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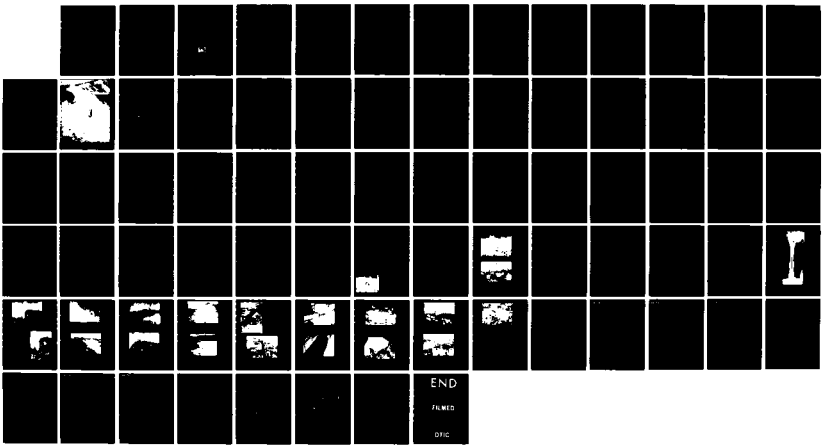

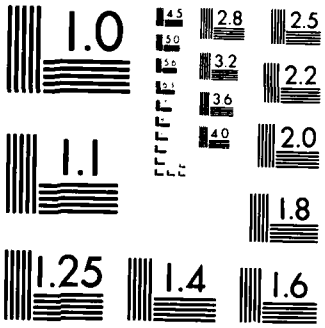

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CONNECTICUT RIVER BASIN

SHERBURNE, VERMONT

COLTON POND DAM

VT 00114

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS. 02154

OCTOBER 1979

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

DAMS, INSPECTION, DAM SAFETY,

Connecticut River Basin
Sherburne, VT.
South Branch Tweed River

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

The dam is an earthen embankment structure with an overall length of 140 ft. and a maximum height of 19 ft. The dam is in good condition. Loss of concrete particles on the riser portion of the principal spillway was noted. The dam is small in size with a significant hazard potential. There are no recommendations resulting from the inspection. However, there are a few remedial measures which should be undertaken by the owner.

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COLTON POND DAM

VT 00114

CONNECTICUT RIVER BASIN
SHERBURNE, VERMONT

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

LETTER OF TRANSMITTAL

FROM THE CORPS OF ENGINEERS TO THE STATE

TO BE SUPPLIED BY THE CORPS OF ENGINEERS

NATIONAL DAM INSPECTION PROGRAM
PHASE I - INSPECTION REPORT
BRIEF ASSESSMENT

Identification No.: 00114

Name of Dam: Colton Pond Dam

Town: Sherburne

County and State: Windsor, Vermont

Stream: South Branch Tweed River

Date of Inspection: September 12, 1979

Colton Pond Dam is an earthen embankment structure with an overall length of 140 feet and a maximum height of 19 feet. The dam consists of an impervious material with a clay core. Top width of the dam is 20 feet. Upstream and downstream embankments are on a 3 horizontal to 1 vertical slope. The principal spillway has a 4 foot by 4 foot box drop inlet located near the center of the dam which outlets via an 18 inch diameter pipe through the center of the dam. The emergency spillway is located at the left abutment and has a concrete wall crest with a horizontal weir crest 50 feet long. The dam was constructed in 1964. Drawings and specifications are on file with the Vermont Department of Water Resources. No design calculations or construction records were made available.

Visual inspection indicated that the dam is in good condition. The inspection revealed displacement of rip-rap in an area along the left slope of the emergency spillway discharge channel and loss of concrete particles on the riser portion of the principal spillway.

Based on a maximum storage of 330 acre-feet and a maximum height of 19 feet, Colton Pond Dam falls within the small size classification. The dam's hazard classification has been established as significant based on potential flooding of two dwellings. Based on the small size of the dam and its significant hazard classification and in accordance with Corps of Engineers Guidelines, the test flood inflow should be of a magnitude ranging from the 100 year frequency flood to 1/2 the Probable Maximum Flood (PMF). One half the PMF was used for the test flood inflow, which is 1155 cfs. The routed test flood outflow of 870 cfs does not overtop the dam as the maximum capacity of the spillways is 1326 cfs. There will be a freeboard of approximately 0.8 feet.

There are no recommendations resulting from this Phase I Inspection. Remedial measures include the repair of the displaced rip-rap on the left bank of the emergency discharge channel, monitoring of the loss of concrete on the riser of the principal spillway and establishment of a downstream warning system.

The recommendations and remedial measures are described in Section 7 and should be addressed within 2 years after receipt of this Phase I Inspection Report by the owner.

Gordon H. Slaney, Jr.

Gordon H. Slaney, Jr., P.E.
Project Engineer

HOWARD NEEDLES TAMMEN & BERGENDOFF
Boston, Massachusetts

This Phase I Inspection Report on Dam has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgment and practice, and is hereby submitted for approval.

CHARLES G. TIERSCH, Chairman
Chief, Foundation and Materials Branch
Engineering Division

FRED J. RAVENS, Jr., Member
Chief, Design Branch
Engineering Division

SAUL COOPER, Member
Chief, Water Control Branch
Engineering Division

APPROVAL RECOMMENDED:

JOE B. FRYAR
Chief, Engineering Division

THIS SHEET TO BE FURNISHED BY THE CORPS OF ENGINEERS

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigations and analyses involving topographic mapping, subsurface investigations, testing and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might be otherwise detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test Flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

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SECTION 4
OPERATIONAL PROCEDURES

4.1 Procedure

The impoundment created by Colton Pond Dam is used for recreation. Water level is maintained by stoplogs in the principal spillway inlet. During the summer and fall the reservoir is maintained at the crest of the inlet. Several stoplogs (about 2 feet) are removed for the winter and spring.

4.2 Maintenance of Dam

Grass on the dam is cut once or twice a year. Once every three or four years brush is removed from the dam. Otherwise, there is no regular maintenance except on an as needed basis.

4.3 Maintenance of Operating Facilities

There is no regular maintenance procedure for the operating facilities. Repairs are made as needed.

4.4 Description of Warning Systems

There are no warning systems in effect for this facility.

4.5 Evaluation

The current operation and maintenance procedures for this dam are inadequate to insure that problems encountered can be remedied within a reasonable period of time.

The owner should establish a written operational procedure as well as establishing a warning system to follow in the event of emergency conditions.

e. Downstream Channel. The outlet channel for the spillway runs along the left abutment of the dam and is rip-rapped with heavy stone. Downstream of the dam the channel bed is strewn with rocks. The bottom width is about 8 feet and the channel banks are heavily overgrown with brush. The channel immediately downstream of the principal spillway outlet can be seen in Photo No. 18.

3.2 Evaluation

Visual examination indicates that the dam is in good condition. Visual examination revealed the following:

(a) An area on the left slope of the spillway discharge channel has been eroded and the riprap protection has been displaced.

(b) Surface deterioration of the concrete on the box drop inlet of the principal spillway.

c. Appurtenant Structures. Visual inspection of the concrete box drop inlet spillway, emergency earth spillway and discharge conduit with a concrete outlet structure did not reveal any evidence of stability problems. The concrete surface of the box spillway structure generally appeared to be in good condition except for the loss of fine aggregate particles from the concrete surface. The spillway trash rack and service deck are in good condition.

The principal box spillway structure, as seen in Photo No. 12, consists of three elements: a box inlet overflow control, a vertical transition (box structure) and closed discharge conduit. Removal of the stoplogs would permit use of the 18 inch closed discharge conduit as a pond drain. The spillway structure is located at the toe of the embankment near the center of the dam. Visual inspection revealed that the concrete box spillway structure appeared to be in sound condition except for the surface deterioration as seen in Photo No. 13. Up to 1/2 inch of fine concrete particles appear to be missing from the concrete surface.

The discharge conduit consists of an 18 inch reinforced concrete pipe and outlet structure with walls and apron slab. The outlet structure is located at end of the discharge conduit at the toe of the downstream embankment slope. Visual inspection revealed that the discharge conduit and outlet structure are in good condition, see Photos No. 14 & 15. The outlet channel is paved with riprap and joins the spillway channel about 30 feet below the toe of the embankment.

The service deck to the spillway structure from the dam embankment as seen in Photo No. 2, consists of steel beams and a wood deck. Both deck and steel beams are in excellent condition.

The 50 foot wide emergency spillway is an earth excavation on the left abutment. A 2 foot wide concrete wall extends across the spillway as shown in Photo No. 10. The approach channel to the spillway, shown in Photo No. 9 is paved with riprap. The channel downstream of the concrete wall is paved with large riprap shown in Photos No. 16 & 17. Small brush is growing in the spillway. Photo No. 16 shows an area on the left slope of the emergency spillway discharge channel which was eroded during the flood of 1973. The Photo shows the displaced riprap due to this erosion.

d. Reservoir Area. The reservoir is about 30 acres in extent and the shoreline is mostly wooded. A portion of the reservoir upstream of the dam can be seen in Photo No. 1. At the southeasterly end of the pond there is a boat ramp. A campground abuts the shoreline on the northwesterly shore.

SECTION 3
VISUAL INSPECTION

3.1 Findings

a. General. The field inspection of Colton Pond Dam was made on September 12, 1979. The inspection team consisted of personnel from Howard, Needles, Tammen & Bergendoff and Geotechnical Engineers, Inc. A representative of the owner was also present during the inspection. Inspection checklists, completed during the inspection, are included in Appendix A. At the time of inspection, the water level was approximately 2 inches below the crest of the principal spillway. The upstream face of the dam could only be inspected above this level.

b. Dam. Visual inspection of the dam indicated that it is in good condition.

The dam consists of an earth embankment about 140 feet long with a riprap protected at the left abutment. The spillway is 50 feet long on the horizontal crest.

Upstream Slope

The upstream slope shown in Photo No. 3 is inclined at 3 horizontal to 1 vertical. Riprap slope protection is made up of small sized rounded stone as shown in Photo No. 4.

The riprap above the water line has been filled in with soil which has vegetation growing on it.

Crest

The crest of the dam is 20 feet wide and is grass covered, as shown in Photo No. 7. Entrance of vehicles onto the crest is controlled by a locked chain. No evidence of cracking or misalignment of the crest was observed.

Downstream Slope

The downstream slope, which is shown in Photo No. 8, is inclined at 3 horizontal to 1 vertical. The slope is covered with grass. There was evidence that small brush had been cut and the grass mowed.

No seepage or wet areas were observed on the slope or in the area just below the slope.

SECTION 2
ENGINEERING DATA

2.1 Design

Original design plans and specifications are available for Colton Pond Dam. Design of the dam was done by Haley and Ward Engineers, Boston, Massachusetts. No design calculations were made available. The dam was constructed in 1964. There is no record of any modifications since construction.

2.2 Construction

No construction records are available for use in evaluating the dam.

2.3 Operation

No engineering operational data were disclosed.

2.4 Evaluation

a. Availability. Engineering data available for Colton Pond Dam consists of information outlined in Section 2.1. In addition, there are inspection reports completed by the Vermont Department of Water Resources. All of the above are on file with the Vermont Agency of Environmental Conservation, Department of Water Resources, Water Quality Division, Montpelier, Vermont 05602.

b. Adequacy. The plans and data available provided some of the information required for a definitive review. Therefore, the adequacy of this dam was assessed from the data available and visual inspection, past performance history and sound engineering judgement.

c. Validity. The field inspection indicated that the external features of Colton Pond Dam substantially agree with those shown on the available plans.

(4) Gates - stoplogs from invert to crest

(5) Upstream Channel - none

(6) Downstream Channel - The 18 inch pipe outlet through a concrete structure with headwall, wingwalls and an apron. The channel downstream of the outlet is about 3 feet wide and one foot high until it joins the emergency spillway outlet channel.

i. Emergency Spillway

(1) Type - concrete weir crest two feet wide

(2) Length of weir - 50 foot long horizontal portion with 5 horizontal to 1 vertical sides.

(3) Crest Elevation - 1315.5

(4) Gates - none

(5) Upstream Channel - none

(6) Downstream Channel - Maximum 50 foot bottom width along left abutment downstream of dam. Paved with heavy riprap.

j. Regulating Outlets. The principal spillway box drop inlet can control the reservoir level by placement or removal of stoplogs. There are two sets of stoplog slots which are used to facilitate maintenance. The crest of the inlet is at elevation 1315.0 and the crest opening is 4 feet square. The stoplogs extend to the invert of the structure 1305.0 and can be removed to that level to drain the pond. The 18 inch outlet pipe has an invert of 1305.0. There is a fence type trash rack at the crest of the inlet. Access to the structure is via a 25 foot long catwalk with a locked gate to control access. When the water level is at the crest of the emergency spillway, weir flow will control and maximum capacity will be about 14 cfs.

(3) Spillway Crest Pool - 210

(4) Top of Dam - 330

f. Reservoir Surface (acres)

(1) Recreation Pool - 30.0

(2) Flood Control Pool - N/A

(3) Spillway Crest - 30.0

(4) Test Flood Pool - 30.0

(5) Top Dam - 30.0

g. Dam

(1) Type - earth

(2) Length - 140 feet

(3) Height - 19 feet

(4) Top Width - 20 feet

(5) Side Slopes - upstream and downstream 3 horizontal to vertical

(6) Zoning - none

(7) Impervious core - clay varies 5 to 6 feet wide

(8) Cutoff - none

(9) Grout Curtain - none

(10) Other - none

h. Diversion and Regulating Tunnel

See Section j below.

i. Principal Spillway

(1) Type - concrete box drop spillway 4 feet square with 18 inch diameter outlet pipe.

(2) Length of Weir - effective length 12 feet

(3) Crest Elevation - 1315.0

The crest elevation is 1315.5. The maximum capacity when the water level is at the top of the dam, elevation 1319.0 is 1290 cfs.

(2) There are no records of maximum discharge at the site.

(3) The total capacity of the spillways when the water surface is at the top of the dam, elevation 1319.0 is 1330 cfs.

(4) The capacity of the spillways when the water surface elevation is at the test flood elevation of 1318.2 is 870 cfs.

(5) The total project discharge at the test flood elevation of 1318.2 is 870 cfs.

c. Elevation (feet above NGVD)

(1) Streambed at centerline of dam - 1300.0 (original stream)

(2) Maximum tailwater - unknown

(3) Upstream invert of outlet works - 1305.0

(4) Normal pool - 1315.0

(5) Full flood control pool - N/A

(6) Spillway crest (principal spillway) - 1315.0
(emergency spillway) 1315.5

(7) Design surcharge - unknown

(8) Top Dam - 1319.0

(9) Test Flood Surcharge - 1318.2

d. Reservoir (miles)

(1) Length of Maximum Pool - unknown

(2) Length of Normal Pool - 0.38

(3) Length of Flood Control Pool - N/A

e. Storage (gross acre-feet)

(1) Normal Pool - 210

(2) Flood Control Pool - N/A

e. Ownership. This dam is owned by the Vermont Department of Fish and Game, Montpelier, Vermont 05602.

f. Operator. This dam is maintained and operated by the State of Vermont Fish and Game Department. The State's Dam Safety Engineer is Mr. A. Peter Barranco, Jr., P.E. Mr. Barranco is located at the Agency of Environmental Conservation, Department of Water Resources, Water Quality Division, Montpelier, Vermont 05602. Telephone No. (802) 828-2761.

g. Purpose of Dam. The waters impounded by this dam are used for recreation. The pond is stocked with trout.

h. Design and Construction History. The dam was constructed in 1964. Prior to construction of the dam there was a natural pond at the site. There is no record of any major modifications.

i. Normal Operating Procedures. Throughout the summer and fall the stoplogs are left in place to the top of the principal spillway. In the winter and spring the pond level is lowered by 2 or 3 stoplogs or about 2 feet.

1.3 Pertinent Data

a. Drainage Area. The area tributary to Colton Pond consists of 0.77 square miles of wooded mountainous terrain. The watershed is narrow and orientated on a northeast-southwest axis while the reservoir is on a northwest-southeast axis and almost divides the basin in half. Route 100 also divides the basin parallel to the axis of the pond. Maximum elevation in the basin is 2020 feet NGVD at the southwest end and 2500 at the northeast end. Normal pool elevation is at 1315 feet NGVD.

The reservoir is about 30 acres in extent and the shoreline is mostly wooded. At the southeasterly end of the pond there is a boat ramp. A campground abuts the shoreline on the northwesterly shore.

b. Discharge at Dam Site.

(1) The outlet works for Colton Pond Dam consist of a principal spillway with a box drop inlet and 18 inch diameter reinforced concrete outlet pipe. The box inlet is 4 feet by 4 feet with the crest at elevation 1315.0. The 18 inch outlet pipe is at elevation 1305.0. Water level can be controlled by stoplogs which are set in the face of the box and can be removed to elevation 1305.0. Capacity of the principal spillway when the water level is at the crest of the emergency spillway 1315.5 is 14 cfs. The emergency spillway has a crest length of 50 feet on the horizontal, and 5 horizontal to 1 vertical side slopes.

b. Description of Dam and Appurtenances. Colton Pond Dam is an earthen structure. Overall length is 140 feet and the maximum embankment height is 19 feet as measured from the streambed to the top of dam. Structural height of the dam is 21 feet. The embankment consists of impervious material with a clay core in the center of the dam. The core varies in width from 6 feet to 5 at the top. The top of the core wall is even with and four feet below the crest of the dam. Top width of the dam is 20 feet and slope of the upstream and downstream embankments are 3 horizontal to 1 vertical. The upstream face of the dam is paved with riprap at the normal water line.

The principal spillway has a box drop inlet located near the center of the dam. Inside dimensions of the box are 4 feet by 4 feet and the box crest is at elevation 1315.0. An 18 inch diameter reinforced concrete pipe outlets the box through the dam to a concrete outlet structure with wingwalls and an apron slab. The upstream face of the inlet box consists of 2 sets of stoplog slots, (for maintenance purposes) which extend from the crest to the invert or 10.0 feet. Removal of the stoplogs would permit use of the 18 inch outlet pipe as a pond drain. There is a steel fence type trash rack at the inlet crest. Access to the principal spillway is via a catwalk from the crest of the dam. The emergency spillway is located on the left abutment. The crest is formed by a concrete weir with a 50 foot long horizontal crest and additional sloped crest length on each side. The left side of the emergency spillway meets the natural grade and the right side blends into the dam. Downstream of the concrete crest the emergency spillway channel is paved with heavy rip-rap.

Figure 1 located in Appendix B, shows a plan of the dam and its appurtenant structures. Photographs of each structure are shown in Appendix C.

c. Size Classification. Small (hydraulic height-19 feet, storage-330 acre-feet) classification based on the height being less than 40 feet and the storage being less than 1000 acre-feet as given in Recommended Guidelines for Safety Inspection of Dams.

d. Hazard Classification. The potential for damage posed by this dam is classified as significant. Failure of this dam with the water level at the top of dam would result in a flood wave about 11.0 feet high in the reach extending from the dam to a road located about 1500 feet downstream. Two dwellings are set about 8 and 9 feet respectively above the streambed, and there is a road, which is about 8 feet above the channel. The dwellings would be flooded by 2 to 3 feet and there would be a minimal hazard to life. Other than the two dwellings there is very little development downstream of the dam.

NATIONAL DAM INSPECTION PROGRAM
PHASE I INSPECTION REPORT
COLTON POND DAM

SECTION 1
PROJECT INFORMATION

1.1 General

a. Authority. Public Law 92-367, August 8, 1972, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a National Program of Dam Inspection throughout the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. Howard, Needles, Tammen & Bergendoff has been retained by the New England Division to inspect and report on selected dams in the State of Vermont. Authorization and notice to proceed were issued to Howard, Needles, Tammen & Bergendoff under a letter of August 24, 1979 from John P. Chandler, Colonel, Corps of Engineers. Contract No. DACW33-79-C-0060 has been assigned by the Corps of Engineers for this work.

b. Purpose

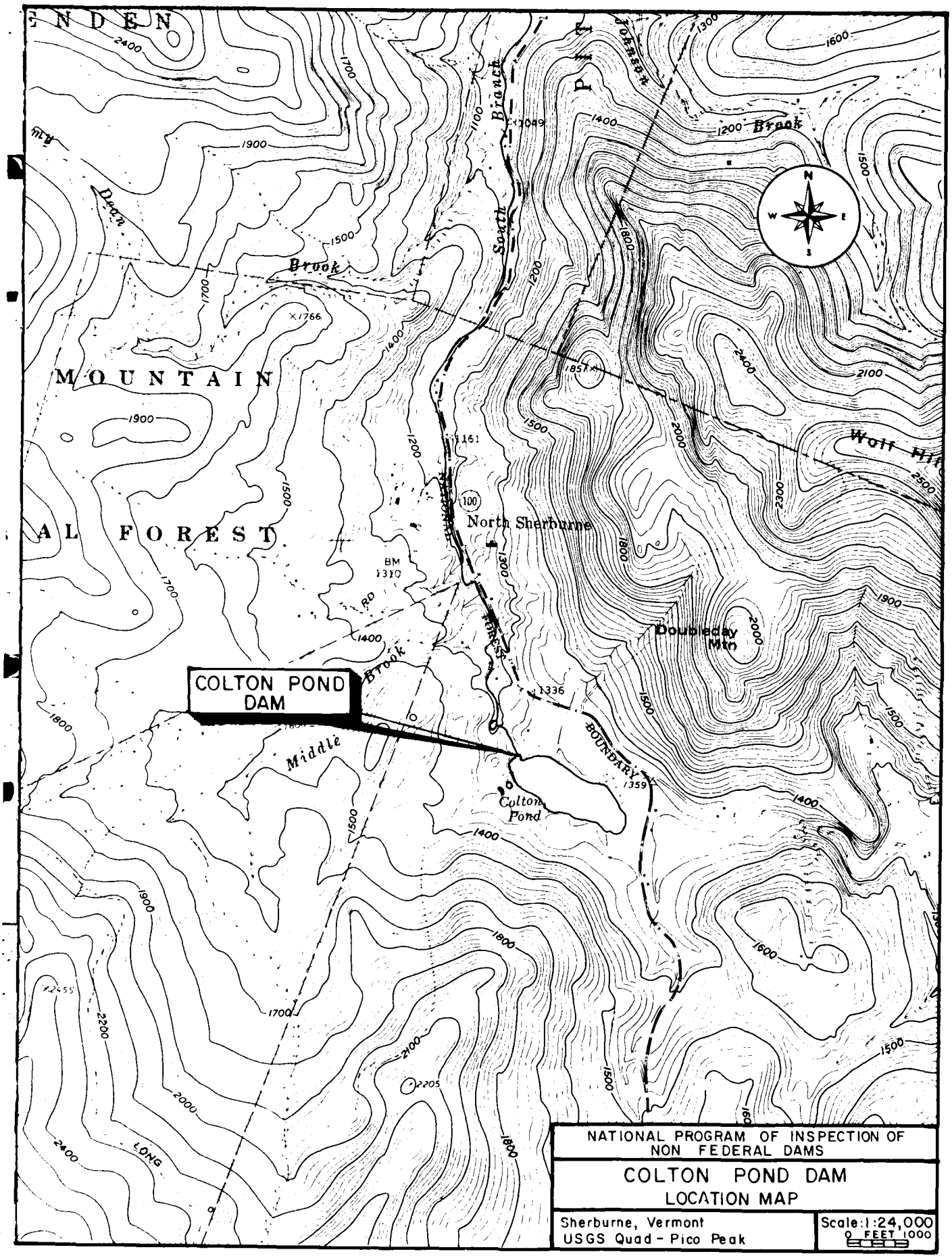
(1) To perform technical inspection and evaluation of non-Federal dams to identify conditions which threaten the public safety and thus permit correction in a timely manner by non-Federal interests.

(2) To encourage and prepare the states to initiate quickly effective dam safety programs for non-Federal dams.

(3) To update, verify and complete the National Inventory of Dams.

1.2 Description of Project

a. Location. Colton Pond Dam is located on the South Branch of Tweed River in the Connecticut River Basin about 3000 feet upstream from its confluence with Middle Brook in the Town of Sherburne, Vermont. The location is shown on U.S.G.S. Quadrangle Pico Peak, Vermont with approximate coordinates N43° 41'56" E72° 49'21", Rutland County, Vermont. The location of Colton Pond Dam is shown on the preceeding page.



NATIONAL PROGRAM OF INSPECTION OF NON FEDERAL DAMS

COLTON POND DAM

LOCATION MAP

Sherburne, Vermont

USGS Quad - Pico Peak

Scale: 1:24,000

0 FEET 1000

Colton Pond Dam - Overview from above left abutment

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SECTION 5
HYDROLOGY AND HYDRAULIC ANALYSIS

5.1 Evaluation of Features

a. General. Colton Pond Dam is an earthen structure with an overall length of 140 feet. The maximum embankment height is 19 feet from the original streambed to the top of dam. The principal spillway consists of a 4 foot square box drop inlet controlled by stoplogs and an 18 inch diameter outlet pipe. The emergency spillway located on the left abutment consists of a 50 foot horizontal concrete weir crest with side slopes of five horizontal to one vertical. The pond can be regulated or drained by removing the stoplogs in the principal spillway inlet.

The impoundment is used for recreation. The dam is classified as small in size having a maximum storage of 330 acre-feet and a maximum height of 19 feet.

b. Design Data. No hydrologic or hydraulic design data were disclosed for Colton Pond Dam.

c. Experience Data. There are no records of maximum discharge at the site.

d. Visual Observations. No evidence of damage to any portion of the dam due to overtopping was visible at the time of inspection.

e. Test Flood Analysis. No detailed design and operational information are available for this dam. The hydrologic evaluation was performed using information gathered by field investigation, watershed characteristics, and Probable Maximum Flood (PMF) curves prepared by the Corps of Engineers. In accordance with Corps of Engineer Guidelines the significant hazard classification and small size classification of this dam warrants a test flood magnitude ranging from a 100 year frequency flood to 1/2 the PMF. A test flood equal to 1/2 the PMF was used, as the maximum storage and height of the dam are in the mid-range of the size classifiction range of small. A test flood inflow of 1155 cfs is based on a watershed consisting of 0.77 square miles of wooded mountainous terrain. As the drainage area was outside the PMF curve envelope, the recommended maximum value of 3,000 csm for the PMF was used.

The routed test flood outflow was determined in accordance with Corps of Engineers Guidance for Estimating Effect of Surcharge Storage on Maximum Probable Discharge, and the

hydraulic characteristics of the dam. The stage discharge curve was developed considering discharge through the emergency spillway as flow over a broad crest weir and the discharge through the principal spillway as being controlled by the 18 inch diameter outlet pipe. Note that when the head on the crest of the principal spillway is less than one foot the control will be the crest of the box. The routing was started with the water surface at the crest of the principal spillway. The routed test flood outflow was determined to be approximately 870 cfs. As the maximum capacity of the spillways is approximately 1330 cfs there will be a freeboard of about 0.8 feet.

f. Dam Failure Analysis. The impact of failure of the dam was assessed using the "Rule of Thumb" Guidance for Estimating Downstream Dam Failure Hydrographs prepared by the Corps of Engineers. The breach discharge was estimated with the water surface at the crest of the dam and a breach width equal to 40 percent of the length of the dam at mid-height. The downstream hydrograph is a sum of the breach discharge and the maximum spillway discharge. Prior to the breach of dam the downstream river stage would be about 6 feet with the spillways at a full capacity discharge of 1300 cfs. Breach of dam would result in an additional 4170 cfs for a total of 5470 cfs. The downstream stage was estimated using an average channel cross section in the reach between the dam and a road located 1500 feet downstream of the dam. The breach flood stage in this reach would be about 11.0 feet. This level would not change much in the reach as there is little valley storage available. Two dwellings may be affected. On the upstream side of the road, one dwelling is set about 9 feet above the channel and 100 feet from the stream. The other dwelling is about 8 feet above the streambed and about 30 feet from the streambed and located immediately downstream of the road. The road crossing the stream has a gravel surface and it is about 8' above the streambed. There is a 5 foot diameter corrugated metal pipe for a waterway opening.

SECTION 6
STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

a. Visual Observation. The visual inspection of Colton Pond Dam did not reveal any immediate stability problems.

b. Design and Construction Data. Design drawings and construction specifications exist and indicate the dam is a compacted earth embankment consisting of clayey, silty sand and gravel. The embankment has a central compacted clay core about 5 feet wide. It is not known if the dam rests on a bedrock or glacial till foundation. The embankment, which is about 19 feet above the streambed, has upstream and downstream slopes of 3 horizontal to 1 vertical. The crest is 20 feet wide.

An emergency riprap paved spillway passes around the embankment on the left abutment.

The outlet works is a drop inlet structure at the upstream toe leading to an 18-inch diameter reinforced concrete conduit passing through the embankment.

c. Operating Records. No operating records were made available.

d. Post-Construction Changes. There is no record of post-construction changes.

e. Seismic Stability. The dam is located in Seismic Zone 2, and in accordance with the recommended Phase I guidelines, does not warrant seismic analysis.

SECTION 7
ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES

7.1 Dam Assessment

a. Condition. The visual inspection of Colton Pond Dam indicates that the dam is in good condition. The inspection revealed the following:

(1) An area on the left slope of the spillway discharge channel has been eroded and the rip-rap protection has been displaced.

(2) Surface deterioration of the concrete on the box drop inlet of the principal spillway.

The hydraulic analysis reveals that the spillway can pass the routed test flood.

b. Adequacy of Information. The plans and data available provided some of the information required for a definitive review. Therefore, the adequacy of this dam was assessed from the data available and visual inspection, past performance history and sound engineering judgement.

c. Urgency. This dam is in generally good condition. The recommendations and remedial measures described in Sections 7.2 and 7.3 should be accomplished within two years after receipt of this Phase I Inspection Report by the owner.

d. Necessity of Additional Investigation. No additional investigation is needed to complete the Phase I inspection.

7.2 Recommendations

There are no recommendations resulting from this Phase I Inspection.

7.3 Remedial Measures

(a) Repair the left slope of the spillway channel and add riprap to prevent future erosion.

(b) Prepare a downstream warning system in the event of an emergency.

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(c) A technical inspection program should be initiated and continued on a biennial basis. Special note of the amount of loss of concrete particles on the drop inlet should be taken during the inspections. Repair of the surface should be accomplished when it is considered necessary.

7.4 Alternatives

There are no practical alternatives to the recommendations of Sections 7.2 and 7.3.

APPENDIX A

INSPECTION CHECKLIST

VISUAL INSPECTION CHECK LIST
PARTY ORGANIZATION

PROJECT Colton Pond Dam

DATE 9/12/79

TIME 1:00 PM

WEATHER Fair

W.S. ELEV. 1314.8 U.S. _____ DN.S

PARTY:

1. D. LaGatta GEI
2. S. Mazur HNTB
3. R. Yarsites HNTB
4. Peter Barranco Jr. VDWR
5.
6.
7.
8.
9.
10.

PROJECT FEATURE	INSPECTED BY	REMARKS
1. Dam	Dan LaGatta	
2. Spillway, Outlet and	Stan Mazur	
3. Downstream Channel	Robert Yarsites	
4.		
5.		
6.		
7.		
8.		
9.		
10.		

PERIODIC INSPECTION CHECK LIST

PROJECT Colton Pond DATE September 12, 1979

PROJECT FEATURE Embankment Dam NAME

DISCIPLINE Geotechnical Engineer NAME D. P. LaGatta

AREA EVALUATED	CONDITION
DAM EMBANKMENT	
Crest Elevation	1319.0
Current Pool Elevation	1314.8
Maximum Impoundment to Date	None observed
Surface Cracks	No pavement
Pavement Condition	None observed
Movement or Settlement of Crest	
Lateral Movement	
Vertical Alignment	No misalignment
Horizontal Alignment	
Condition at Abutment and at Concrete Structures	Good
Indications of Movement of Structural Items on Slopes	None
Trespassing on Slopes	None
Sloughing or Erosion of Slopes or Abutments	None
Rock Slope Protection - Riprap Failures	No riprap above water line. Riprap below water is small.
Unusual Movement or Cracking at or near Toes	
Unusual Embankment or Downstream Seepage	None
Piping or Boils	None
Foundation Drainage Features	None
Toe Drains	None
Instrumentation System	None
Vegetation	Not excessive

PERIODIC INSPECTION CHECK LIST

PROJECT Colton Pond Dam DATE 9/12/79

PROJECT FEATURE Intake Channel/Structure NAME D. LaGatta

DISCIPLINE Geotechnical/Structural NAME S. Mazur

AREA EVALUATED	CONDITION
OUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE	
a. Approach Channel	Outlet works has no approach channel. Drop inlet in reservoir.
Slope Conditions	
Bottom Conditions	
Rock Slides or Falls	
Log Boom	
Debris	
Condition of Concrete Lining	
Drains or Weep Holes	
b. Intake Structure	Metal trash rack is in good condition. Loss of fine particales of concrete aggregates was noted on concrete surface.
Condition of Concrete	
Stop Logs and Slots	Good

PERIODIC INSPECTION CHECK LIST

PROJECT Colton Pond Dam DATE 9/12/79

PROJECT FEATURE Outlet Works Conduit NAME S. Mazur

DISCIPLINE Hydraulic/Structural NAME R. Yarsites

AREA EVALUATED	CONDITION
OUTLET WORKS - TRANSITION AND CONDUIT	
General Condition of Concrete	An 18" Dia. reinforced concrete pipe, good condition.
Rust or Staining on Concrete	some staining
Spalling	None
Erosion or Cavitation	None
Cracking	None observed
Alignment of Monoliths	
Alignment of Joints	
Numbering of Monoliths	

PERIODIC INSPECTION CHECK LIST

PROJECT Colton Pond Dam DATE 9/12/79

PROJECT FEATURE Service Deck NAME S. Mazur

DISCIPLINE Structural NAME

AREA EVALUATED	CONDITION
OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL	
General Condition of Concrete	Good
Rust or Staining	Some staining
Spalling	None
Erosion or Cavitation	None
Visible Reinforcing	None
Any Seepage or Efflorescence	None
Condition at Joints	Good
Drain Holes	No training walls
Channel	Good adequate rip-rap
Loose Rock or Trees Overhanging Channel	None
Condition of Discharge Channel	Good

PERIODIC INSPECTION CHECK LIST

PROJECT Colton Pond Dam DATE 9/12/79

PROJECT FEATURE Outlet Works/Spillway NAME D. LaGatta

DISCIPLINE Geotechnical/Structural/Hydraulic NAME S. Mazur, R. Yarsites

AREA EVALUATED	CONDITION
OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS	
a. Approach Channel	
General Condition	Good
Loose Rock Overhanding Channel	None
Trees Overhanging Channel	None
Floor of Approach Channel	Slope of embankment has rip-rap protection
b. Weir and Training Walls	
General Condition of Concrete	Loss of fine particlaes of concrete aggregates was noted on concrete surface (Photo 13).
Rust or Staining	
Spalling	None noted
Any Visible Reinforcing	None
Any Seepage or Efflorescence	None
Drain Holes	No training walls
c. Discharge Channel	
General ~~XXXXXX~~ Condition	Good. Some displacement of rip-rap on left slope.
Loose Rock Overhanging Channel	None
Trees Overhanging Channel	None
Floor of Channel	Rip-rap protection
Other Obstructions	None

PERIODIC INSPECTION CHECK LIST

PROJECT Colton Pond Dam DATE 9/12/79

PROJECT FEATURE Outlet Structure/Channel NAME S. Mazur

DISCIPLINE Structural/Hydraulic/Geotechnical NAME R. Yarsites, D. LaGatta

AREA EVALUATED	CONDITION
OUTLET WORKS - SERVICE BRIDGE	
a. Super Structure	Service Deck - steel I-shape beams and wood decking, good condition.
Bearings	
Anchor Bolts	
Bridge Seat	
Longitudinal Members	
Under Side of Deck	
Secondary Bracing	
Deck	
Drainage System	
Railings	
Expansion Joints	
Paint	
b. Abutment & Piers	
General Condition of Concrete	
Alignment of Abutment	
Approach to Bridge	
Condition of Seat & Backwall	

APPENDIX B

ENGINEERING DATA

1. LIST OF DESIGN, CONSTRUCTION AND MAINTENANCE RECORDS
2. PAST INSPECTION REPORTS
3. PLAN AND DETAILS

PHOTO NO. 1 - Panorama of reservoir from dam.

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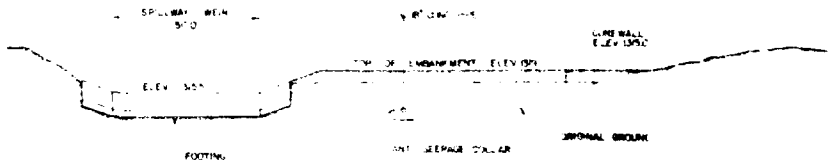
APPENDIX C

PHOTOGRAPHS

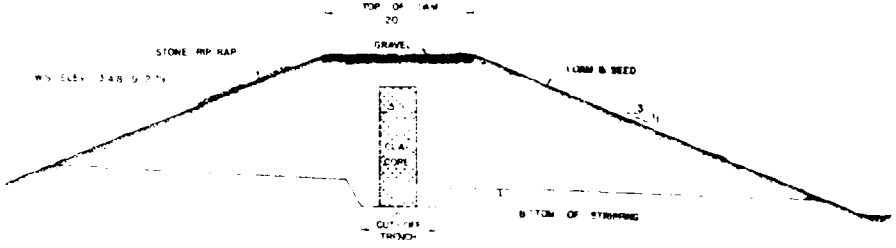
FOR LOCATION OF PHOTOS, SEE FIGURE 1
LOCATED IN APPENDIX B

Colton Pond

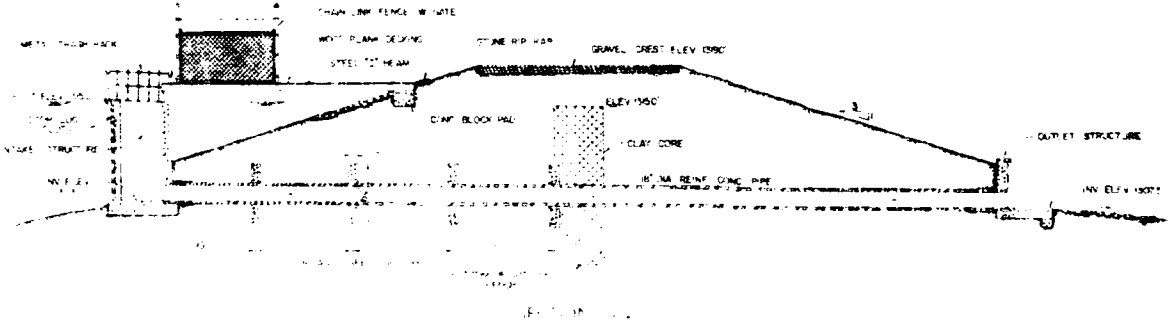
OVERVIEW PLAN



SECTION C-C



SECTION B-B



(A) INDICATES PHOTO LOCATION & DIRECTION

1. THE INFORMATION SHOWN ON THESE DRAWINGS IS BASED ON THE ORIGINAL CONSTRUCTION PLANS AND VISUAL OBSERVATIONS MADE DURING THE FIELD INSPECTION. DIMENSIONS OR MATERIALS INDICATED ON THESE DRAWINGS WHICH WERE BELOW GRADE OR WATER DURING THE TIME OF INSPECTION WERE NOT VERIFIED.

2. THE ELEVATIONS SHOWN IS N.G.V.D. 1929

NATIONAL DIVISION OF WATER RESOURCES

COLTON POND DAM

ROUTING

GENERAL

TO	NOTED	DATE
APB		

SUBJ. TO TC

FILE

WATER QUALITY DIVISION

802/828-2761

September 29, 1978

MEMORANDUM

To: Edward F. Kehoe, Commissioner, Fish & Game

From: A. Peter Barranco, Jr., Environmental Engineer

Subject: Colton Pond Dam - Sherburne

On September 28 the writer made a brief inspection of subject dam.

The dam appears to be in generally good condition but needs to have the brush cut on upstream and downstream slopes, in the emergency spillway and adjacent to the principal spillway outlet channel. Some beaver cuttings have accumulated at the principal spillway drop inlet and should be removed.

vl

COLTON POND — SHERBURNE

INSPECTED 9/28/78 APB

@ T&G BM = - 3.25 WL @ ES = - 0.55' WRT CREST

Flow practically nil. P/S had full column of stop logs, WL somewhat below top (couldn't get out on spillway because gate locked).

Brush growing on U/S & D/S slopes.

D/S some beaver cutting in drop inlet
— downstream channel: some brush

E/S growing up with brush

U/S & D/S slopes dry

COLTON POND - SHELBURNE

9-28-78

/I
SPILLWAY

CREST

E/S WEIR ~ BRUSH GROWING IN CHANNEL

January 15, 1976

MEMORANDUM

To: Edward F. Kehoe, Commissioner, Dept. of Fish & Game

From: Gordon R. Pyper, Commissioner, Dept. of Water Resources

Subject: Baker Pond Dam, Brookfield
Colton Pond Dam, Sherburne

Forwarded herewith are copies of inspection reports prepared by engineers from the Management & Engineering Division, concerning the above dams.

Maintenance and observation items are noted which you may wish to schedule in your future activities.

GRP/DJM/vdl

Enclosures

FILE COPY

State of Vermont

ROUTING		
GENERAL		
TO	NOTED	DATE
	D/C	11-21-75
		11/21/75
		11/24
		12/5/75
SUSPEND TO		
FILE		

Class III
Hit. 20'
FIG

AGENCY OF ENVIRONMENTAL CONSERVATION

MARTIN L. JOHNSON, Secretary

Montpelier, Vermont 05602

DEPARTMENT OF WATER RESOURCES

MANAGEMENT & ENGINEERING DIVISION

Department of Fish and Game
Department of Forests and Parks
Department of Water Resources
Environmental Board
Division of Environmental Protection
Division of Recreation
Division of Planning
Natural Resources Conservation Council

November 21, 1975

MEMORANDUM

To: File

From: Donald H. Spies

Subject: Colton Pond Dam - Sherburne

On November 19, 1975, Larry Fitch and the writer inspected the subject structure except for the drop inlet. No structural deficiencies were found on the earth fill, though there is some scattered brush and the grass needs mowing.

The crest and portions of the discharge channel have considerable brush growth which should be cut. The section of the discharge channel which suffered erosion during the 1973 flood does not appear to have changed. However, it should be checked after any period of high runoff, such as spring rains and/or snow melt.

A stop log was found downstream and recovered by the inspecting engineers.

DHS/vdl

FILE COPY

ROUTING		
GENERAL		
TO	NOTED	DATE
	DHS	11-19-73
DJM	DJM	11/19/73
AJR		11/21
SUSPEND TO		
FILE		

MANAGEMENT & ENGINEERING DIVISION

MEMORANDUM

To: Robert Collins, Fish and Game

From: Donald H. Spies, Dam Engineer

Subject: Colton Pond Dam - Sherburne

Date: November 19, 1973

On November 6, 1973, I stopped at the subject structure. That floating island is definitely a problem and I have no magic formulas for removing it. However, it definitely should be removed. Maybe it can be cut up and the pieces dragged into the woods. I also noticed some erosion in the emergency spillway. Have this area filled with large boulders (600 to 800 pounds). In addition, the brush and saplings should be cut.

DHS/gb

4-5-74 Stopped @ dam on 4-4-74. Island has been removed.

DHS

FILE COPY

AGENCY OF
ENVIRONMENTAL
CONSERVATION
MONTPELIER

AGENCY MEMORANDUM

SUBJECT

Colton Pond Dam (Pine Pond) - Sherburne

TO: Edward F. Kehoe, Commissioner, Department of Fish & Game

FROM: Donald H. Spies, Dam Construction Engineer
Department of Water Resources

DATE: November 13, 1972

On October 19, 1972, the writer made an inspection of the subject structure. The dam is an earth fill structure with a concrete box drop inlet for the principal spillway and an earth cut channel for the emergency spillway. The principal spillway has a set of stop planks incorporated into the drop inlet to control the water level. The emergency spillway has a concrete control weir at the crest.

The dam appears to be in good condition. No seepage or erosion was noted. There is a little brush growth on the dam. The emergency spillway, however, is quite filled with saplings and brush growth. These should be cut and the cuttings removed from the area. The drop inlet is out of plumb and should be observed for a while to be sure it has stabilized.

cc: Robert Collins, Maintenance Supervisor
Richard Sears, Land Negotiator

ROUTING		
GENERAL		
TO	NOTED	DATE
DHS		
JEC.		
SUSPEND TO		
FILE ✓		

ROUTING
GENERAL

TO	NOTED	DATE
RWT	[illegible]	2-24
JEC	[illegible]	2-19

AND TO

February 19, 1964

Mr. Claus Burtenstein
Selectman of Sherburne
Killington, Vermont

Dear Mr. Burtenstein:

In accordance with Title 10, Chapter 29, Section 703 of the Vermont Statutes Annotated, this Department is hereby notifying the Selectmen of the town of Sherburne of its intention to build an earthfill dam at the outlet of Pine Pond, so-called.

The dam and resulting flowage, mentioned in the preceding paragraph, will be constructed entirely on lands previously purchased by this Department, in the name of the State of Vermont, for the express purpose of creating a public fishing impoundment. Approximately 50 feet of freeboard was also secured around the proposed flowline so that the pond will retain an attractive and natural appearance and will not become flooded with docks and similar private improvements. A suitable access will be provided at the southerly end of the proposed impoundment for the parking of cars, boat trailers, and the launching of boats for fishing. This impoundment will not be available for swimming and water skiing and similar abuses will be controlled under regulations by the Department.

Very truly yours,

ROGER A. SEAMANS
Federal Aid Coordinator

RAS/p

cc:Water Resources Board

COPY

VERMONT DEPARTMENT OF WATER RESOURCES

INFORMATION SHEET

Name of Dam Colton Pond (Pine Pond) Town Sheffburne

Owner Dept. of Fish & Game Name of Stream Tweed River Trib

Address Montpelier VT 05602 Classification III

U.S.G.S. Coordinates: Lat. 43°-42'-0" Long. 72°-49'-21"

U.S.G.S. Map Pico Peak, VT Aerial Photos VT-462 21-208

U.S.G.S. Elev. @ Spillway

Total Length of Dam 138' Crest Width of Emergency Spillway 50'

Width of Top 20' Maximum Height 19'

Spillway Capacity: Principal Emergency

Pond Area 30 A Drainage Area 530 A

Pond Volume: Normal Water Level 210 AF Design High Water Level

Maximum Water Depth: Normal Water Level ~~15'~~ 12' Design High Water Level

Storage Before Emergency Spillway is Used ~15 AF @ full pond

Use of Reservoir public recreation (fishing)

Description of Dam: earth fill w/clay core & 3:1 slope both faces

Description of Spillway(s): P.S. - Concrete drop inlet w/stop logs & 18" barrel
E.S - earth channel w/concrete control weir

Designed by Haley & Ward Year Built 1964

Hearing Date February 18, 1964 Order Date February 26, 1964

Additional Remarks:

PAST INSPECTION REPORTS

AVAILABLE ENGINEERING DATA

1. A set of plans consisting of two sheets.

2. Specifications

The above available for inspection at the Vermont Department of Water Resources, Montpelier, Vermont.

PHOTO NO. 2 - Upstream face of dam from right abutment.

PHOTO NO. 3 - Upstream slope as viewed from right abutment. Note absence of rip-rap above waterline.

PHOTO NO. 4 - Upstream slope near emergency spillway. Note absence of rip-rap above waterline and small size of stone below water surface.

PHOTO NO. 5 - View of right abutment from center of dam.

PHOTO NO. 6 - View of dam crest and emergency spillway from left abutment.

PHOTO NO. 7 - View of crest from right abutment.

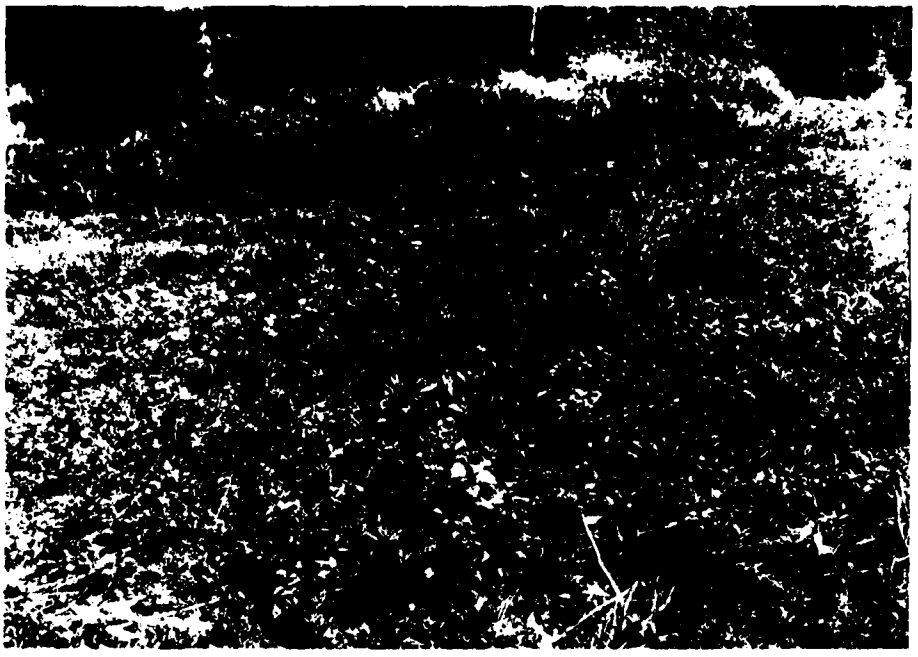


PHOTO NO. 8 - Downstream embankment viewed from emergency spillway.

PHOTO NO. 9 - View of emergency spillway crest from shoreline upstream of left abutment.

PHOTO NO. 10 - Emergency spillway crest is viewed from left end of spillway.

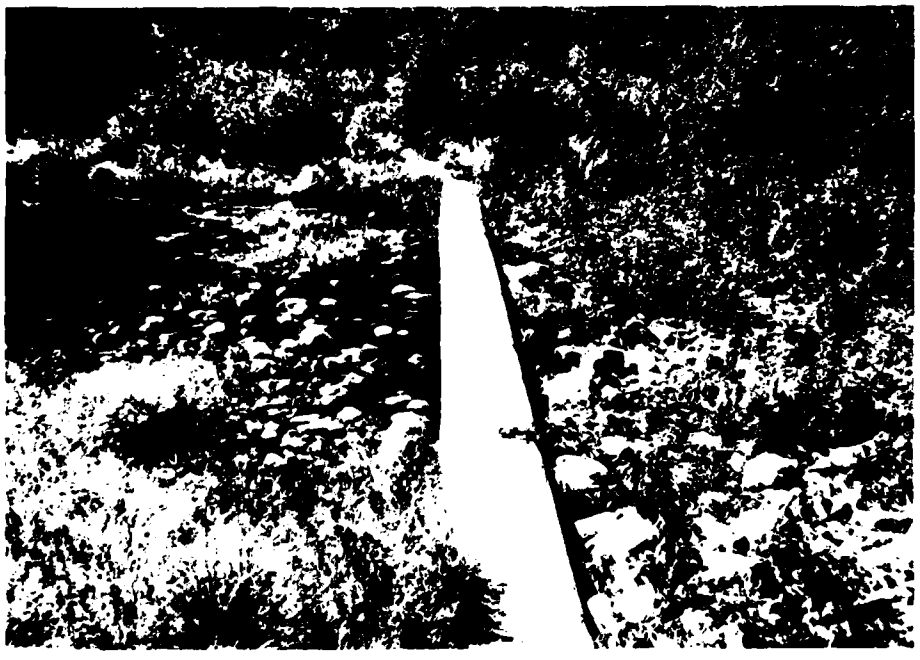


PHOTO NO. 11 - Emergency spillway crest as viewed from right end of spillway.

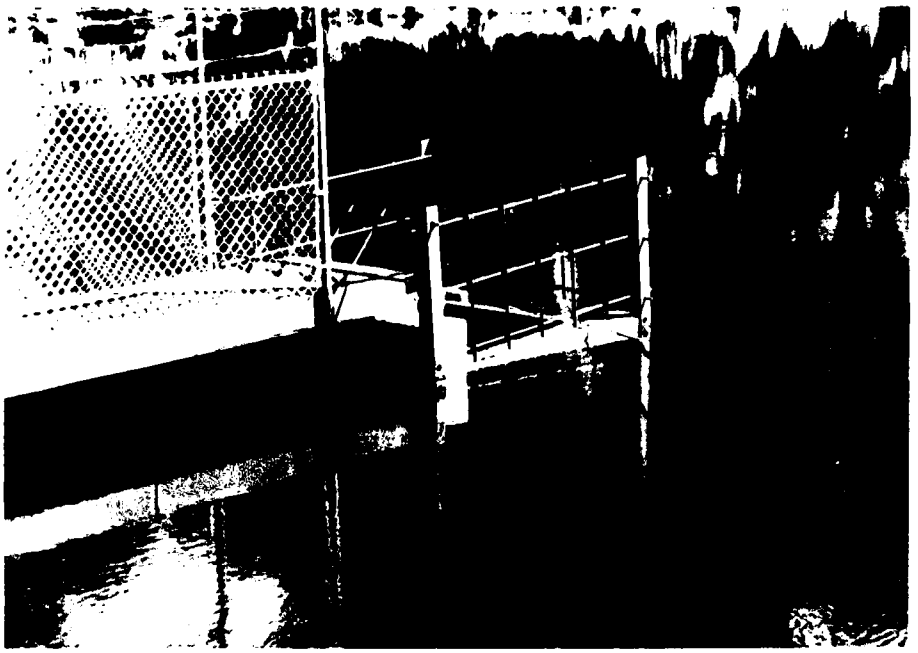


PHOTO NO. 12 - Principal spillway from crest of dam.

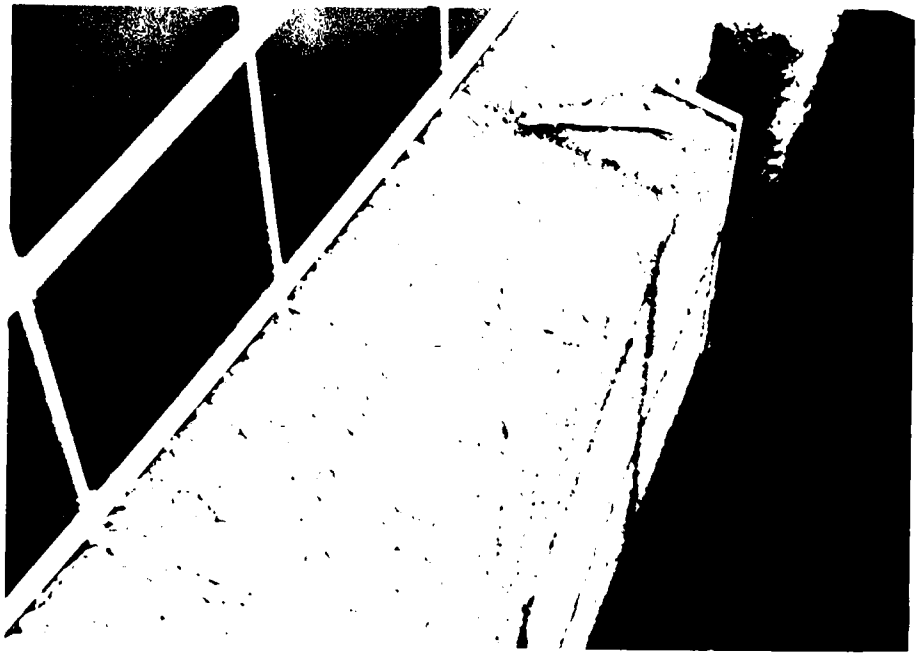


PHOTO NO. 13 - Detail of right face of principal spillway box drop inlet.

PHOTO NO. 14 - Outlet structure and channel.

PHOTO NO. 15 - Detail of outlet structure.

PHOTO NO. 16 - Left side of spillway discharge channel. Note displaced rip-rap on left side.

PHOTO NO. 17 - Spillway discharge channel viewed from spillway crest.

PHOTO NO. 18 - Outlet structure channel.

APPENDIX D

HYDROLOGIC AND HYDRAULIC COMPUTATIONS

HNTB HOWARD NEEDLES TAMMEN & BERGENDOFF	Made by RY	Date 9/24/79	Job No. 5965-11-19
	Checked by HH	Date	Sheet No. 1

Colton Pond Dam

Hydraulics & Hydrology

Colton Pond Dam is located along the South Branch of the Tweed River, in the Town of Sherburne, Rutland County, Vermont in the Connecticut River Basin.

Classification: Size: Small
Hazard: Significant

Basic Data: D.A. = 0.77 mi^2
Upstream Basin Mountainous slope
Aves. 870 ft/mi

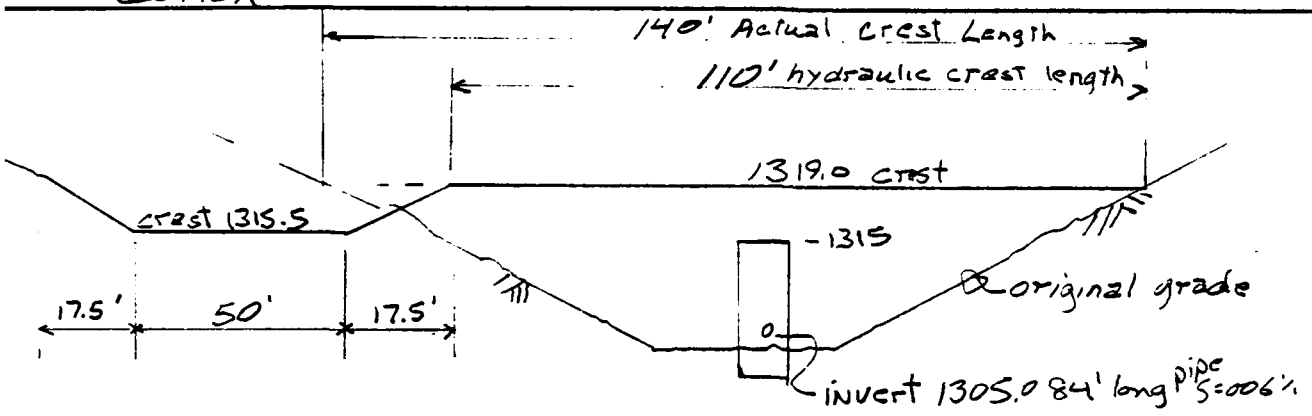
Reservoir: Normal Pool elev 1315.0
Storage 210 acre ft
Max Pool top of Dam elev 1319.0
Storage 330 acre ft
Surface Area 30 Ac assume
Vertical prism storage
above spillway crest.

Dam: Earth w/ core wall
Length 140' max hydraulic 110'
height 19 ft.

Spillways:
Drop box inlet 4'x4' inlet
18" ϕ outlet pipe
Elev 1305.0 INV. of pipe.
Concrete crest emergency spillway
Crest elev 1315.5
50' Horizontal length
Sloped sides 5:1 H to V

HNTB EDWARD NEEDLES TAMMEN & BERGENDOFF	Made by RY	Date 9/24/79	Job No. S965-11-19
	Checked by	Date	Sheet No. 2

Colton



Section thru Axis of Dam

Step 1 Calculation of Test Flood Inflow

Classification Size: Small
Hazard Intermediate

Hydrologic Evaluation Guideline Recommends

100yr frequency Flood to ½ PMF

Use ½ PMF as maximum storage is near mid range of small classification Range 330 Acft Vs max range of 1000 acft

For Test Flood Inflow use Mountainous curve from PMF Guide curves. However the DA. of 0.77mi² is outside curve envelope therefore use the maximum value of 3000 csm for PMF

Test Flood Inflow = ½ × 3000 × .77 sqmi = 1155 cfs

INTB HARD NEEDLES TAMMEN & BERGENDOFF	Made by RY	Date 9/24/79	Job No. 5965-11-19
	Checked by	Date	Sheet No. 3

Colton

Step 2 Calculation of Surcharge

Drop inlet spillway

Crest 1315.0 18"φ pipe outlet

invert 1305.0

18"φ will control when $H > .9$ ft

use $Q = CA\sqrt{2gH}$ $C = 0.7$

$A = 1.77$ □'

$Q = 9.94\sqrt{h+9.0}$

H = w.s. − pipe ℄ elev

$= h + 9.25$

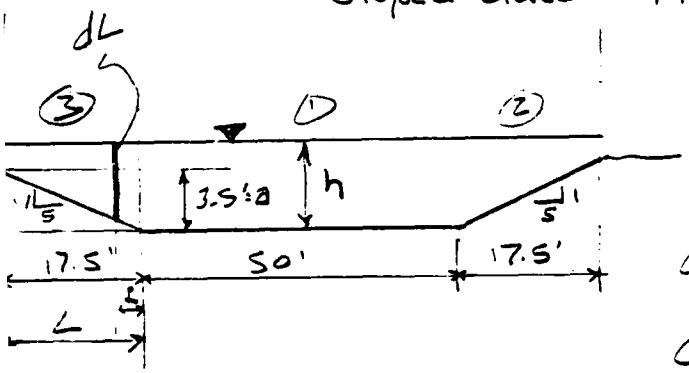
h is w.s. relative to emer. spillway crest

Emergency Spillway

Crest 1315.5

Horizontal Length 50'

Sloped sides - 17.5' on 5:1 slope



Consider as Broad crest weir

$Q = CLH^{3/2}$

$C = 3.09$

$Q_{①} = 3.08(50)\,h^{3/2} = 154\,h^{3/2}$

$Q_{②}$ $dQ = C\,dL\,(h - S\ell)^{1.5}$

$$\Sigma dQ = C\int_{\ell=0}^{\ell=L} (h - S\ell)^{1.5}\,dL$$

$$Q = C\left(\frac{h^{2.5} - (h - SL)^{2.5}}{2.5S}\right)$$

$$Q_{\substack{emer\\spillway}} = 154h^{3/2} + 2\times 3.09\left(\frac{h^{2.5} - (h - .2L)^{2.5}}{2.5\times .2}\right)$$

INTB	Made by RY	Date 9/24/79	Job No. 5965-11-17
WARD NEEDLES TAMMEN & BERGENDOFF	Checked by	Date	Sheet No. 4
Colton			

Stage - Discharge

Elev	h	Q_{outlet}	Emergency Spillway Q_1	Emergency Spillway $2 \times Q_2$	Q_{Total}
1315.0	0	0	0	0	0
1315.5	0	14 cfs*	0	0	14 cfs
1316.0	.5	31	54 cfs	2 cfs	87
1317.0	1.5	32	283	34	349
1318.0	2.5	34	608	122	764
1319.0	3.5	35	1008	283	1326

* weir control

See Figure 1 for Plot

Step 3 Calculation of Surcharge Effect

$Q_{P_1} = 1155$ cfs

Storage - Vertical prism above normal pool

R.O. = 9.5 in

$$Q_{P_2} = Q_{P_1} \times \left(1 - \frac{Stor}{9.5}\right)$$

$$Stor = \frac{Stage(ft) \times 30 ac \times 12 in/ft}{0.77 mi^2 \times 640 ac/mi^2} = .73 \times Stage$$

Routing Curve

see fig 1 for plot

Stage	Elev	Stor	Q_{P_2}
1	1316	.73	1070 cfs
2	1317	1.46	980
3	1318	2.19	890
4	1319	2.92	800

From Figure 1

Outflow 870 cfs
Stage Elev. 1318.2
Freeboard 0.8 feet

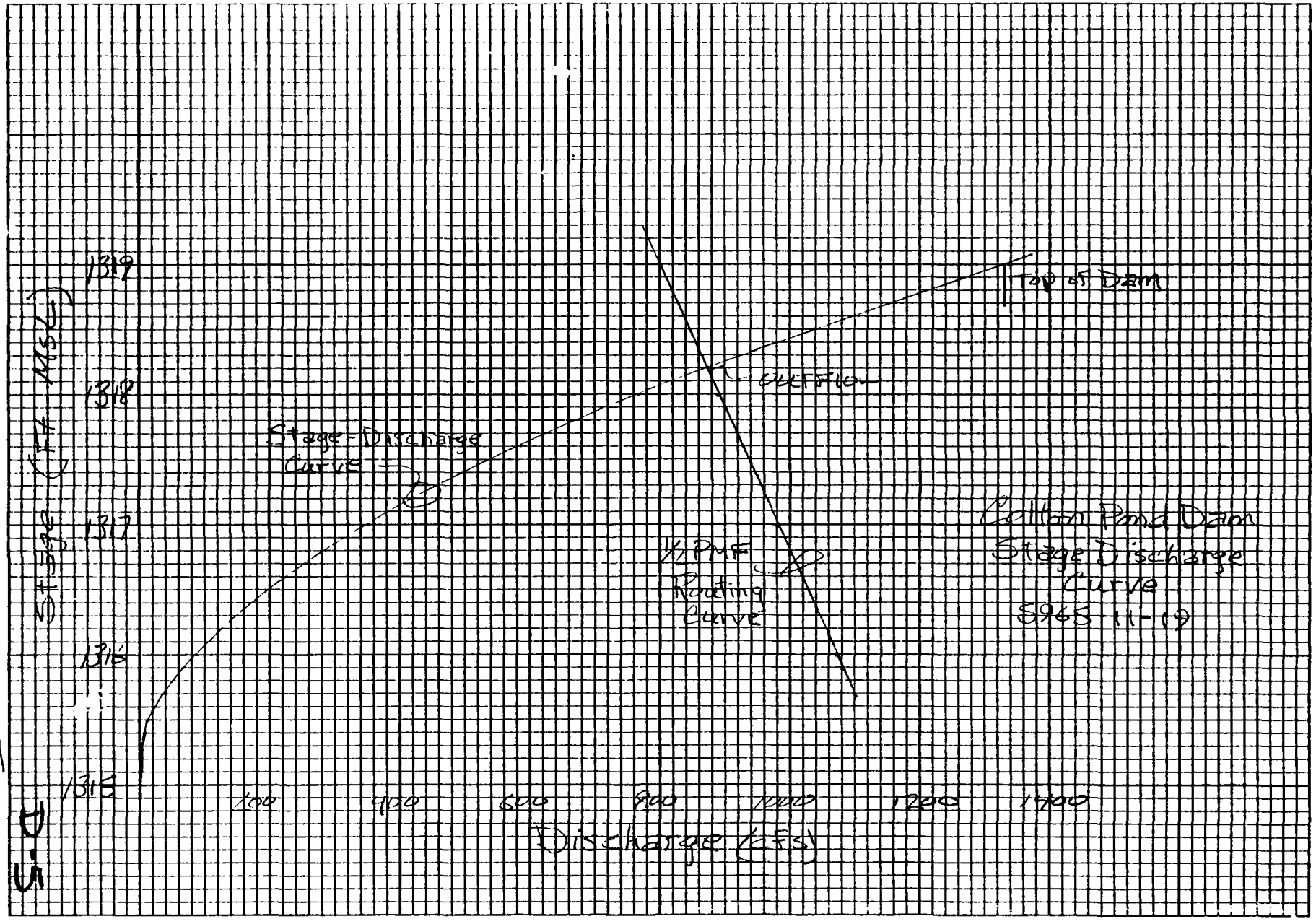

Top of Dam
Overflow
Stage-Discharge Curve
½ PMF Routing Curve
Cotton Pond Dam
Stage Discharge Curve
5965 11-19
Stage (Ft MSL)
1319
1318
1317
1316
1315
100
400
600
800
1000
1200
1400
Discharge (cfs)

Figure 1

HNTB HOWARD NEEDLES TAMMEN & BERGENDOFF	Made by RV	Date 9/17/79	Job No. 5965-11-19
	Checked by	Date	Sheet No. 5
For Colton Pond			

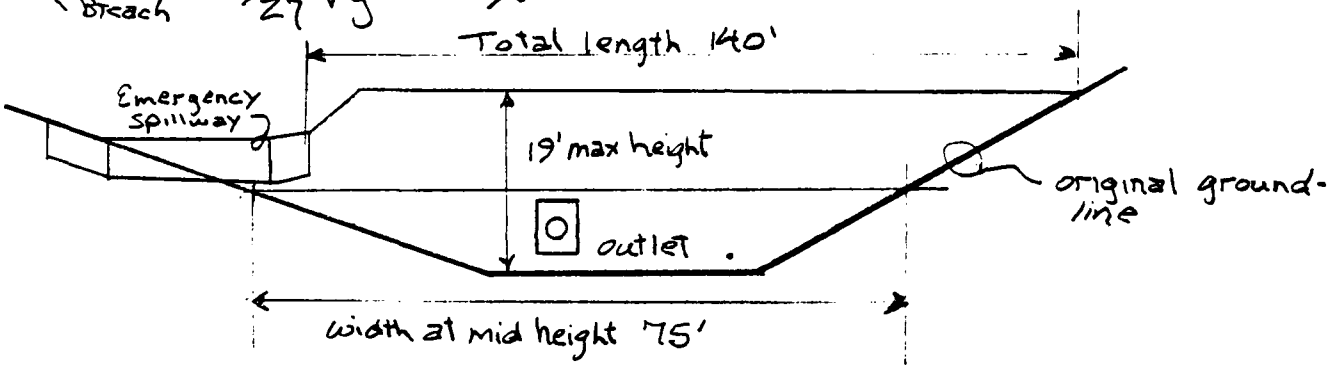
Estimate of Downstream Damage

Step 1 Reservoir Storage

Normal Pool	elev.	1315.0 (954)
	storage	210 acre-ft
Maximum Pool	elev	1319.0 (958)
	storage	330 acre-ft

Step 2 Breach Discharge

$$Q_{Breach} = \frac{8}{27}\sqrt{g}\, w_o\, y_o^{3/2}$$



w_o = 40% of dam length at mid height = 40 × 75

y_o = max height top to streambed 19 ft

$$Q_{Breach} = \frac{8}{27}\sqrt{g}\,(.4)(75)(19)^{3/2} = 4170 \text{ cfs}$$

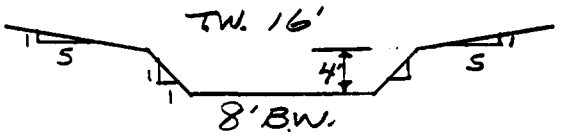
Discharge Emergency Spillway say 1300

5470 cfs

- 5470 cfs

HNTB HOWARD NEEDLES TAMMEN & BERGENDOFF	Made by RY	Date 9/17/79	Job No. 5965-11-19
	Checked by	Date	Sheet No. 6
For Colton Pond			

Step 3 Stage-Discharge



Channel Characteristics

Reach length 1700'

Channel slope = .0242 ft/ft

$n_{channel}$ = .04

n_{Banks} = .08

Stage-Discharge

2 ft	150 cfs
4 ft	510 cfs
5	830
6	1250
7	1790
8	2460
9	3280
10	4260
11	5410
12	6760

Step 4 Reach Outflow

Q_{P_1} = 5470 cfs L = 1700 feet S = 330 acre ft

Stage 1 = 11.05' Area 409 □'

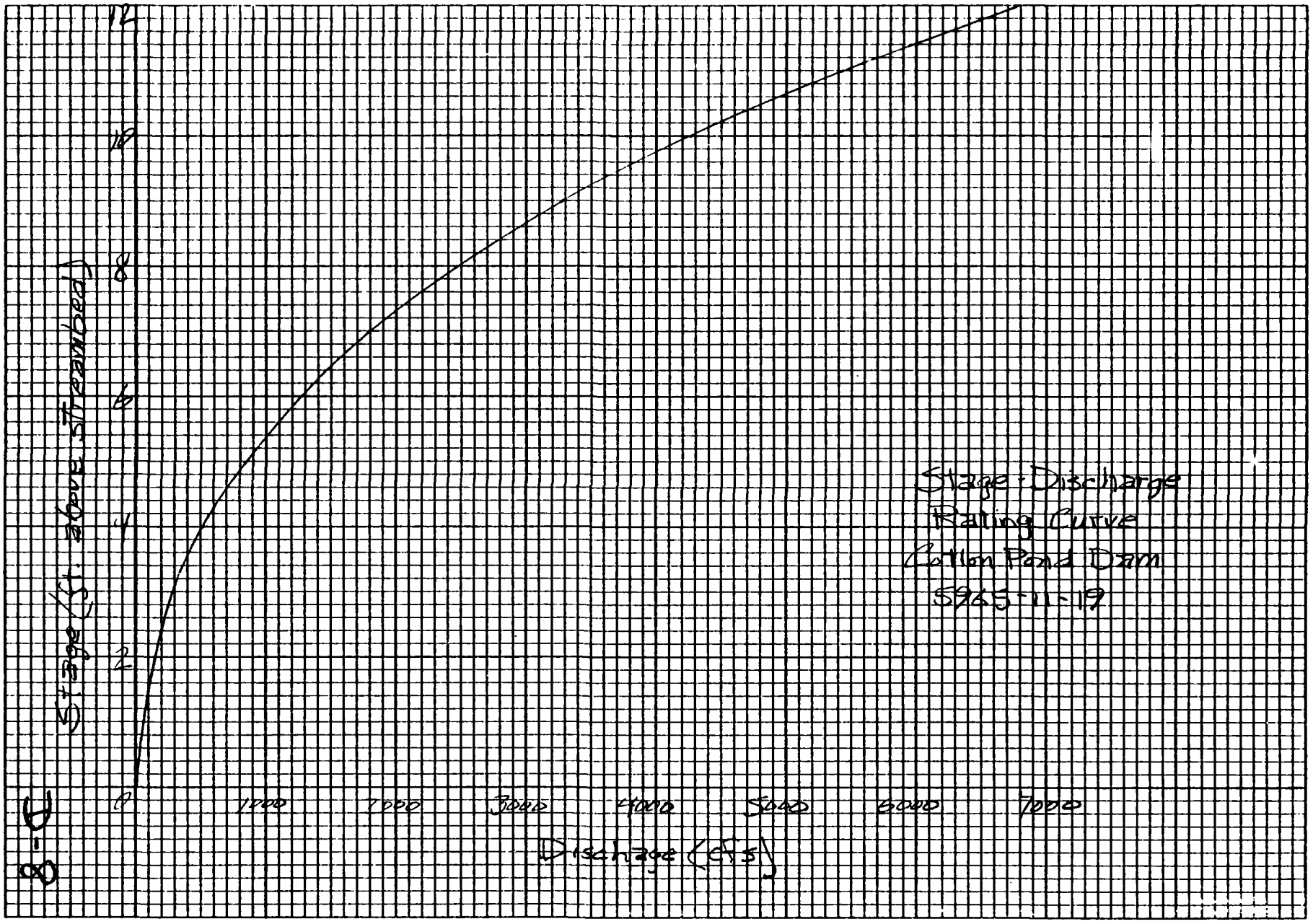
$$V_1 = \frac{1700' \times 409\,\square'}{43560} = 16 \text{ acre ft} < \frac{330}{2}$$

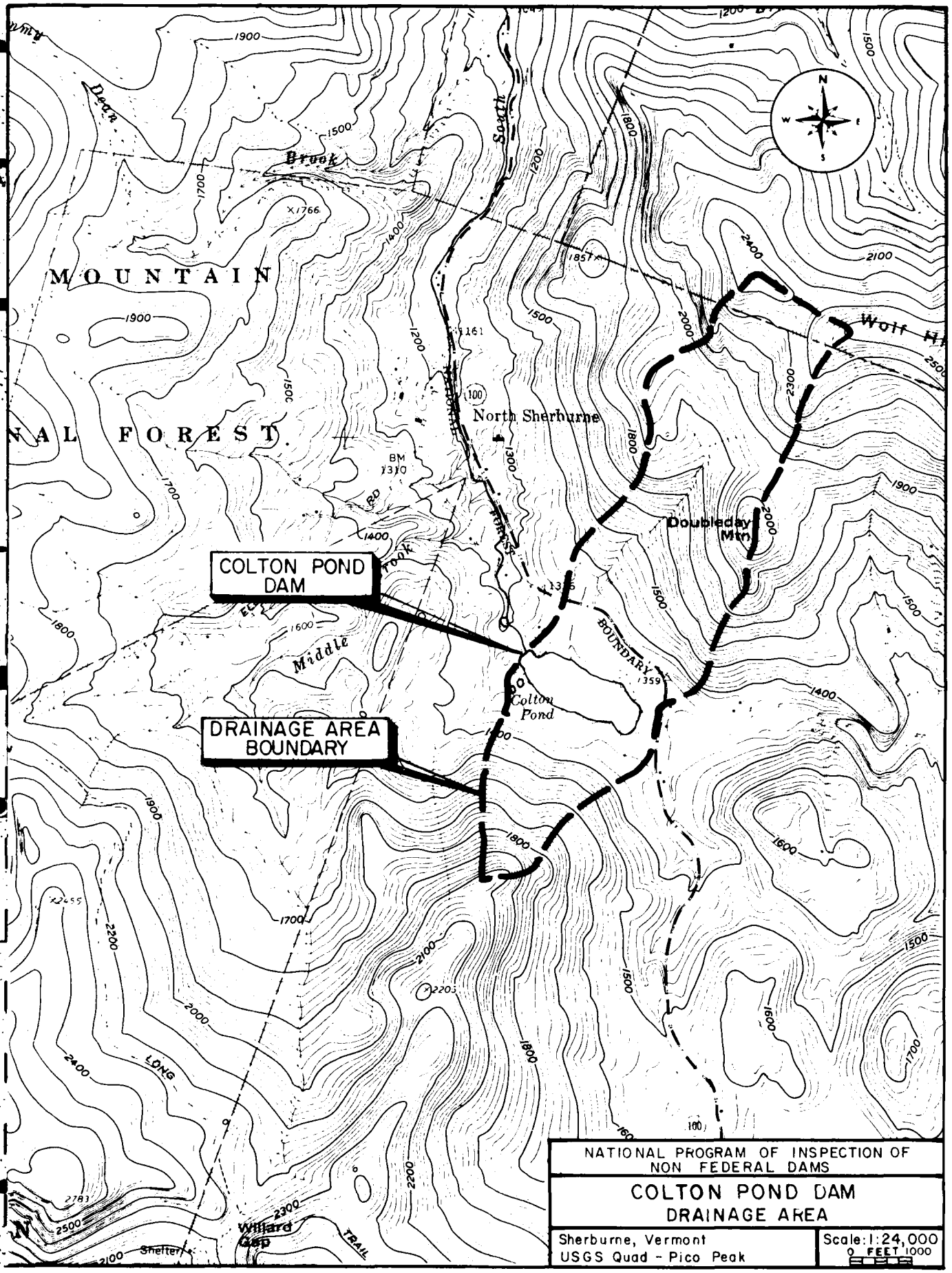
$$Q_{P_{RT}} = 5470\left(1 - \frac{16}{330}\right) = 5200 \text{ cfs}$$

Stage 2 10.8' ~ Channel storage has little effect on flood wave

$Q_{d.s.}$ = 5400 cfs Stage 11.0 ft

BRUNING 40-8500 MADE IN U.S.A.



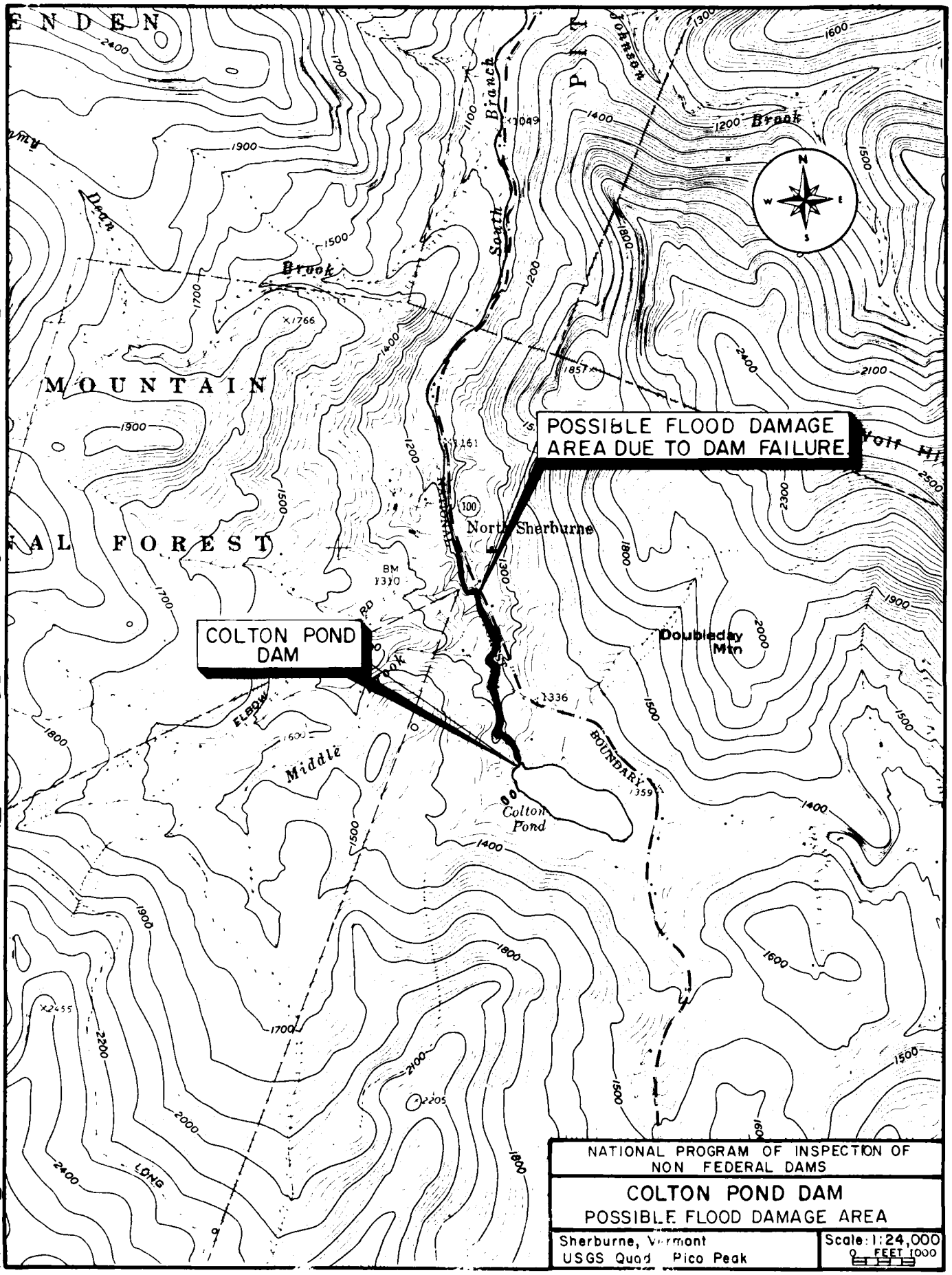


NATIONAL PROGRAM OF INSPECTION OF NON FEDERAL DAMS

COLTON POND DAM
DRAINAGE AREA

Sherburne, Vermont
USGS Quad - Pico Peak

Scale: 1:24,000
0 FEET 1000



NATIONAL PROGRAM OF INSPECTION OF NON FEDERAL DAMS

COLTON POND DAM

POSSIBLE FLOOD DAMAGE AREA

Sherburne, Vermont

USGS Quad Pico Peak

Scale: 1:24,000

0 FEET 1000

APPENDIX E

INFORMATION AS CONTAINED IN THE NATIONAL INVENTORY OF DAMS

END

FILMED

8-85

DTIC