 6 ft. wide stone masonry wall which extends to the left abutment. The outle works, located to the left of the spillway, consists of a 7 ft. by 5 ft. opening through this stone masonry wall with an upstream sluice gate discharging to a downstream forebay.

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ROALD HAESTAD, INC.
CONSULTING ENGINEERS

37 Brookside Road • Waterbury, Conn. 06708 • Tel. 203 753-9800

July 18, 1980

The Department of the Army
New England Division
Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

Attention: E. P. Gould
Project Management Division

Re: Hoadley Pond Dam
Seymour, Connecticut

Gentlemen:

Following field surveys and a dam failure analysis of Hoadley Pond Dam, we conclude that the dam should be reclassified as having a low hazard potential.

We are enclosing a brief letter report substantiating our findings.

Very truly yours,

ROALD HAESTAD, INC.

By Roald Haestad
Roald Haestad

STATE OF CONNECTICUT
ROALD J. HAESTAD
No. 5749
REGISTERED
PROFESSIONAL ENGINEER

RH:cft
Encl.

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DESCRIPTION

HOADLEY POND DAM
CT 00090
TOWN OF SEYMOUR, CONNECTICUT
ON LITTLE RIVER
OWNED AND OPERATED BY THE BRIDGEPORT HYDRAULIC COMPANY

The Hoadley Pond Dam consists of a stone masonry structure with a maximum height of 19 feet, and an overall length of 145 feet, including a 67 foot long overflow spillway at the right end of the dam.

A stone masonry wall with a top width of 4 feet connects the right end of the spillway to the right abutment. To the left of the spillway there is a 6 foot wide stone masonry wall which extends to the left abutment. The outlet works, located to the left of the spillway, consists of a 7 foot by 5 foot opening through this stone masonry wall with an upstream sluice gate discharging to a downstream forebay. The forebay has an 8 foot long overflow spillway and a 16 inch low level outlet that discharges into the river downstream of the dam. A stone masonry wall with a concrete cap is present along the left side of the river downstream of the dam.

There is a vibration damper consisting of 8 wood timbers on a steel cable strung across the spillway.

The dam is owned and operated by the Bridgeport Hydraulic Company. The purpose of the dam is to maintain the head on an upstream well field. The dam appears to be in fair condition.

EVALUATION OF HYDRAULIC/HYDROLOGIC FEATURES

The Hoadley Pond Dam has a tributary watershed of 15 square miles, a water surface area of 8 acres, and a spillway capacity of 2,300 cfs. The dam has a hydraulic height of 19 feet and a storage capacity of 70 Acre-Feet with the water level at the top of the dam. In accordance with the Corps of Engineers' Recommended Guidelines for Safety Inspection of Dams, the Hoadley Pond Dam is classified as "Small" in size based on storage capacity.

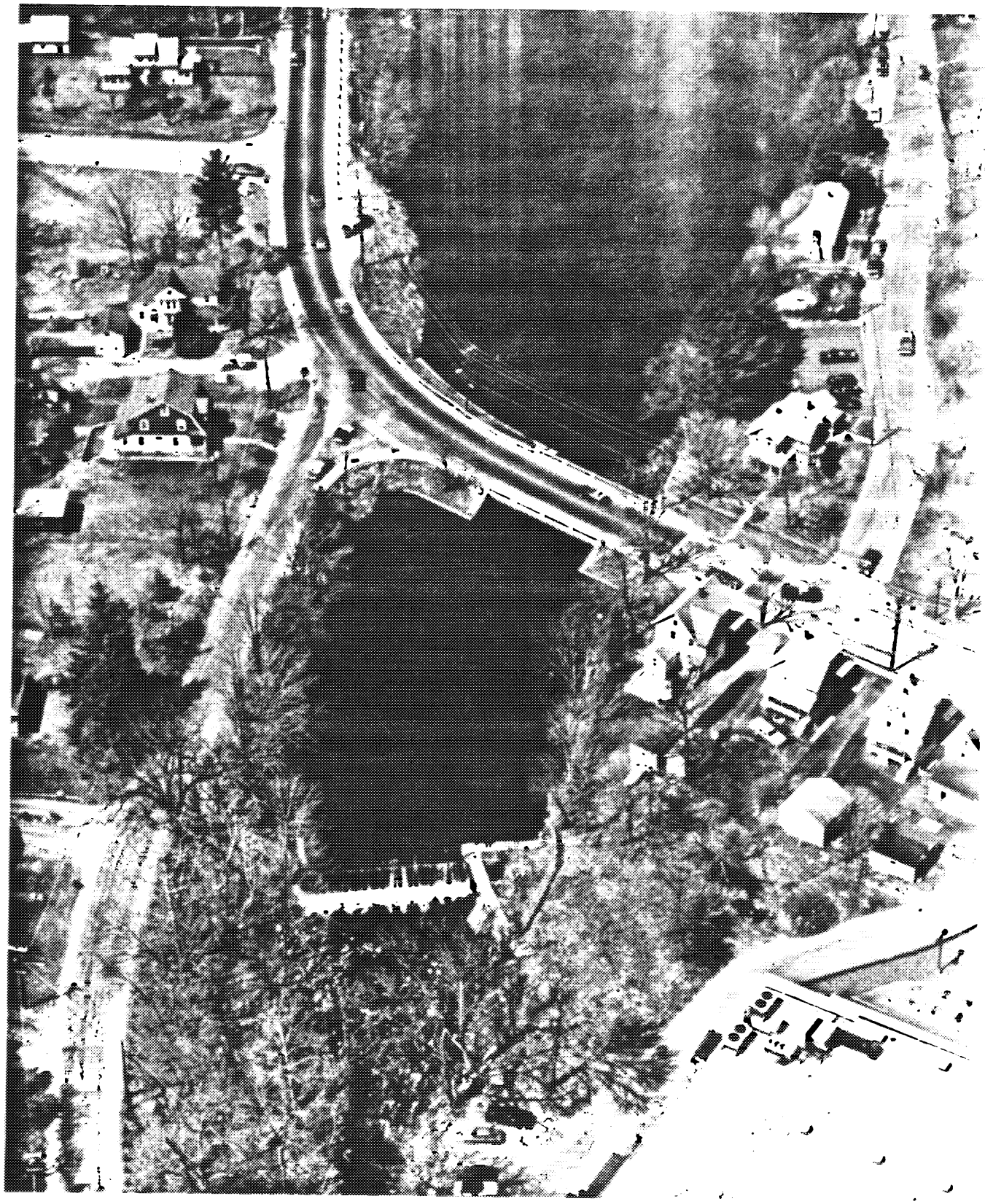
No plans or design data were available.

A dam breach analysis was made using the Corps of Engineers' "Rule of Thumb" guidance for estimating downstream dam failure hydrographs. Failure was assumed with the water level at the top of the dam. The peak discharge from the dam was calculated to be 4,100 cfs. The flood waters were routed through the downstream reaches to the Naugatuck River.

The flood waters would travel 1,700 feet downstream in a well-defined channel before overtopping Connecticut Route 67 by approximately 1 foot. The flood waters would then flow back into the channel and would again cross under Connecticut Route 67, this time without overtopping. The flood would then spill over the Swan Company Dam, Section 3, Figure 3, at a depth of approximately 8.3 feet, and would overtop the left abutment with a small portion of the flood waters continuing down Connecticut Route 67.

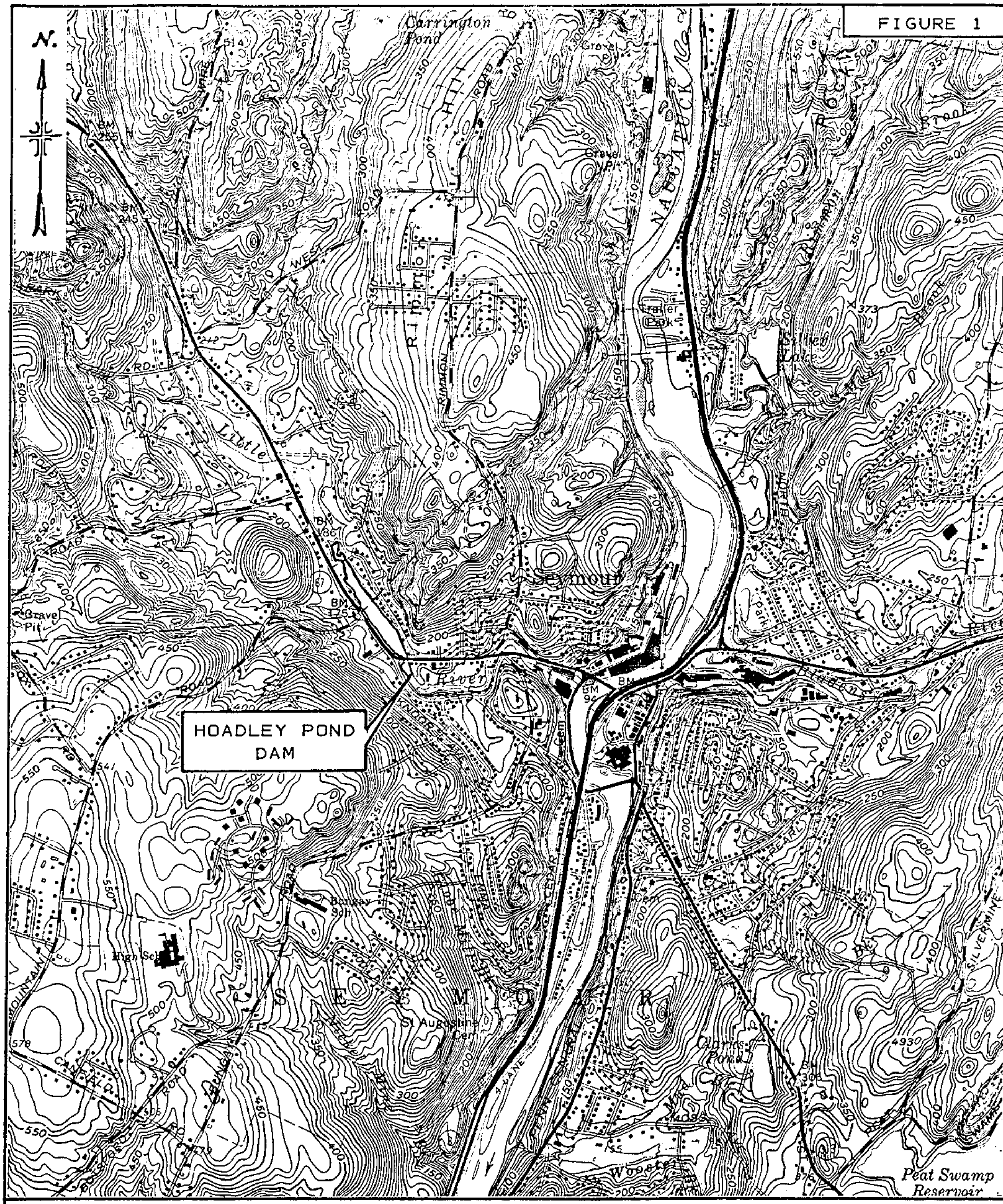
Beyond the Swan Company Dam the flood waters would flow through a steep channel at a depth of approximately 6 feet and discharge

The flood would stay primarily within the channel and property damage would probably be minimal. Loss of life from a failure of Hoadley Pond Dam is unlikely. Therefore, the dam is classified as "Low" hazard potential.



OVERVIEW PHOTO

U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASSACHUSETTS	NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS	HOADLEY POND DAM LITTLE RIVER SEYMOUR, CONNECTICUT CT 00090 19 APRIL '80
ROALD HAESTAD, INC. CONSULTING ENGINEERS WATERBURY, CONNECTICUT		



LOCATION PLAN

HOADLEY POND DAM
SEYMOUR, CONNECTICUT

SCALE: 1" = 2000'

ROALD HAESTAD, INC. NAUGATUCK QUADRANGLE 1972

Appendix A

Engineering Data

Appendix B

Photographs

Note: For Photo Locations,
See Figure 2,
Appendix A

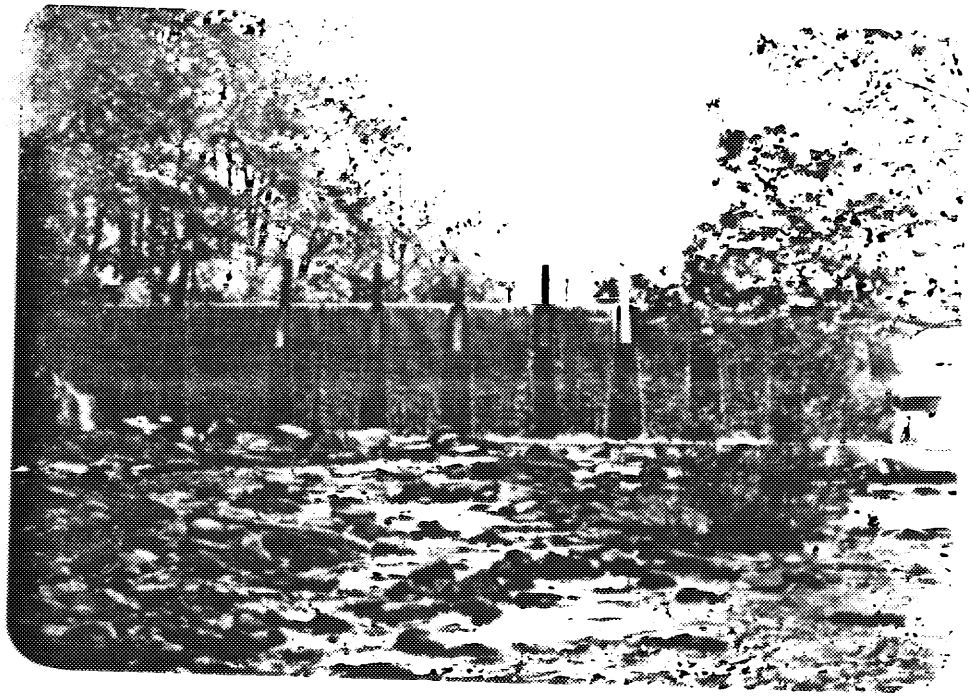


PHOTO NO. 1

DAM FROM DOWNSTREAM.
NOTE CABLE AND TIMBER VIBRATION DAMPER.

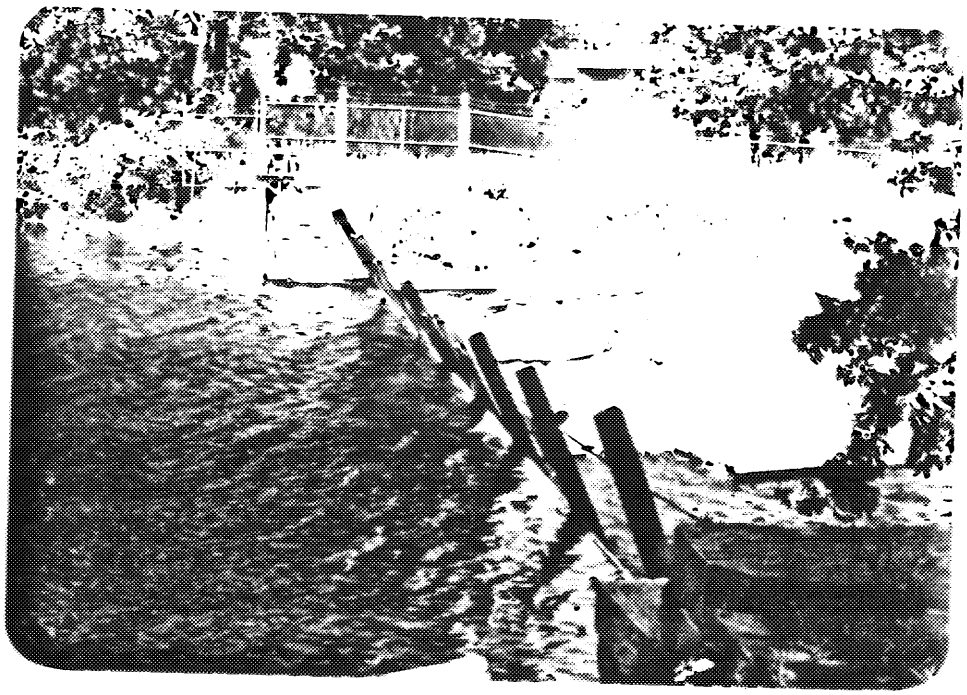


PHOTO NO. 2

DAM FROM RIGHT ABUTMENT
LOOKING TOWARD OUTLET WORKS AT LEFT ABUTMENT.

U.S.ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASSACHUSETTS	NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS	HOADLEY POND DAM LITTLE RIVER SEYMOUR, CONNECTICUT CT 00090 2 AY '80
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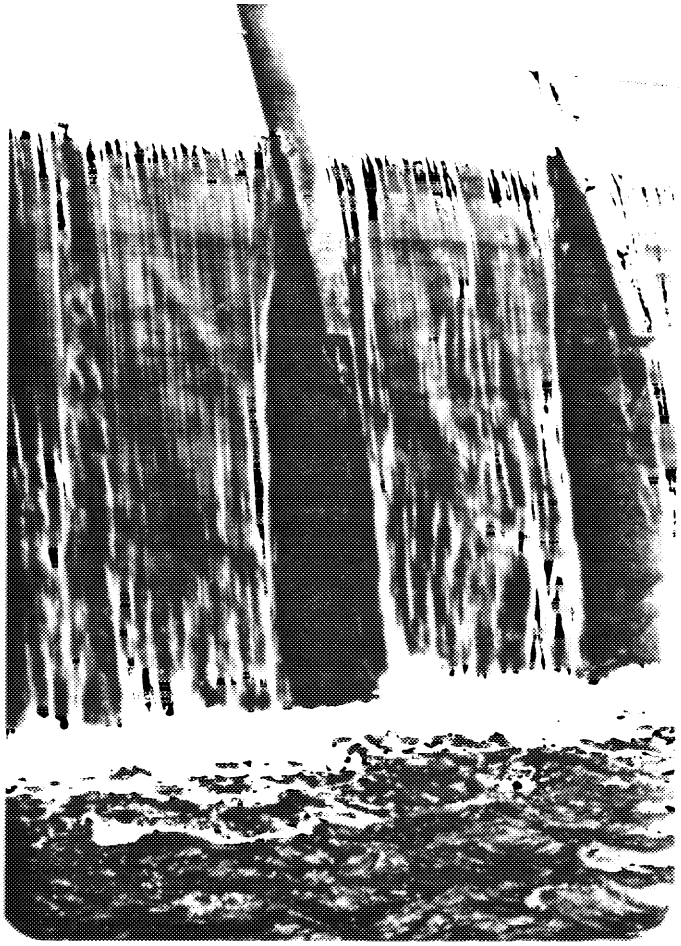


PHOTO NO. 3

CLOSE UP OF
STONE MASONRY
SPILLWAY

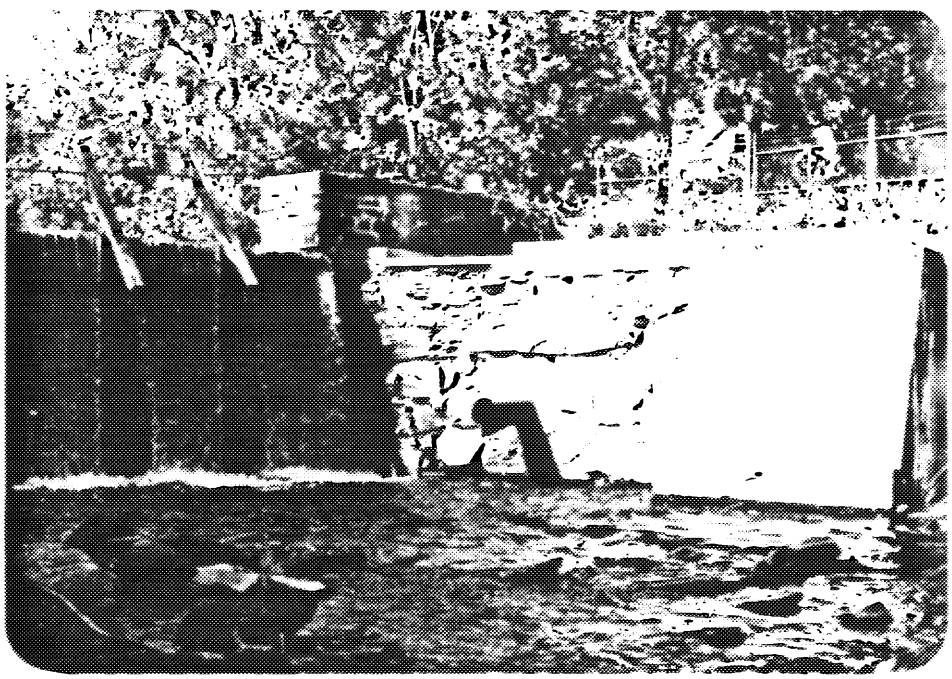


PHOTO NO. 4

OUTLET WORKS
AT RIGHT
ABUTMENT

U.S.ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASSACHUSETTS	NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS	HOADLEY POND DAM LITTLE RIVER SEYMOUR, CONNECTICUT CT 00090 25 MAY '80
ROALD HAESTAD, INC. CONSULTING ENGINEERS WATERBURY, CONNECTICUT		

Appendix C

Hydrologic Computations

S = Storage at time of failure = Storage at spillway level + Freeboard Storage

S = (8 acres × 4 ft) + (8 acres × 4.7 ft)

S = 69.6 use 70 ac-ft

Q_{pl} = Peak Failure Outflow = $8/27\, W_b \sqrt{g}\, Y_o^{3/2}$

W_b = Breach Width - 40% of dam length across river at mid height = 0.4(140) = 56 ft

Y_o = Total height from river bed to pool level at time of failure = 19 ft

$Q_{pl} = 8/27\,(56)(\sqrt{32.2})(19)^{3/2} = 7{,}798$ use 7,800 cfs

<u>Note</u>: Breach Width (W_b) is calculated assuming a depth for the core wall located in the left abutment.

50% of the spillway discharge capacity at top of dam is added to the Peak Failure Outflow because it is assumed that a portion of the spillway will continue to discharge in the event of a dam failure.

Spillway Data: 1) Length = 67'
2) Discharge coefficient = 3.4
3) Available freeboard = 4.7'

$Q = CLH^{3/2} = 3.4(67)(4.7)^{3/2} = 2{,}321$ cfs

Total Discharge = Peak Failure Outflow + 50% of spillway discharge

= 7,800 cfs + 0.5(2,321 cfs)

= 8,960.5 use 8,960 cfs

BY SAL DATE 7/8/80 ROALD HAESTAD, INC. SHEET NO 2 OF 13

CKD BY DLS DATE 7/14/80 CONSULTING ENGINEERS JOB NO 49-016

SUBJECT HOADLEY POND DAM-FLOOD ROUTING

SECTION NUMBER 1A

MAIN CHANNEL

H	W	A	R	S	V	Q
1.0	13	6	.48	.0125	2.89	18
2.0	26	25	.95	.0125	4.59	113
3.0	33	53	1.61	.0125	6.53	347
4.0	38	86	2.29	.0125	8.24	710
5.0	42	123	2.91	.0125	9.67	.1189
6.0	47	164	3.49	.0125	10.91	1788
7.0	52	209	4.04	.0125	12.03	2510
8.0	55	256	4.70	.0125	13.32	3415
9.0	57	305	5.38	.0125	14.57	4444
10.0	59	354	6.02	.0125	15.70	5561
11.0	61	404	6.62	.0125	16.73	6757
12.0	63	454	7.19	.0125	17.68	8027
13.0	65	505	7.73	.0125	18.56	9367
14.0	67	556	8.25	.0125	19.38	10771

MANNING COEFFICIENT=N=.0350

SECTION NUMBER 1B

LEFT OVERBANK

H	W	A	R	S	V	Q
11.0	4	1	.14	.0125	1.11	1
12.0	18	11	.60	.0125	2.96	31
13.0	31	33	1.06	.0125	4.32	144
14.0	39	67	1.72	.0125	5.96	398

MANNING COEFFICIENT=N=.0400

SECTION NUMBER 1

TOTAL SECTION

	AREA			DISCHARGE		
H	A	B	TOTAL	A	B	TOTAL
1.0	6	0	6	18	0	18
2.0	25	0	25	113	0	113
3.0	53	0	53	347	0	347
4.0	86	0	86	710	0	710
5.0	123	0	123	1189	0	1189
6.0	164	0	164	1788	0	1788
7.0	209	0	209	2510	0	2510
8.0	256	0	256	3415	0	3415
9.0	305	0	305	4444	0	4444
10.0	354	0	354	5561	0	5561
11.0	404	1	404	6757	1	6758
12.0	454	11	465	8027	31	8059
13.0	505	33	538	9367	144	9511
14.0	556	67	623	10771	398	11169

STORAGE AT TIME OF FAILURE=S= 70 AC. FT.
LENGHT OF REACH=L= 1700 FT.

INFLOW INTO REACH=QP1= 8960 CFS
DEPTH OF FLOW=H1= 12.6 FT.
CROSS SECTIONAL AREA=A1= 510 SQ. FT.
STORAGE IN REACH=V1= 19.9 AC. FT.

TRIAL REACH OUTFLOW=QP(TRIAL)= 6414 CFS
TRIAL DEPTH OF FLOW=H(TRIAL)= 10.7 FT.
TRIAL CROSS SECTIONAL AREA=A(TRIAL)= 390 SQ. FT.
TRIAL STORAGE IN REACH=V(TRIAL)= 15.2 AC. FT.

REACH OUTFLOW=QP2= 6713 CFS
DEPTH OF FLOW=H2= 11.0 FT.

BY SAL 7/25/80 **ROALD HAESTAD, INC.** SHEET NO 5 OF 13

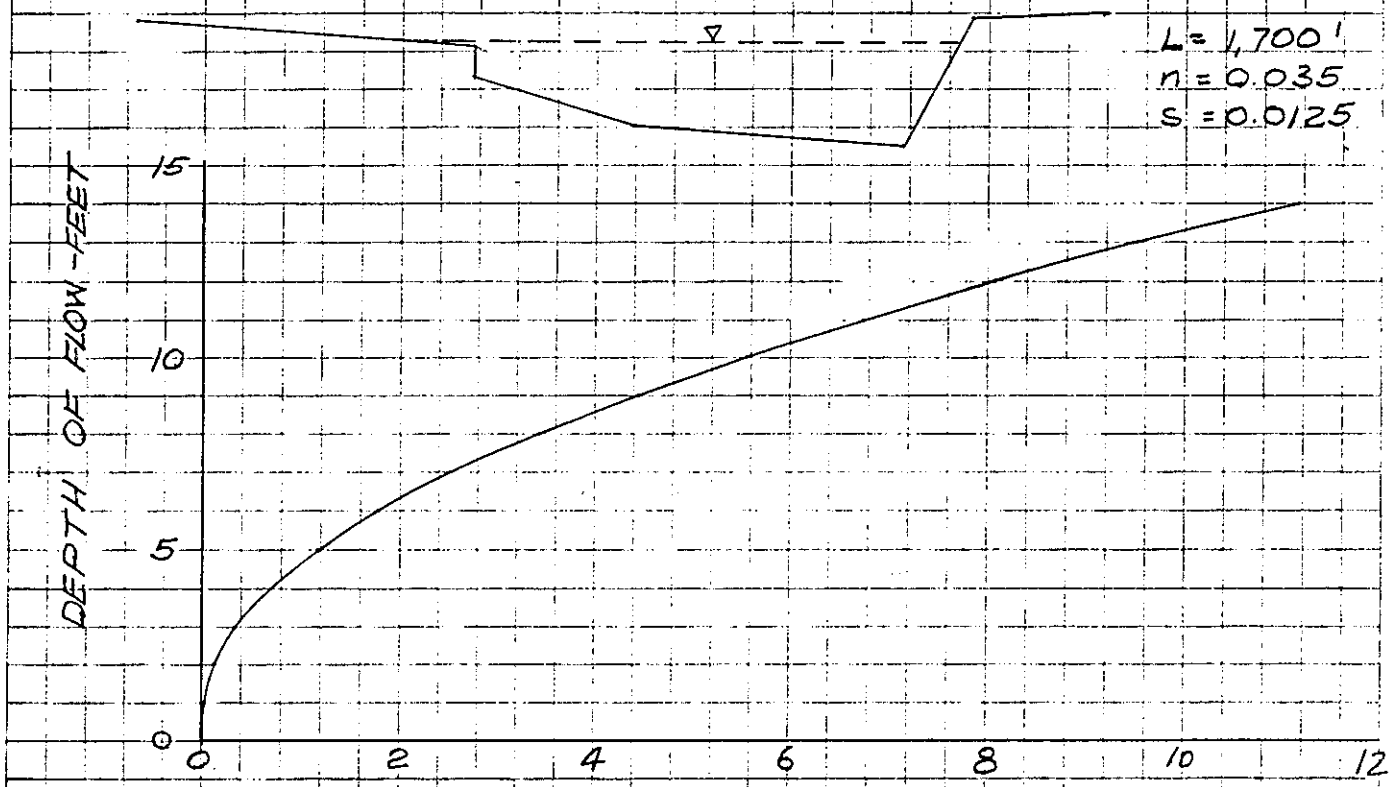
CONSULTING ENGINEERS

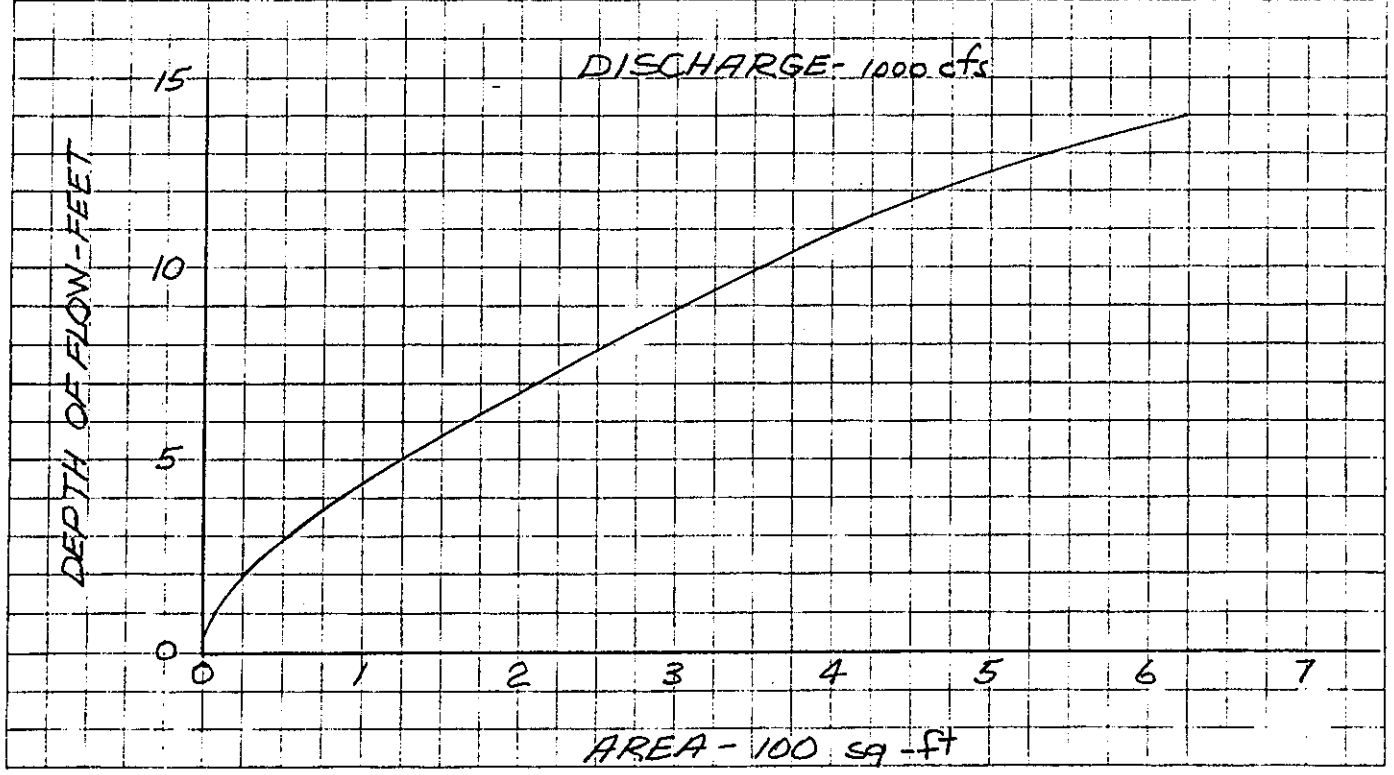
CKD BY PLS 7/16/80 37 Brookside Road - Waterbury, Conn. 06708 JOB NO 049-16

SUBJECT HOADLEY POND DAM - Flood Routing

SECTION NO 1 (Plaza) (Field Surveyed)
(See Figure 3)

Scale: 1" = 20' Horiz
1" = 20' Vert





SECTION NUMBER 2

TOTAL SECTION

H	W	A	R	S	V	Q
1.0	92	86	.93	.0125	4.52	387
2.0	94	176	1.87	.0125	7.20	1264
3.0	96	266	2.77	.0125	9.36	2485
4.0	98	356	3.63	.0125	11.21	3987
5.0	100	446	4.46	.0125	12.86	5730
6.0	102	536	5.26	.0125	14.35	7684
7.0	104	626	6.02	.0125	15.71	9827
8.0	106	716	6.76	.0125	16.97	12140
9.0	108	806	7.47	.0125	18.13	14607
10.0	110	896	8.15	.0125	19.22	17216

MANNING COEFFICIENT=N=.0350
STORAGE AT TIME OF FAILURE=S= 70 AC. FT.
LENGHT OF REACH=L= 800 FT.

INFLOW INTO REACH=QP1= 6713 CFS
DEPTH OF FLOW=H1= 5.5 FT.
CROSS SECTIONAL AREA=A1= 492 SQ. FT.
STORAGE IN REACH=V1= 9.0 AC. FT.

TRIAL REACH OUTFLOW=QP(TRIAL)= 5847 CFS
TRIAL DEPTH OF FLOW=H(TRIAL)= 5.1 FT.
TRIAL CROSS SECTIONAL AREA=A(TRIAL)= 451 SQ. FT.
TRIAL STORAGE IN REACH=V(TRIAL)= 8.3 AC. FT.

REACH OUTFLOW=QP2= 5882 CFS
DEPTH OF FLOW=H2= 5.1 FT.

BY S.A.L. DATE 5/15/80 **ROALD HAESTAD, INC.** SHEET NO 7 OF 13

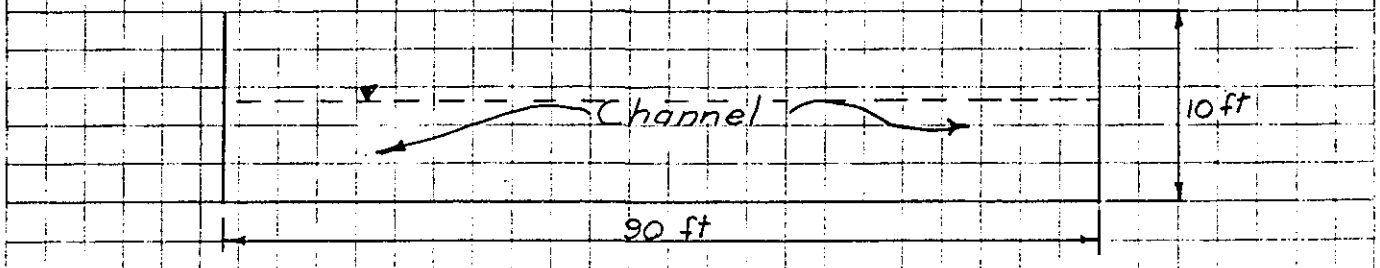
CONSULTING ENGINEERS

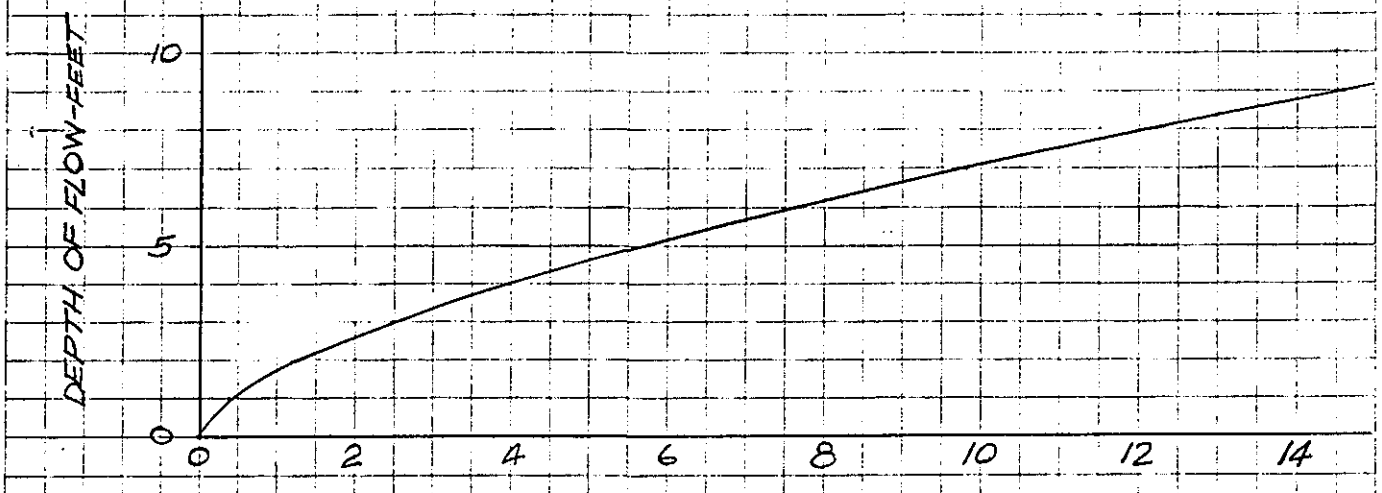
CKD BY D.L.S. DATE 7/16/80 37 Brookside Road - Waterbury, Conn. 06708 JOB NO 49-016

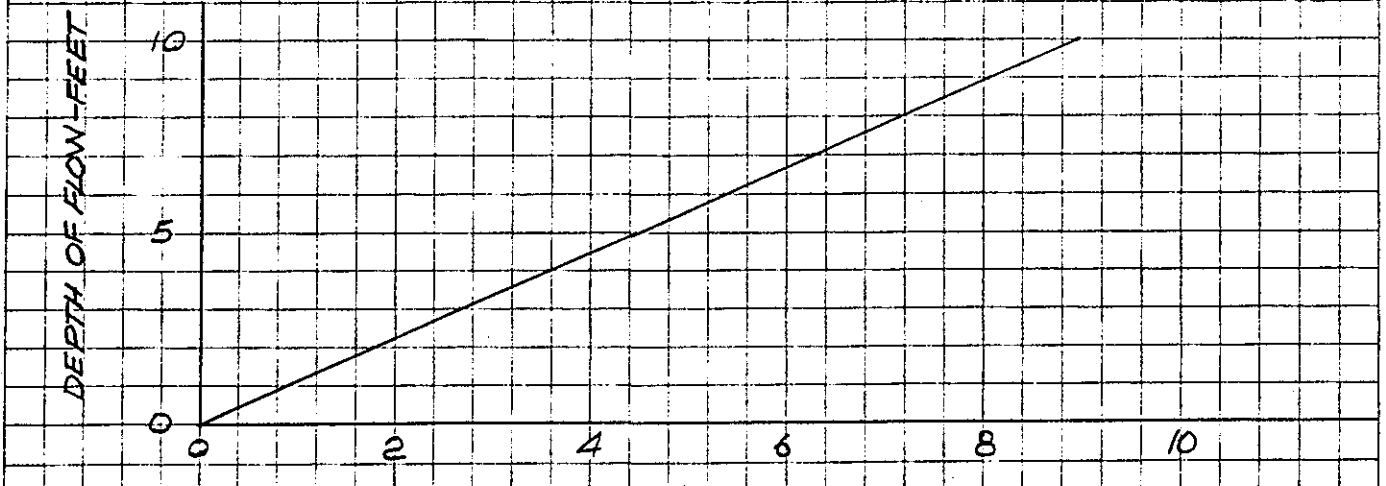
SUBJECT HOADLEY POND DAM - Flood Routing

SECTION NO 2: (Field Measurements) (See Figure 3) Scale: 1" = 20 Horiz 1" = 10 Vert

L = 800' S = 0.0125 n = 0.035







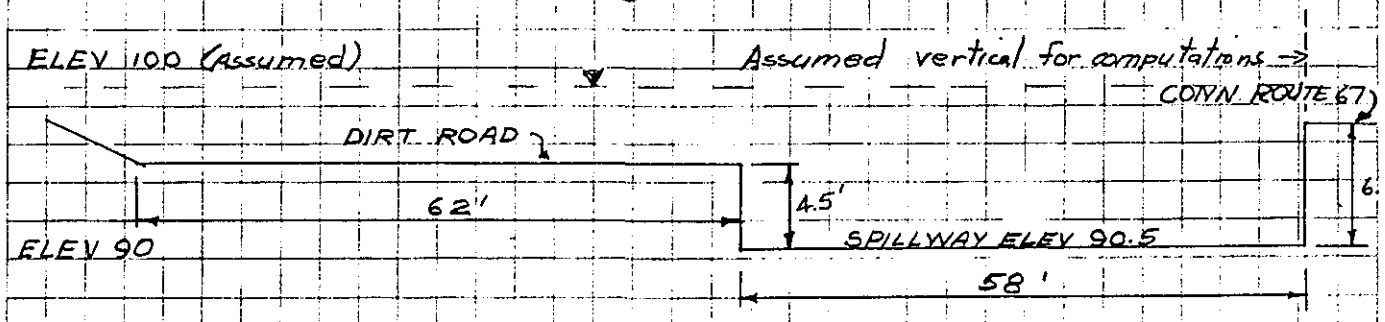
BY S.A.L. DATE 5/15/80 **ROALD HAESTAD, INC.** SHEET NO 8 OF 13

CONSULTING ENGINEERS

CKD BY DLS DATE 7/16/80 37 Brookside Road - Waterbury, Conn. 06708 JOB NO 49-016

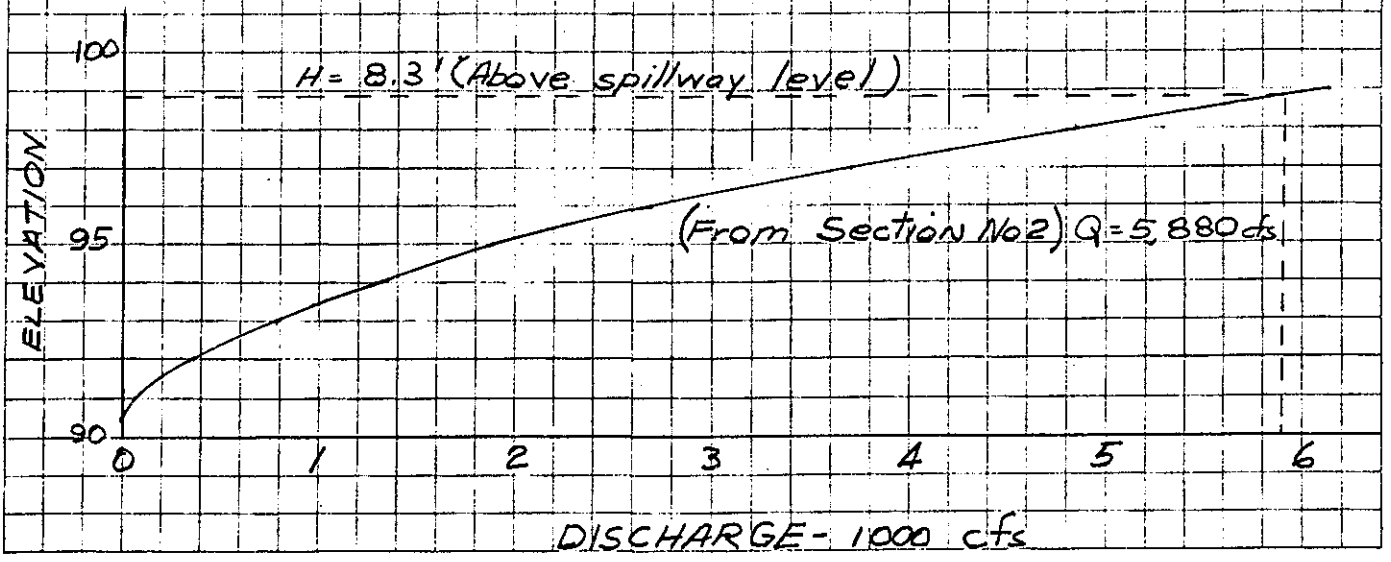
SUBJECT HOADLEY POND DAM - Depth of flow

SECTION NO 3: (Swan Company Dam) (Field Surveyed) (See Figure 3) Scale: 1"=20' Horiz 1"=10' Vert



Spillway Discharge Coeff = 3.4
Dirt Road " " = 2.5

Elev (ft)	Spillway Discharge Capacity (cfs)	Dirt Road Discharge Capacity (cfs)	Total Discharge Capacity (cfs)
90.5	0	0	0
91	70	0	70
92	362	0	362
93	780	0	780
94	1,291	0	1,291
95	1,882	0	1,882
96	2,544	155	2,699
97	3,268	438	3,706
98	4,050	805	4,855
99	4,887	1,240	6,127



SUBJECT HOADLEY POND DAM-DEPTH OF FLOW

SECTION NUMBER 4A

MAIN CHANNEL

H	W	A	R	S	V	Q
1.0	30	15	.49	.0730	6.27	94
2.0	41	53	1.28	.0730	11.84	628
3.0	44	94	2.14	.0730	16.64	1568
4.0	47	137	2.93	.0730	20.54	2820
5.0	50	182	3.67	.0730	23.89	4350
6.0	52	229	4.37	.0730	26.84	6140
7.0	55	277	5.04	.0730	29.49	8178
8.0	57	327	5.71	.0730	32.05	10489
9.0	60	378	6.34	.0730	34.39	12997
10.0	62	429	6.94	.0730	36.54	15684
11.0	64	481	7.52	.0730	38.51	18538
12.0	66	534	8.06	.0730	40.35	21552
13.0	69	588	8.51	.0730	41.82	24585
14.0	73	644	8.87	.0730	43.00	27676
15.0	76	702	9.23	.0730	44.16	30980

MANNING COEFFICIENT=N=.0400

BY SAL DATE 7/8/80 ROALD HAESTAD, INC. SHEET NO 10 OF 13

CKD BY DLS DATE 7/16/80 CONSULTING ENGINEERS JOB NO 49-016

SUBJECT HOADLEY POND DAM-DEPTH OF FLOW

SECTION NUMBER 4B

LEFT OVERBANK

H	W	A	R	S	V	Q
8.0	29	20	.67	.0730	7.66	150
9.0	31	48	1.52	.0730	13.25	631
10.0	33	76	2.26	.0730	17.30	1308
11.0	35	104	2.93	.0730	20.54	2128
12.0	37	132	3.52	.0730	23.22	3057
13.0	39	160	4.05	.0730	25.51	4072
14.0	41	188	4.53	.0730	27.49	5159
15.0	43	216	4.97	.0730	29.23	6304

MANNING COEFFICIENT=N=.0400

BY SAL DATE 7/8/80 ROALD HAESTAD, INC. SHEET NO 11 OF 13

CKD BY DLS DATE 7/16/80 CONSULTING ENGINEERS JOB NO 49-016

SUBJECT HOADLEY POND DAM-DEPTH OF FLOW

SECTION NUMBER 4

TOTAL SECTION

	AREA			DISCHARGE		
H	A	B	TOTAL	A	B	TOTAL
1.0	15	0	15	94	0	94
2.0	53	0	53	628	0	628
3.0	94	0	94	1568	0	1568
4.0	137	0	137	2820	0	2820
5.0	182	0	182	4350	0	4350
6.0	229	0	229	6140	0	6140
7.0	277	0	277	8178	0	8178
8.0	327	20	347	10489	150	10639
9.0	378	48	426	12997	631	13628
10.0	429	76	505	15684	1308	16992
11.0	481	104	585	18538	2128	20667
12.0	534	132	666	21552	3057	24609
13.0	588	160	747	24585	4072	28657
14.0	644	188	831	27676	5159	32835
15.0	702	216	917	30980	6304	37284

REACH OUTFLOW=QP2= 5882 CFS
DEPTH OF FLOW=H2= 5.9 FT.

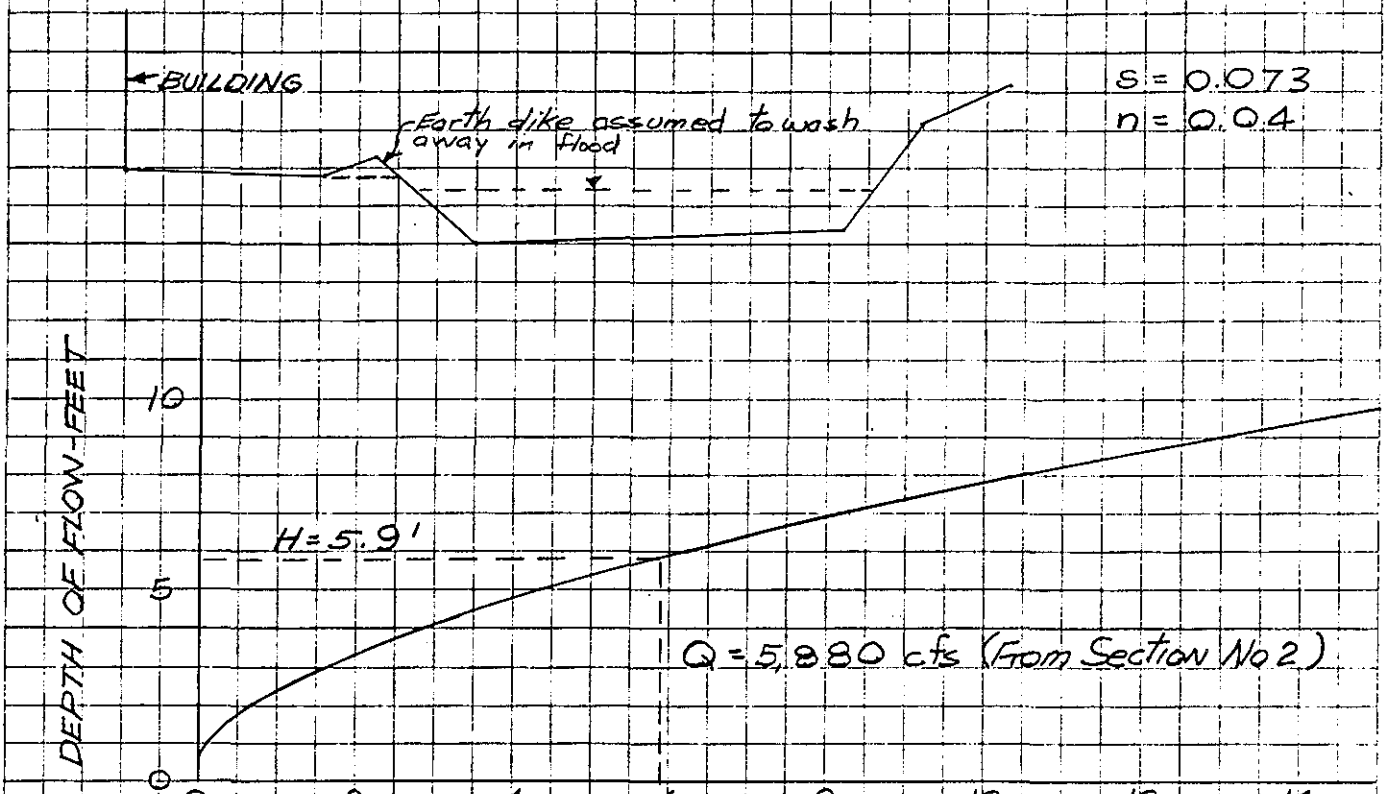
BY SAL DATE 7/7/80 **ROALD HAESTAD, INC.** SHEET NO 12 OF 13

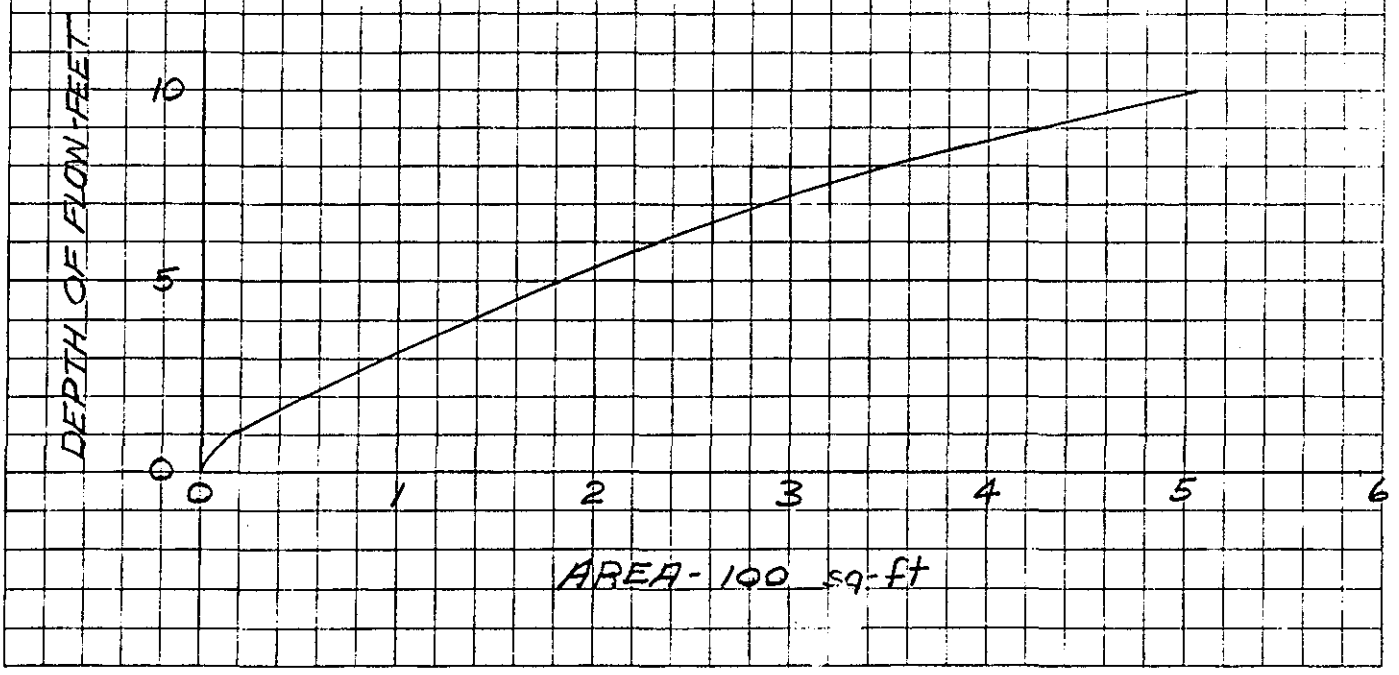
CONSULTING ENGINEERS

CKD BY DLS DATE 7/16/80 37 Brookside Road - Waterbury, Conn. 06708 JOB NO 49-016

SUBJECT HOADLEY POND DAM - Depth of flow

SECTION NO 4: (Field Surveyed) Scale 1" = 20' Horiz 1" = 20' Vert





BY S.A.L. DATE 4/29/80 **ROALD HAESTAD, INC.** SHEET NO. 13 OF 13

CONSULTING ENGINEERS

CKD BY DLS DATE 7/16/80 37 Brookside Road - Waterbury, Conn. 06708 JOB NO. 049-16

SUBJECT HOADLEY POND DAM - Areas

Planimeter Readings:

1) Surface Area: Third = 5.44 sq in 1.36
First = 2.72 sq in 1.36
Start = 1.36 sq in

$$1.36\ in^2 \times \frac{(500\ ft)^2}{in^2} \times \frac{1\ acre}{43{,}560\ ft^2} = 7.8 \quad \text{use 8 acres}$$

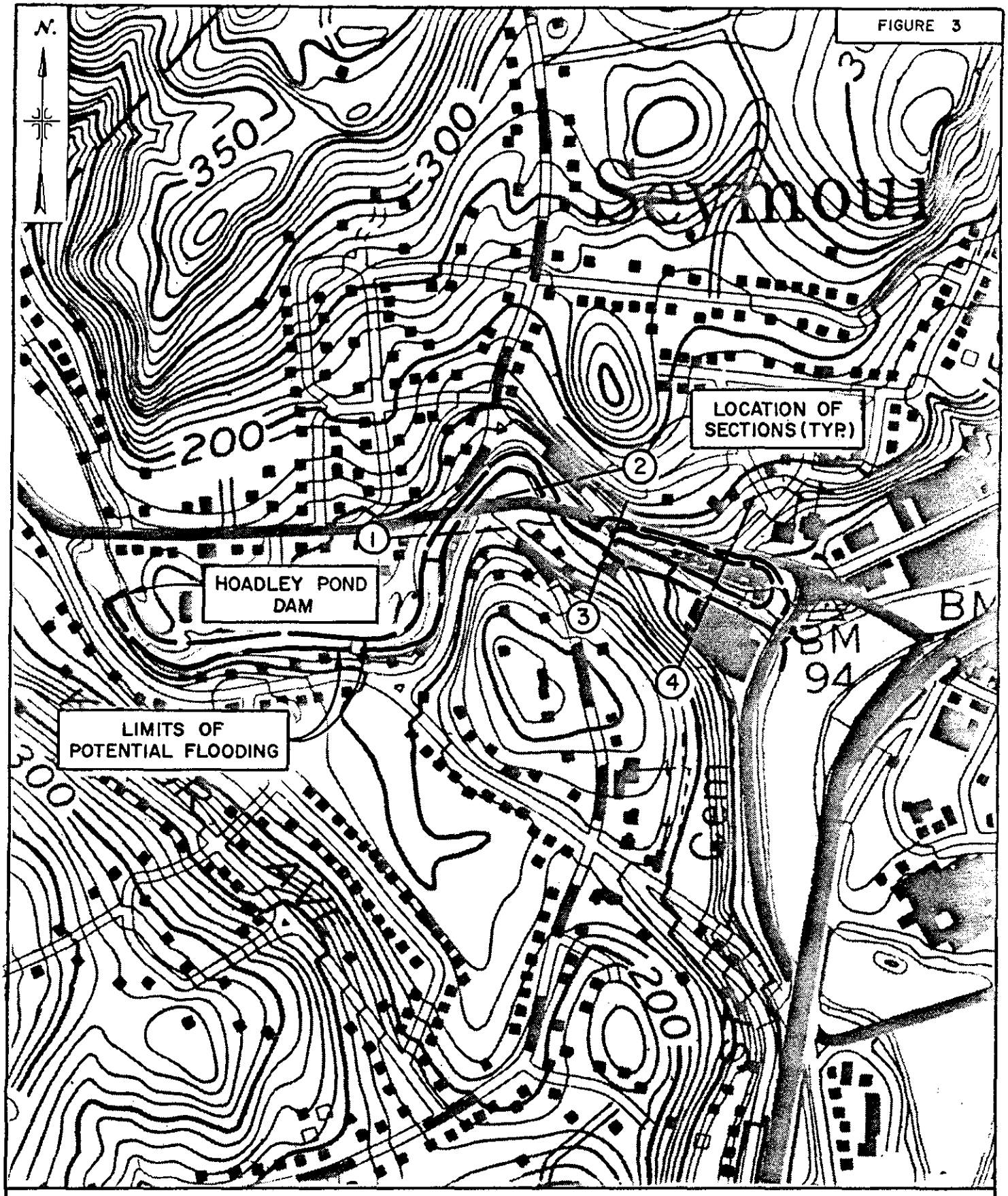
2) Watershed Area:

a) Section No 1: Third = 35.05 11.44 × 4 = 45.76 sq in
First = 12.19 11.45 (A planimeter constant)
Start = 0.74

b) Section No 2: Third = 45.14 14.86 × 4 = 59.44 sq in
First = 15.40 14.85 (A planimeter constant)
Start = 0.55

$$(45.76 + 59.44)\ in^2 \times \frac{(2{,}000\ ft)^2}{in^2} \times \frac{1\ sq\ mi}{(5{,}280\ ft)^2} = 15.09\ sq\ mi$$

use 15 sq mi



LIMITS OF POTENTIAL FLOODING

HOADLEY POND DAM
SEYMOUR, CONNECTICUT

SCALE: 1" = 500'

ROALD HAESTAD, INC.

NAUGATUCK QUADRANGLE 1972