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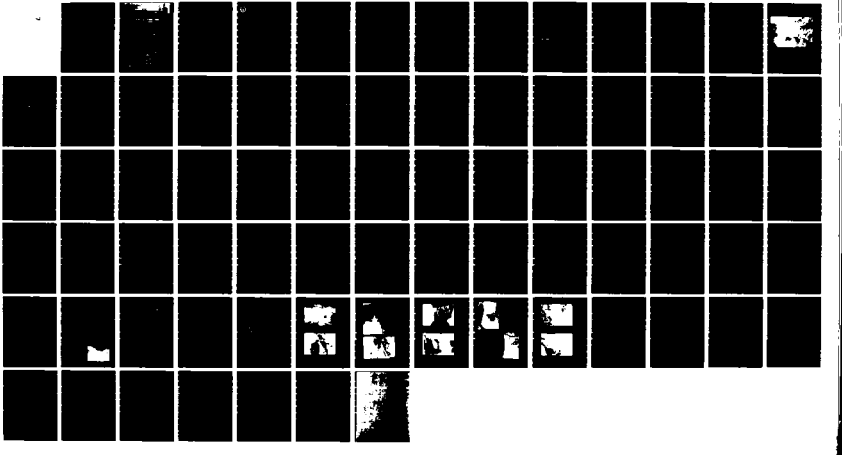

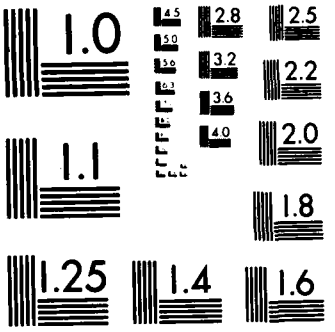

WHEELER POND DAM
CT 00239

PHASE 1 INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

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

SEPTEMBER 1978

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

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Cover program reads: Phase I Inspection Report, National Dam Inspection Program; however, the official title of the program is: National Program for Inspection of Non-Federal Dams; use cover date for date of report.

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

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Thames River Basin
Montville,Conn.

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

Wheeler Pond Dam is a masonry structure constructed in the early 1800's. The dam has a maximum height of 20.0 ft. and is approx. 54.0 ft. long. Based upon the visual inspection at the site, the lack of engineering back-up data available, and no operational or maintenance evidence, there are areas of concern which must be corrected to assure the long term performance of this dam. The dam is considered to be in fair condition with the following visible signs of concern: the inoperable lower gate, poor condition of the mill intake and the obstructed downstream channel.

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DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02154

REPLY TO
ATTENTION OF:

NEDED

OCT 26 1978

Honorable Ella T. Grasso
Governor of the State of Connecticut
State Capitol
Hartford, Connecticut 06115

Dear Governor Grasso:

I am forwarding to you a copy of the Wheeler Pond Dam Phase I Inspection Report, which was prepared under the National Program for Inspection of Non-Federal Dams. This report is presented for your use and is based upon a visual inspection, a review of the past performance and a brief hydrological study of the dam. A brief assessment is included at the beginning of the report. I have approved the report and support the findings and recommendations described in Section 7 and ask that you keep me informed of the actions taken to implement them. This follow-up action is a vitally important part of this program.

A copy of this report has been forwarded to the Department of Environmental Protection, the cooperating agency for the State of Connecticut. In addition, a copy of the report has also been furnished the owner, Mr. T. Wisniewski, 996 Norwich Turnpike, Uncasville, Connecticut 06382.

Copies of this report will be made available to the public, upon request, by this office under the Freedom of Information Act. In the case of this report the release date will be thirty days from the date of this letter.

I wish to take this opportunity to thank you and the Department of Environmental Protection for your cooperation in carrying out this program.

Sincerely yours,

JOHN P. CHANDLER
Colonel, Corps of Engineers
Division Engineer

Incl
As stated

WHEELER POND DAM

CT 00239

THAMES RIVER BASIN
MONTVILLE, CONNECTICUT

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

NATIONAL DAM INSPECTION PROGRAM

PHASE 1 - INSPECTION REPORT

IDENTIFICATION NO.: CT 00239

NAME OF DAM: WHEELER POND DAM

TOWN: MONTVILLE

COUNTY AND STATE: NEW LONDON COUNTY, CONNECTICUT

STREAM: OXOBOXO BROOK

DATE OF INSPECTION: 15 JUNE, 1978

BRIEF ASSESSMENT

Wheeler Pon Dam is a masonry structure constructed in the early 1800's. The dam has a maximum height of 20.0 feet and is approximately 54.0 feet long. It is comprised of a 21.0 foot concrete ogee spillway at the left abutment and a 33.0 foot vertical masonry wall at the right abutment. The outlet works at the left abutment is a system of intake chambers and valve pits which withdraw a supply of process water for the adjacent mill complex. There are no plans, specifications, or computations available from the Owner, County, or State offices regarding the design, construction or repairs of this dam.

Due to its age, Wheeler Pond Dam was neither designed nor constructed by approved state of the art methods. Based upon the visual inspection at the site, the lack of engineering back-up data available, and no operational or maintenance evidence, there are areas of concern which must be corrected to assure the long term performance of this dam. The dam is considered to be in fair condition with the following visible signs of concern: the inoperable, low-level spillway gate, the poor condition of the mill intake and by-pass chamber and valve pit system now used for the control of water levels in the pond, the obstructed downstream channel and the apparent lack of maintenance of the dam and its appurtenances.

Hydraulic analyses indicate that the existing spillway can discharge a flow of 934 cubic feet per second (cfs) at Elevation (El.256.0) top of dam. A spillway design test flood of 6995 cfs (one half of the probable maximum flood) will overtop the dam by approximately 6.92 feet. In the improbable event of overtopping, complete failure of the dam could occur. Due to the potential for overtopping, it is recommended that a definite plan for surveillance and a warning system be developed for use during periods of unusually heavy rains and runoff.

It is recommended that the Owner engage the services of an engineer experienced in the design of dams to analyze the freeboard requirements with respect to the spillway design test flood and institute corrective measures to reduce the overtopping potential and improve the spillway capacity. Other action to be undertaken by the Owner should include the rehabilitation of the mill intake and by-pass chamber and valve pit system in order to control the water surface levels, restoration of the low level spillway gate to improve regulation of the pond levels, development of a regular program of maintenance and inspection, clearance of the dam site and downstream channel of debris and vegetal growth and preparation of an emergency action plan.

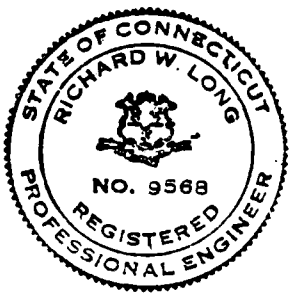
The above recommendations should be implemented within one to two years after receipt of the Phase I Inspection Report. The alternatives to these recommendations would be draining the reservoir and maintaining the water surface at a reduced level.

C-E MAGUIRE, INC.

by

Richard W. Long

Richard W. Long, P.E.
Vice President



This Phase I Inspection Report on Wheeler Pond 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

SEP 21 [illegible]

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 investigation, 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 otherwise be 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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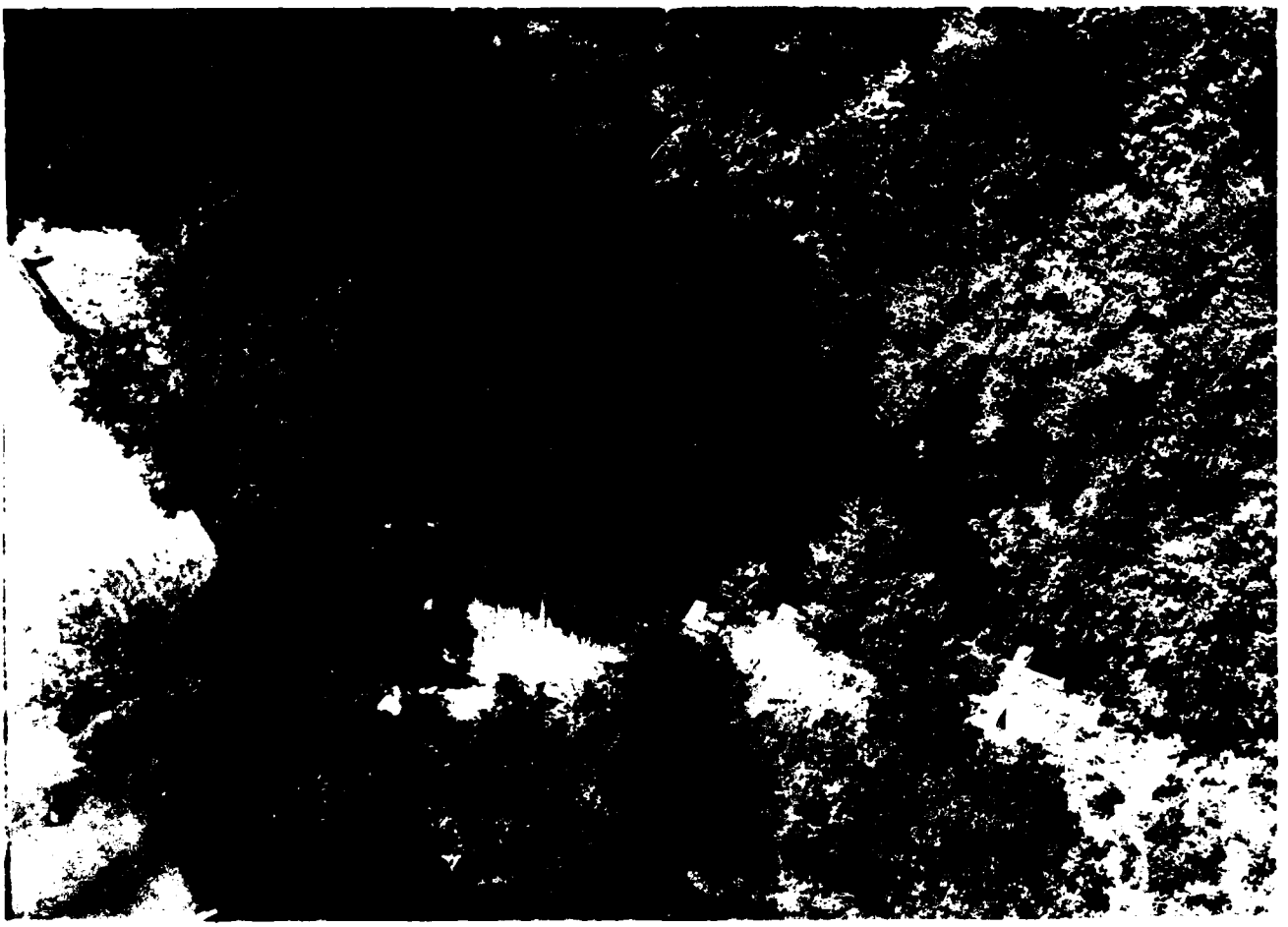
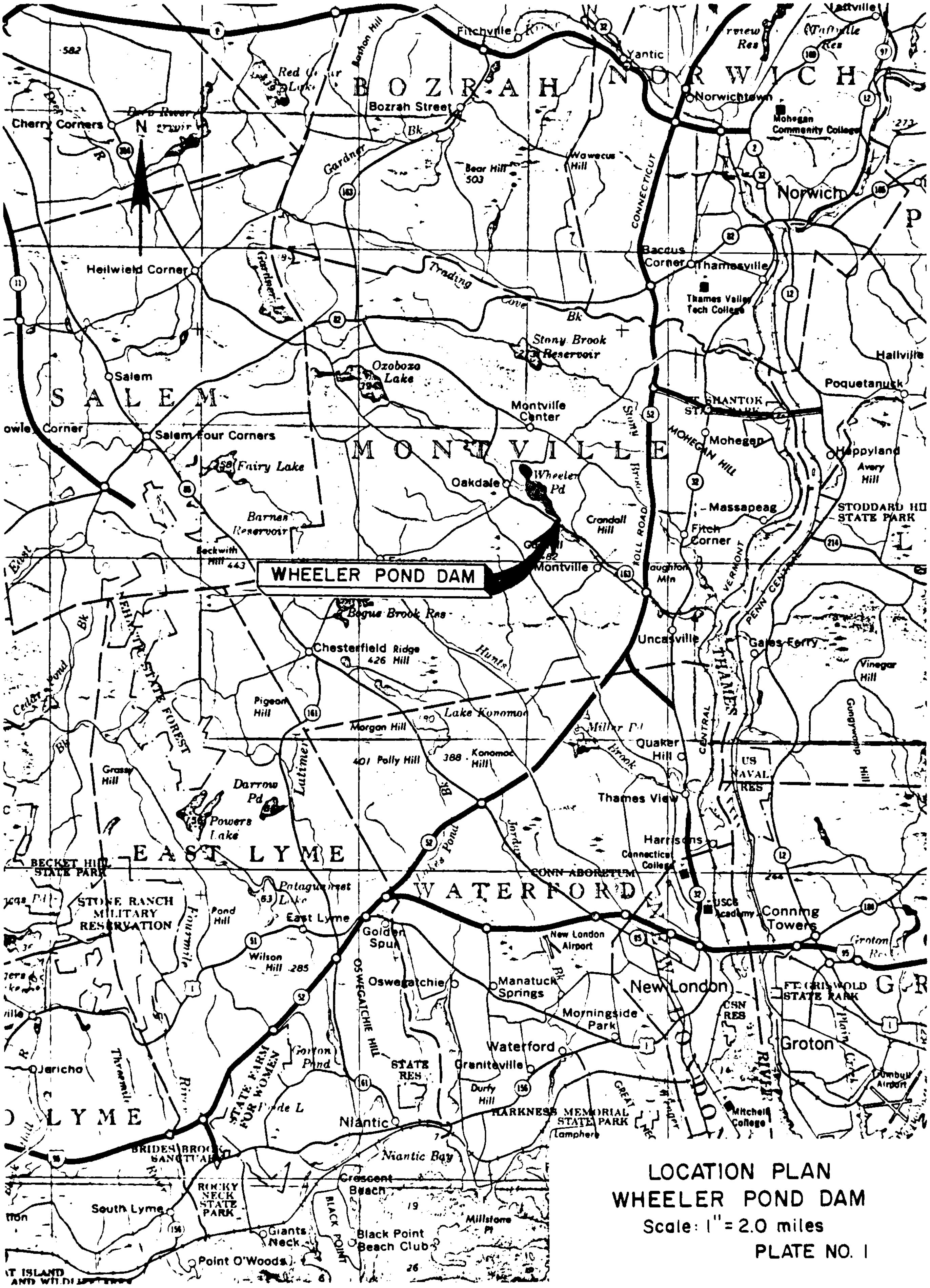


C-1 WHEELER POND DAM - LOOKING UPSTREAM



LOCATION PLAN
WHEELER POND DAM
Scale: 1" = 2.0 miles
PLATE NO. 1

NATIONAL DAM INSPECTION PROGRAM
PHASE 1 INSPECTION REPORT

WHEELER 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. C-E Maguire, Inc. has been retained by the New England Division to inspect and report on selected dams in the State of Connecticut. Authorization and notice to proceed was issued to C-E Maguire, Inc. under a letter of 26 April, 1978 from Ralph T. Garver, Colonel, Corps of Engineers. Contract No. DACW33-78-C-0300 has been assigned by the Corps of Engineers for this work.

b. Purpose:

(1) 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) Encourage and assist 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: Wheeler Pond is located in the Oxoboxo Brook watershed of the Thames River Basin, approximately 1.0 mile northeast of Montville along Route 163, in New London County. Wheeler Pond has a surface area of 92.0 acres and drains a watershed of 9.09 sq. miles. The watershed is rural in character with rolling hills of woodland and swamps. The pond is oblong in shape and aligned in an approximate north-south axis with the dam located at the most southerly point.

b. Description of Dam and Appurtenances:

Wheeler Pond Dam is a masonry structure approximately 54.0 ± ft. long (including spillway) with a maximum height of about 20.0 ft. above streambed at the centerline of the dam. A concrete ogee spillway section 21.0 ft. long forms the left abutment of the crest section. The spillway crest elevation of the dam is 253.0 National Vertical Geodetic Datum (NGVD). The dam is located at a point where the valley is narrow and the bedrock forms steep abutments. The outlet works consists of a low level vertical slide gate located at the right abutment.

The dam provided process water for the Federal Paperboard Company located adjacent to the facility. Process water was withdrawn from the pond at the left abutment through an intake chamber and flowed through a 16" diameter steel pipe to the mill. Gated wet well chambers also located at the left abutment regulated the flow to the mill or the quantity to be by-passed and released downstream

of the dam (See Sketch Appendix B). The dam is presently used to store supplemental process water supply for the Connecticut Paperboard Company located downstream at the confluence of Oxoboxo Brook and the Thames River.

c. Size Classification: The dam is classified as intermediate in size because its impoundment capacity at spillway crest elevation is equal to 1000 Ac-Ft. which is the lower limit for that category under the Recommended Guidelines for Safety Inspection of Dams.

d. Hazard Classification: The dam is a significant hazard potential category structure because it is located in a predominantly rural or agricultural area where failure may damage isolated homes, secondary highways or cause interruption of use or service of public utilities.

e. Ownership: Records are not clear as to the early ownership of the dam, however, it is known that a Mr. T. Wisniewski, 996 Norwich Turnpike, Uncasville, 06382, its present owner,

purchased the dam in 1971 from the Federal Paperboard Company. The flowage and water rights are owned and controlled by the Connecticut Paperboard Company and used for process water supply at their downstream facility.

f. Operator: Mr. L. Duchemin, Maintenance Supervisor
Connecticut Paperboard Company
Uncasville, Connecticut
(203)-848-0681 home
(203)-848-1500 business

g. Purpose of the Dam: The dam is used to store a supplemental supply of process water for the Connecticut Paperboard Company located downstream primarily, with some limited recreational use.

h. Design and Construction History: No data is available regarding design or construction.

i. Normal Operating Procedures: Gates at Wheeler Pond Dam, normally, are not regulated during the year with the exception of the mill process water intake. This intake is opened in the spring slightly to provide a supply to the sprinkler system of the abandoned Federal Paperboard Company complex.

1.3 PERTINENT DATA

a. Drainage Area: The Wheeler Pond Dam drainage basin located in New London County, Connecticut is generally triangular in shape oriented in a northwest-southeast axis. The basin is approximately 3.4 miles in length with an average width of 2.0 miles and a total drainage area of 9.09 sq. miles. The topography is generally rolling hills with swamp areas providing natural storage. Elevations range from a high of 600.0 NGVD to the spillway crest at 253.0 with basin slopes of a flat to moderate degree. Upstream natural and manmade storages include Oakdale, Schofield and Paris Pond and Oxoboxo Lake. Oxoboxo Lake Dam located in the upper reach of the basin controls 3.29 sq. miles of watershed. These storages tend to delay and dampen the peak runoff flowing to Wheeler Pond. The drainage basin is mainly undeveloped, wooded and agricultural in character. A general basin map is shown in Appendix D.

b. Discharge at Damsite: The peak and shape of the inflow hydrograph is appreciably modified by

storages located upstream from Wheeler Pond Dam. The adopted spillway design flood (1/2 PMF) is equal to 830 csm or 7545 CFS and 6995 CFS as inflow and outflow values respectively. (See Appendix D) A flood of 100 year recurrence interval will be approximately 2200 CFS and 2126 CFS as inflow and outflow, respectively. No discharge records are maintained for this dam. Other discharge values are listed below:

1. Outlet works (conduits) size 2'-6"x2'-6" and Invert El. 242.60.
2. Maximum known flood at damsite - unknown.
3. Overflow spillway capacity at maximum pool elevation 934.0 CFS @ El. 256.0.
4. Gated outlet capacity at normal pool elevation 105.0 CFS @ El. 253.0 and tailwater El. 235.0.
5. Gated outlet capacity at maximum pool elevation 121 CFS @ El. 256.0.
6. Total discharge capacity at maximum pool elevation 1055 CFS @ El. 256.0.

c. Elevations (ft. above MSL)

1.	Top Dam	256.0
2.	Maximum pool-design surcharge	3.0 feet with no freeboard

3.	Full flood control pool	256.0 with no free-board
4.	Recreation pool	253.0
5.	Spillway crest	253.0
6.	Upstream invert of Intake Structure	242.60
7.	Streambed at center-line of dam	233.0 - 232.0
8.	Maximum tailwater	Not computed

d. Reservoir (Feet)

1.	Length of maximum pool	6150
2.	Length of recreation pool	6150
3.	Length of flood control pool	6150

e. Storage (acre-feet)

1.	Recreation pool	1000
2.	Flood control pool	276
3.	Design surcharge	276
4.	Top of dam	1276

5. Flood control pool of 276 Ac-Ft represents 0.57 inches of runoff from its drainage area of 9.09 sq. miles.

f. Reservoir Surface (acres)

1.	Top dam	92.0
2.	Maximum pool	92.0

3.	Flood-control pool	92.0
4.	Recreation pool	92.0
5.	Spillway crest	92.0
6.	One foot of surcharge represents 0.19 inches of runoff from its drainage area of 9.09 square miles.	

g. Dam

1.	Type	Stone masonry and concrete
2.	Length	33.0 ft. stone masonry + 21.0 ft. concrete
3.	Height	20.0
4.	Top Width	5.0
5.	Side Slopes	Vertical Face Masonry
6.	Zoning	N/A
7.	Impervious Core	N/A
8.	Cutoff	N/A
9.	Grout Curtain	N/A
10.	Other	N/A

h. Spillway

1.	Type	Overflow uncontrolled
2.	Length of Weir	Total length 54.0 21.0 ogee type + 33.0 free overfall type

3.	Crest elevation	253.0
4.	Gates	Vertical Slide Gate (Inoperable)
5.	U/S Channel	Curved Natural Bed
6.	D/S Channel	Stony Natural Bed and Bed Rock
7.	General	N/A

i. Regulating Outlets

1.	Invert	242.6
2.	Size	2.6'x2.6'
3.	Description	Manually operated vertical
4.	Control Mechanism	Slide Gate located on spillway of dam. Inoperable on the day of inspection.
5.	Other	---

SECTION 2

ENGINEERING DATA

2.1 DESIGN

No engineering data for this dam is available.

2.2 CONSTRUCTION

No record of the construction or repairs, if any, exist.

2.3 OPERATION

No records of the operation of this facility have been maintained.

2.4 EVALUATION

a. Availability: No specific information is available to permit evaluation of design parameters and construction practices employed.

b. Adequacy: Available data is inadequate. Design parameters must be assumed.

c. Validity: Validity of limited data must be verified.

SECTION 3

VISUAL INSPECTION

3.1 FINDINGS

a. General: The dam is utilized only as an auxilliary supply of process water for downstream use and therefore not being actively used appears to be neglected and poorly maintained. Brush and trees overgrow the structure, gates are leaking

and inoperable and valve chambers are open, filled with debris and subject to vandalism. Access to the dam and its appurtenances is not restricted and hence the damsite suffers from misuse. The intake chamber and by-pass valve pit system is filled with debris and the valves are leaking. The appearance of the dam is poor and its condition is deteriorating.

b. Dam: The dam is located in a quartzite valley which appears to have had two channels. The deeper channel is now occupied by the dam.

The dam appears to be founded on bedrock, and both abutments are quartzite. The bedrock bedding strikes parallel to the dam crest and dips about 45° toward the reservoir. One joint set strikes about N60°E and dips 40° to 70°s. A conjugate joint set strikes about N15°W and dips 57° to 84°W. All bedrock jointing appears to be tight with no leaks observed.

The downstream face of the dam appears to have significant seepage exiting through the joints in the dry masonry face. Other joints appear open but are not leaking.

The joints in the bedrock abutments are tight and show no signs of seepage downstream of the dam. However, one block of bedrock in the right abutment just downstream of the dam appears to be loosening.

c. Appurtenant Structure: The ogee spillway section of the dam appeared to be inadequate in size. Freeboard for the structure, as observed, was minimal.

The low level sluice gate (outlet works) in the vertical masonry section of the dam was closed and inoperable. The access bridge to the gate control was badly weathered and in disrepair.

The right abutment training wall has settled with stones dislodged and loosened.

The mill process water intake and by-pass system is severely neglected. It consists of uncovered pits with leaking valves, valve chambers filled with debris and rubbish, stop logs and trash racks rotted or broken and the adjacent terrain overgrown with brush and trees. Continued deterioration and neglect of this mill intake and by-pass system will lead to loss of regulation of the reservoir levels with subsequent detrimental effects on the dam.

d. Reservoir Area: Generally, the pond shoreline is heavily wooded with moderately to steep sided terrain. The heavy growth should preclude the occurrence of slides or sloughs and subsequent sedimentation. However, this heavy growth adjacent to the dam and mill intakes could cause clogging if not monitored periodically.

The intake and approach channel to the mill was filled with leaves and debris and seriously restricted in operation.

e. Downstream Channel: The downstream channel is naturally winding and confined but is now additionally restricted with debris and vegetative overgrowth. The 12.0 ft. high stone wall on the right side of the downstream channel has collapsed over a length of 6.0 ft. A 4 to 5 inch diameter tree is now growing in the zone from which the stones collapsed.

The spillway channel is a natural bedrock streambed. Trees up to 5.0 inches in diameter overhang the channel.

3.2 Evaluation

a. The seepage exiting from the downstream face of the dam does not appear to adversly effect the stability of the dam.

b. The potential exists for an additional collapse of the wall on the right side of the downstream channel. A further collapse of this wall could severely effect the foundations of the adjacent mill.

c. The non-functioning of the low level sluice gate at the right abutment directly effects the draw-down capabilities of the dam's operation.

d. The poor, deteriorated condition of the mill intake and by-pass system could lead to its mal-function and hence loss of control of water surface levels at the dam.

SECTION 4

OPERATIONAL PROCEDURES

4.1 Procedures

Wheeler Pond Dam water surface levels are not regulated. The storage is maintained as a supplemental supply for downstream use. Gates remain closed and generally

unused. In the spring, the intake to the abandoned Federal Paperboard Company complex adjacent to the dam, is opened slightly to provide a supply of water to the sprinkler system. No formal operational procedures are followed for this facility.

4.2 Maintenance of Dam

The dam is not maintained. Its condition warrants an active program of rehabilitation to insure its continued service.

4.3 Maintenance of Operating Facilities

Operating facilities at the dam are neglected with gates and valves inoperable or partially impaired in use. Valve pits are open and filled with trash and debris and in generally poor condition. Lack of maintenance of these facilities is apparent.

4.4 Description of Any Warning System in Effect

No formal warning system is used. Personnel at the Connecticut Paperboard Company who control the water rights at the dam, monitor local weather forecasts for the approach of high intensity storms. No inspection or monitoring program for the dam is in effect or emergency action plan to reduce or minimize the effects of downstream damages in the event of an emergency situation.

4.5 Evaluation

Operational and maintenance procedures for this dam have not been developed or followed. In view of the neglected condition of this dam and its appurtenances, it is important that the Owner institute a monitoring and a regular inspection program as soon as practicable. An operational procedure to follow in the event of an emergency should also be adopted.

SECTION 5

HYDRAULIC/HYDROLOGY

5.1 Evaluation of Features

a. Design Data: No specific design data is available. In lieu of existing information, U.S.G.S. topographic mapping was used to develop several hydraulic and hydrologic parameters. Storage at crest elevation in the pond was estimated in the absence of elevation-storage graphs. Outflow for the Spillway Test Flood inflow was developed according to Corps of Engineers guidelines assuming the pond level at spillway crest (See Appendix D). Some pertinent hydraulic design data was obtained for the spillway and outlet works by field measure-

INFLOW, OUTFLOW AND SURCHARGE DATA

FREQUENCY IN YEARS	24-HOUR TOTAL RAINFALL IN INCHES	24-HOUR* EFFECTIVE RAINFALL IN INCHES	MAXIMUM INFLOW IN C.F.S.	MAXIMUM** OUTFLOW IN C.F.S.	SURCHARGE STORAGE IN FEET	SURCHARGE STORAGE ELEVATION
10	5.0	2.6	1240	1160	3.80	256.80
50	6.5	4.1	1960	1870	5.20	258.20
100	7.0	4.6	2200	2126	5.34	258.34
1/2 MPF	11.9	9.5	7545	6995	9.92	262.92
TEST FLOOD = M.P.F.	21.4	19.0				

*Infiltration assumed as 0.1"/hour

**Lake assumed initially full at spillway crest elevation 253.0 (Top of dam = 256.0.)

NOTES:

1. Q_{10};Q_{50};Q_{100}; inflow discharges computed by approximate methodology of Soil Conservation Service.
2. 1/2 MPF and "test flood" computation based on COE instructions and guidelines.
3. Maximum capacity of spillway without overtopping the top of the dam elevation 256 is equal to 934 C.F.S.
4. All discharges indicated are dependent upon the continued integrity of upstream storage reservoirs.
5. Surcharge storage is allowed to overtop the dam when exceeding the spillway capacity.

ment during the visual inspection. Due to lack of downstream data, the dam failure profile was not calculated but an approximation was made of the depth of normal flow due to the failure of the dam. Surcharge storage and overtopping were calculated assuming that the Wheeler Pond surface area remained constant above the spillway crest elevation.

b. Experience Data: No historial data for discharges or water levels have been recorded for Wheeler Pond Dam.

c. Visual Observations: The following detrimental items were observed or calculated requiring analysis and correction.

1. The freeboard allowance is inadequate.

2. The natural downstream channel is overgrown and obstructed with loose rock and debris.

3. The low level spillway gate is inoperable.

4. The access bridge to the spillway gate is in serious disrepair. It should also be noted that the spillway gate bridge will act as a debris collector and should be periodically inspected.

5. The process water system of intake and valve chambers needs cleaning and rehabilitation.

6. Vegetation must be cleared and maintained from the dam and adjacent areas.

d. Overtopping Potential: Wheeler Pond Dam will not pass the recommended spillway design flood (1/2 PMF) without overtopping the dam, and therefore the spillway capacity is inadequate. The maximum spillway discharge capacity is equal to 934 c.f.s. without overtopping which represents 14% of the "Test Flood" outflow discharge of 6995 cfs. The spillway capacity is judged as serious, since inadequate freeboard for even lesser storm events will cause overtopping of the structure. Wheeler Pond is generally oblong in shape with its axis oriented in a WNW-ESE direction. With a fetch of approximately 6000.0 ft. and a converging channel approach to the dam, wind generated wave surge and ride up have a distinct potential to overtop the structure.

It is estimated that a failure of this dam would cause a failure discharge that would overflow route 163 downstream by approximately 4.0 feet and that water levels in the pond downstream of the highway will, correspondingly, be 3.0 to 4.0 feet higher. Location of this large pond downstream should

quickly dissipate the unsteady flow energy and result in flooding only.

SECTION 6

STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

a. Visual Observations: There were no visual signs of structural instability or distress in the dam at the time of the inspection.

b. Design and Construction Data: No data is available on which to base an evaluation.

c. Operating Records: There are no records of operation available.

d. Post Construction Changes: No data is available regarding construction changes.

e. Seismic Stability: This dam is in seismic zone 1 and hence, does not have to be evaluated for seismic stability, according to the recommended guidelines.

SECTION 7

ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES

7.1 Dam Assessment

a. Condition: Based on examination of available documents and visual inspection of the Wheeler Pond Dam and its appurtenant structures, the dam is judged to be in fair condition. However, there are areas of concern which must be corrected to assure the long term usefulness of this facility.

1. The inoperable low level spillway gate must be restored to service to increase the capacity of the present outlet system and its access bridge upgraded.

2. A detailed examination should be made of the wall on the right side of the spillway as it appears to be potentially unstable and could lead to failure of the foundations of the adjacent mill building and clogging of the downstream channel.

3. The spillway capacity does not satisfy the screening criteria established in the recommended guidelines for the spillway design test flood.

4. Present marginal freeboard allowances can potentially permit overtopping of the structure under moderate storm events and wind conditions.

5. The poor condition of the mill complex intake and by-pass system of chambers and valve pits must be rehabilitated immediately since it is the sole means at present to regulate water levels in Wheeler Pond.

6. Potential clogging of the bridge structure at route 163 exists due to the debris and vegetal growth of the downstream channel.

b. Adequacy of Information: The information available is such that the assessment of the condition of the dam must be based primarily on the visual inspection and the past operational performance of the structure.

c. Urgency: The recommendations and remedial measures outlined below should be implemented within a one to two year period.

d. Necessity for Additional Investigations: Investigations to further assess the adequacy of the dam and its appurtenances are necessary. Sufficient engineering data must be obtained to implement the recommendations listed below.

7.2 Recommendations

a. Facilities: In view of the concerns for the long term condition of Wheeler Pond Dam, and the lack of engineering back-up data, it is recommended that the following measures be undertaken by the Owner:

1. That the Owner obtain the services of an engineer experienced in the design of dams to analyze the freeboard allowance with respect to the Spillway Design Test Flood

criteria and institute corrective measures to reduce the overtopping potential and improve the spillway capacity.

2. Examine and rehabilitate the existing masonry wall at the right abutment of the spillway to prevent damage or collapse of the adjacent mill structure foundation and clogging of the downstream channel of the dam.

7.3 Remedial Measures

1. Alternatives: Alternatives to the recommendations listed above would be to lower the water levels in Wheeler Pond at the approach of high intensity storms or expected rainfall periods to increase the impoundments' capacity for flood control or to consider increasing upstream storage capacity at other facilities to relieve the conditions at Wheeler Pond Dam.

2. Operations and Maintenance Procedures: While the dam is judged to be in fair condition, it is considered extremely important that the following items be attended to as soon as possible:

   a. Immediately institute a program to clear and rehabilitate the intake chamber and valve pit system leading to the abandoned mill complex, in order to maintain control of the water levels at Wheeler Pond.

   b. Drawdown the water level in order that the low level gate at the spillway can be repaired or replaced which will increase the outlet capacity for emergency and repair situations.

c. Remove and dispose the debris and vegetal growth from the dam and its appurtenant structures and the downsteam channel.

d. Develop and implement a regular program of monitoring, inspection and maintenance of the facility.

e. Prepare an emergency action plan to prevent or minimize the impact of dam failure, listing the expedient action to be taken and authorities to be contacted.

APPENDIX A

INSPECTION CHECK LIST

VISUAL INSPECTION CHECK LIST
PARTY ORGANIZATION

PROJECT Wheeler Pond Dam

DATE 14 June 1978

TIME 0930-1500

WEATHER Clear

W.S.ELEV. _____ U.S. _____ D.S.

PARTY:

1. R. Long - C-E Maguire*
2. S. Khanna - C-E Maguire
3. S. Poulos - GEI
4. R. Brown - C-E Maguire
5. K. Dalenberg - GEI
6. T. Wisniewski - Owner
7. H. Beetham - 1st Selectmen
8. W. Staubley - Gate Tender
9. J. Rodgers - Civil Defence
10. A. Reed - C-E Maguire

	PROJECT FEATURE	INSPECTED BY	REMARKS
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

* 2nd inspection 5 August 1978

PERIODIC INSPECTION CHECK LIST

PROJECT Wheeler Pond Dam DATE 14 June 1978

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
DAM	
Crest Elevation	253 NGVD
Current Pool Elevation	253 NGVD
Maximum Impoundment to Date	
Surface Cracks	Not Applicable
Pavement Condition	Not Applicable
Movement or Settlement of Crest	Not Observable
Lateral Movement	None Observed
Vertical Alignment	No misalignment apparent
Horizontal Alignment	
Condition at Abutment and at Concrete Structures	Condition appears good except for loose block of bedrock noted below under sloughing.
Indications of Movement of Structural Items on Slopes	None observed
Trespassing on Slopes	Free access, no difficulties observed.
Sloughing or Erosion of Slopes or Abutments	A block of bedrock several feet in dimension is loose. Block is in right abutment down stream of dam.
Rock Slope Protection - Riprap Failures	None present
Unusual Movement or Cracking at on near Toes	None observed
Unusual Embankment or Downstream Seepage	None observed
Piping or Boils	None observed
Foundation Drainage Features	None apparent
Toe Drains	None
Instrumentation System	None

PERIODIC INSPECTION CHECK LIST

PROJECT Wheeler Pond Dam DATE 14 June 1978

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
DAM (Cont.) Vegetation	None on dam, trees are growing from bedrock abutments. Downstream completely overgrown.

PERIODIC INSPECTION CHECK LIST

PROJECT Wheeler Pond Dam DATE 14 June 1978

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
DIKE EMBANKMENT	NONE

PERIODIC INSPECTION CHECK LIST

PROJECT Wheeler Pond Dam DATE 14 June 1978

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
OUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE	
a. Approach Channel	Natural bed
Slope Conditions	Gradual
Bottom Conditions	Natural bed with weed growth
Rock Slides or Falls	Yes - along right shoreline above gate.
Log Boom	None
Debris	Yes, trees, refuse
Condition of Concrete Lining	Not applicable
Drains or Weep Holes	Not observed
b. Intake Structure	
Condition of Concrete	Not applicable
Stop Logs and Slots	

PERIODIC INSPECTION CHECK LIST

PROJECT Wheeler Pond Dam DATE 14 June 1978

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
OUTLET WORKS - Gate structure on spillway. See note below.	
a. Structural	
General Condition	Poor
Condition of Joints	Open stone masonry
Spalling	None observed
Visible Reinforcing	Not applicable
Rusting or Staining of Concrete	Not applicable
Any Seepage or Efflorescence	Yes, through masonry joints
Joint Alignment	Fair
Unusual Seepage or Leaks in Gate Chamber	Gate not seated - unable to determine extent of leakage.
Cracks	Cannot be observed
Rusting or Corrosion of Steel	Considerable where visible above water line.
b. Mechanical and Electrical	Not applicable
	NOTE: Gate mechanism consists of vertical lift slide gate operated by 6" x 6" timber post with rack and pinion gearing. Gate is inoperable.

PERIODIC INSPECTION CHECK LIST

PROJECT Wheeler Pond Dam DATE 14 June 1978

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
OUTLET WORKS - By-pass gate chambers	
a. Concrete and Structural	
General Condition	Poor, not maintained, open pits partially filled with debris, rusted equipment. See note below.
Condition of Joints	Good
Spalling	None observed
Visible Reinforcing	None observed
Rusting or Staining of Concrete	None observed
Any Seepage or Efflorescence	None observed
Joint Alignment	Not applicable
Unusual Seepage or Leaks in Gate Chamber	None observed
Cracks	None observed
Rusting or Corrosion of Steel	Considerable
b. Mechanical and Electrical	None
	NOTE: Gates, stems, cleanout, trash rack and stop logs in poor condition. Bonnet on gate valve to plant cracked and leaking. Intake filled with debris, stop logs rotten, trash rack useless. Cleanout chamber filled with debris, cleanout burried. All chambers consist of open pits with no covering.

PERIODIC INSPECTION CHECK LIST

PROJECT Wheeler Pond Dam DATE 14 June 1978

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
OUTLET WORKS - TRANSITION AND CONDUIT	Not applicable.

PERIODIC INSPECTION CHECK LIST

PROJECT Wheeler Pond Dam DATE 14 June 1978

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL	
General Condition of Concrete	Not applicable
Rust or Staining	
Spalling	
Erosion or Cavitation	
Visible Reinforcing	
Any Seepage or Efflorescence	
Condition at Joints	
Drain Holes	
Channel	Natural bedrock streambed, heavily overgrown with vegetation and obstructed. Trees up to 5 in. diameter overhang channel. Stone wall on right side of channel, 12 ft. high and 6 ft. in length has collapsed into channel.
Loose Rock or Trees Overhanging Channel	
Condition of Discharge Channel	

PERIODIC INSPECTION CHECK LIST

PROJECT Wheeler Pond Dam DATE 14 June 1978

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS	
a. Approach Channel	
General Condition	Curved with natural bed underwater, one or two feet deep on left side, deepens at outlet gate.
Loose Rock Overhanding Channel	None observed.
Trees Overhanging Channel	Yes, trees up to 4 inch diameter overhang channel.
Floor of Approach Channel	Natural rocky bed with weed growth.
b. Weir	Stone masonry with concrete cap. Spillway is divided into two sections: 1. Concrete ogee overflow. 2. Vertical stone masonry overflow. Some wear noted.
General Condition of Concrete	Concrete portion - good condition, Stone portion - fair condition.
Rust or Staining	None observed.
Spalling	None observed.
Any Visible Reinforcing	None observed.
Any Seepage or Efflorescence	Seepage through open joints of stone masonry observed.
Drain Holes	None.
c. Discharge Channel	
General Condition	Natural bedrock - irregular
Loose Rock Overhanding Channel	Yes - See note "A".
Trees Overhanging Channel	Yes - Up to 5 inch diameter.
Floor of Channel	Natural bedrock.
Other Obstructions	Debris

PERIODIC INSPECTION CHECK LIST

PROJECT Wheeler Pond Dam DATE 14 June 1978

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
"A" Stone wall on right side of channel has caved into channel. Collapsed portion about 12 ft. high and 6 ft. wide. Four to five inch diameter tree now growing in opening.	

PERIODIC INSPECTION CHECK LIST

PROJECT Wheeler Pond Dam DATE 14 June 1978

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
OUTLET WORKS - SERVICE BRIDGE	
a. Super Structure Bearings Anchor Bolts Bridge Seat Longitudinal Members Under Side of Deck Secondary Bracing Deck Drainage System Railings Expansion Joints Paint	Wood access bridge in poor condition. Exposed to severe ice damage heave, etc.
b. Abutment & Piers General Condition of Concrete Alignment of Abutment Approach to Bridge Condition of Seat & Backwall	None

APPENDIX B

1. Listing of Locations for Available Correspondence
2. Copies of Past Inspection Reports
3. Plans, Sections, Details

APPENDIX B-1

No design, construction or maintenance records could be located.

APPENDIX B-2

Water Resources Commission - Supervision of Dams Inventory Sheet dated 25 November, 1964.

7

CT 239

No. MV-30

Inventoried By LWPS

WATER RESOURCES COMMISSION
SUPERVISION OF DAMS
INVENTORY DATA

Date 25 NOVEMBER 1964

Name of Dam or Pond WHEELER POND

Code No. T 9.4 OX 2.9

Nearest Street Location ROUTE 163

Town MONTVILLE

U.S.G.S. Quad. MONTVILLE

Name of Stream OXOBOXO BROOK

Owner ~~FEDERAL PAPER BOARD CO. INC~~ Theodore Wisniewski

Address ~~MONTVILLE~~ Box-326 Uncasville

Long 72-08.5
Lat 41-27.4 PR 7/7

Pond Used For INDUSTRIAL WATER SUPPLY

Dimensions of Pond: Width 800 FEET Length 5000 FEET Area ~~100~~ 91.8 ACRES

Total Length of Dam ~~25~~ 12 FEET Length of Spillway ~~25 FEET~~ 52

Location of Spillway ENTIRE DAM

Height of Pond Above Stream Bed ~~20~~ 21 FEET

Height of Embankment Above Spillway 3 FEET

Type of Spillway Construction CONCRETE, MASONRY

Type of Dike Construction CONCRETE, MASONRY - [illegible]

Downstream Conditions CULVERT UNDER ROUTE 163 AND ROCKLAND POND

Summary of File Data

Remarks SLIGHT LEAKAGE NOTED IN MASONRY PORTION OF DAM

Would Failure Cause Damage? YES Class B

5/14/73

gate is leaking [illegible] [illegible] [illegible] wall [illegible]

wall [illegible] [illegible] [illegible] [illegible] [illegible] (18' [illegible]) [illegible] [illegible]

a second gate [illegible] [illegible] dike

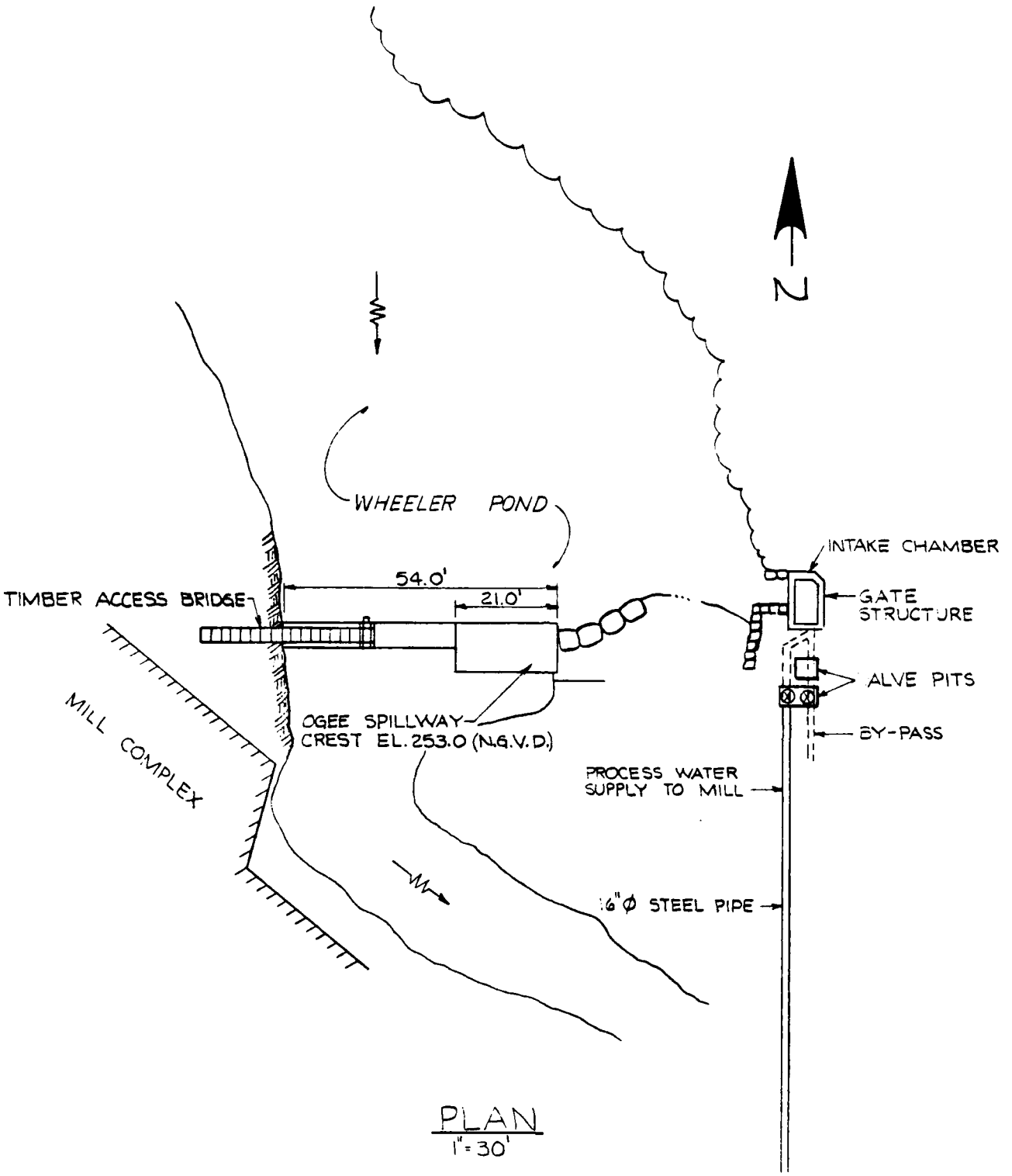
[illegible] [illegible] S. Wilson

10-7-77 - 2" WATER OVER SPWY MADE IT DIFFICULT TO [illegible]

[illegible] MASONRY APPEARS SOUND. SOME [illegible] STARTED

[illegible] [illegible] [illegible] [illegible]

MAR 65



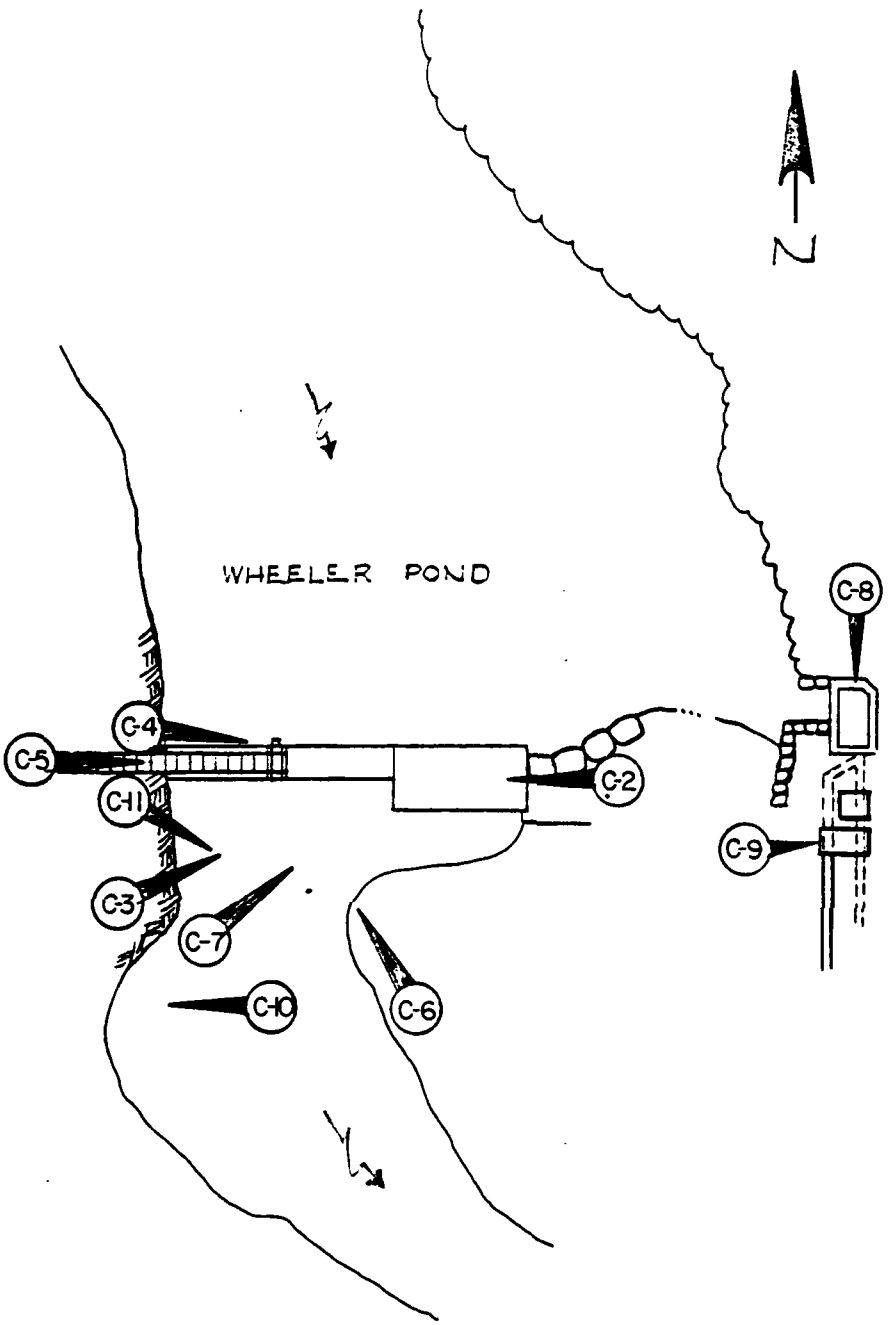
PLAN
1"=30'

WHEELER POND DAM

3-3
1-of-1

APPENDIX C

SELECTED PHOTOS

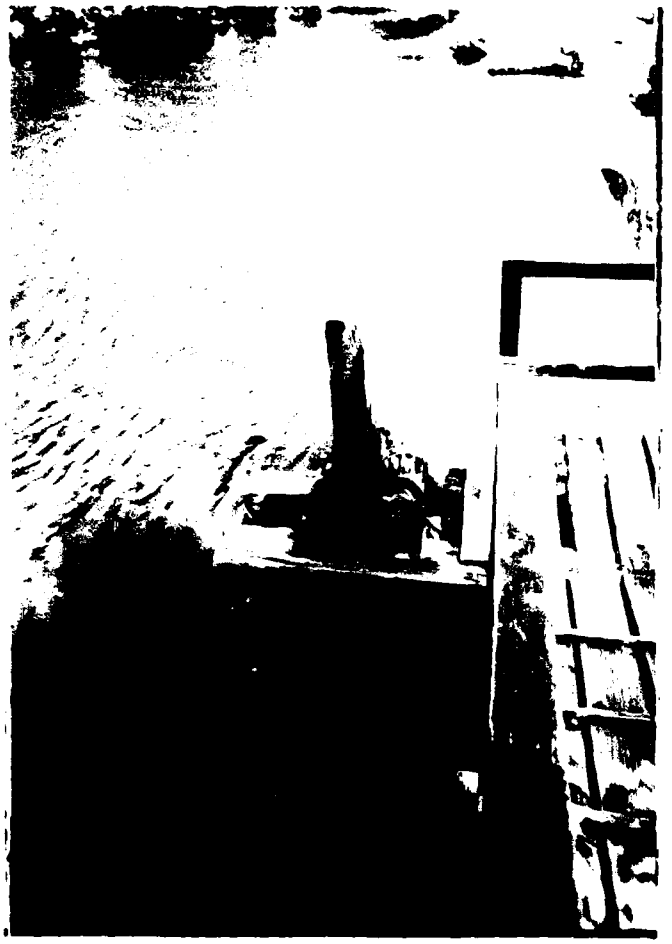


WHEELER POND DAM
PHOTO INDEX

PLATE NO. 2

C-2 SPILLWAY CREST - LOOKING TOWARD RIGHT ABUTMENT
(NOTE: CLOSE PROXIMITY OF MILL BUILDING.)

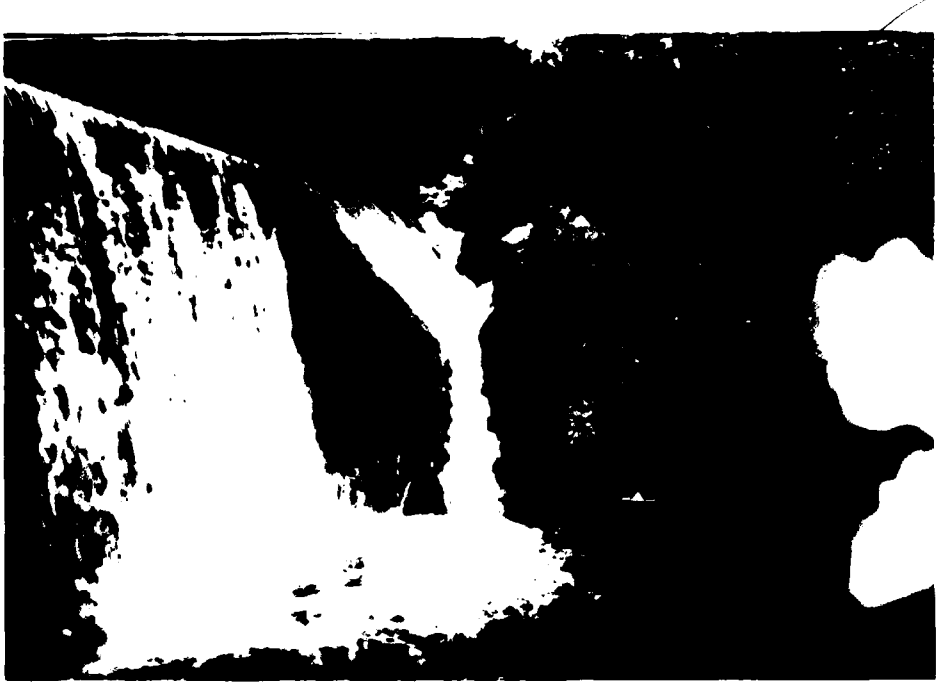
C-3 SPILLWAY CREST - LOOKING TOWARD LEFT ABUTMENT



C-4 OPERATING MECHANISM FOR LOW LEVEL SPILLWAY GATE OUTLET.

C-5 SERVICE BRIDGE LEADING TO OUTLET CONTROL

C-6 DOWNSTREAM FACE OF DAM. (NOTE: DARK AREA BELOW SERVICE BRIDGE - OUTLET GATE OPENING.)

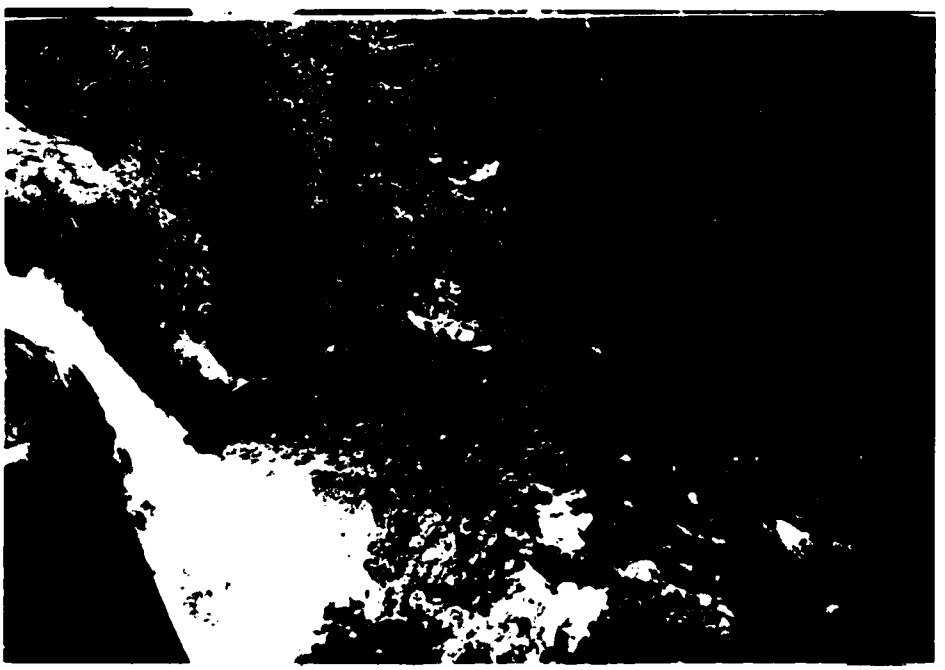


C-7 DOWNSTREAM FACE OF DAM LOOKING TOWARD LEFT ABUTMENT

C-8 UNCOVERED INLET CHAMBER FOR BY-PASS. (NOTE: DEBRIS AND DETERIORATED STOP LOGS IN BACKGROUND.)

C-9 VALVE PIT - FOR PROCESS WATER SUPPLY TO MILL AND BY - PASS

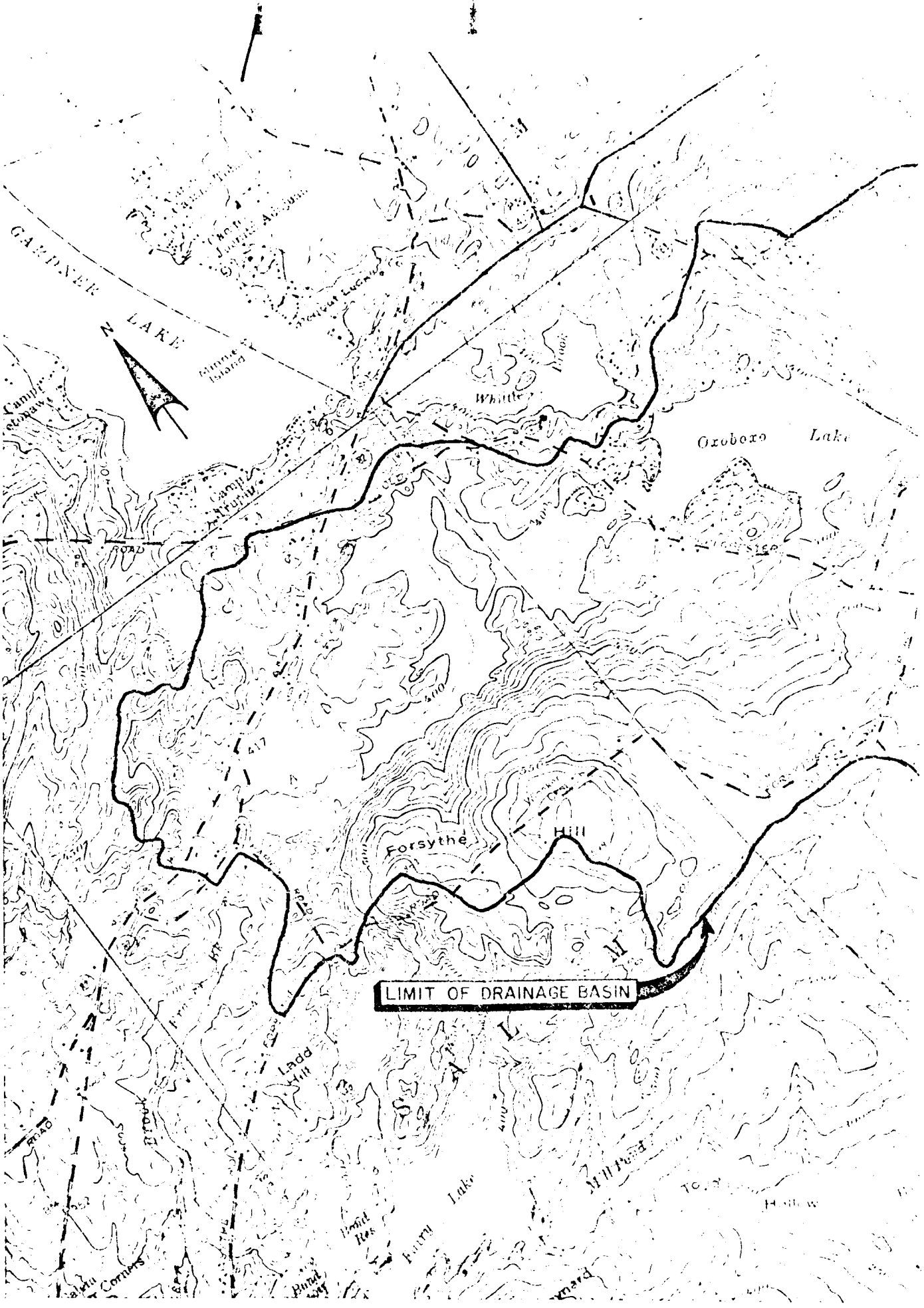
C-10 WALL AT RIGHT ABUTMENT OF DAM

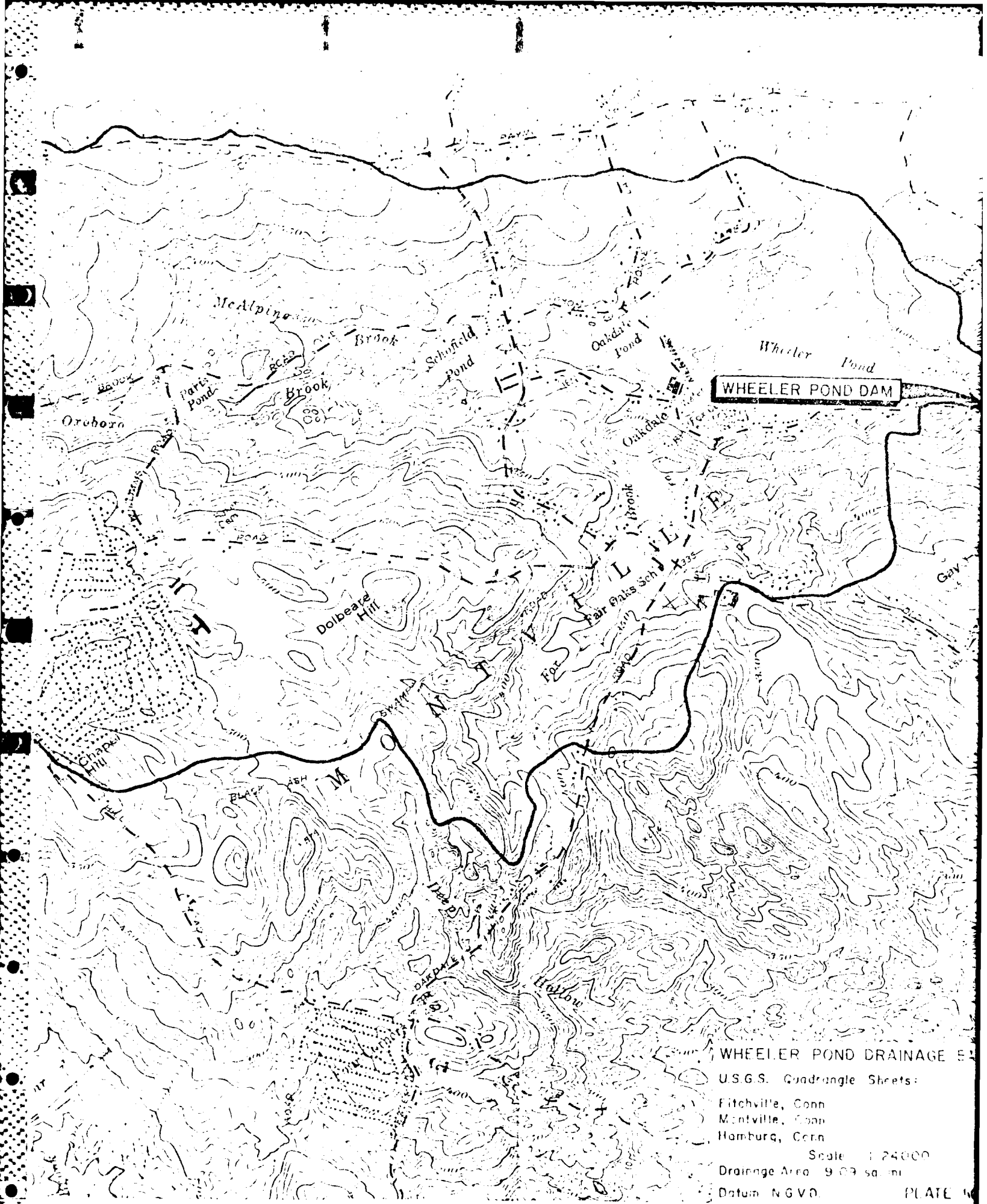


C-11 DOWNSTREAM CHANNEL

APPENDIX D

HYDROLOGIC COMPUTATIONS


GARDNER LAKE
N
Oxoboxo Lake
Forsythe Hill
LIMIT OF DRAINAGE BASIN
Ladd Hill
Mill Pond
Lake


WHEELER POND DAM
Wheeler Pond
Schofield Pond
Oakdale Pond
McAlpine Brook
Paris Pond
Brook
Oxoboro
Oakdale
Dolbeare Hill
Chapel Hill
Far Oaks Sch
Holcomb
WHEELER POND DRAINAGE
U.S.G.S. Quadrangle Sheets:
Fitchville, Conn
Montville, Conn
Hamburg, Conn
Scale 1:24000
Drainage Area 9.03 sq mi
Datum N.G.V.D.
PLATE

2

A. Size Classification

Height of Dam = 21.0 feet; Hence SMALL

at crest elevation reservoir storage = 1000 AC-ft., hence INTERMEDIATE

adopted size category INTERMEDIATE

B. Hazard Potential

DAM IS LOCATED IN A PREDOMINANTLY RURAL AREA AND ITS FAILURE WILL DAMAGE OR BREACH RT. 163 AND MAY CAUSE A LOSS OF A FEW LIVES AND HOMES LOCATED DOWNSTREAM. THERE WILL BE APPRECIABLE ECONOMIC LOSS DUE TO FLOODING PROBLEM. IT IS A SIGNIFICANT HAZARD PROGRAM.

It is estimated from the rule of "thumb" failure hydrograph as follows:

Category	Loss of Life	Economic Loss
		Homes = YES
SIGNIFICANT	YES	Buildings = YES
		Farms = YES
		Miscellaneous = YES
		Highways or roads = YES

Hazard	Size	"Test Flood" or Spillway Design Flood
SIGNIFICANT	INTERMEDIATE	½ PMF TO PMF

Adopted S.D.F. test flood = ½ PMF

Plotted value of test flood due to watershed characteristics = 830 CSM

Estimating Maximum Probable Discharges - Inflow and Outflow Values Date of Inspection: 6/14/78

Name of Dam WHEELER POND DAM; Location of Dam OXOBOXO BROOK Town MONTVILLE, CT.

Watershed Characterization ROLLING HILLS WITH UPSTREAM STORAGE IN OXOBOXO DAM

Adopted "test" flood = HALF PMF = 830 CSM = 7545 C.F.S.

D.A. = Drainage Area = 9.09 Square Miles = _____ Acres

S.A. = Surface Area of Reservoir = 0.1437 Square Miles = 92 Acres

Shape and Type of Spillway = OGEE AND BROADCRESTED PLUS FREE OVERFALL

B = Width of Spillway = 54 feet; C = Coefficient of Discharge = (3.43 − Friction) = 3.33

Maximum Capacity of Spillway Without Overstopping = 934 C.F.S. = 12.4 % of test flood

Top of Dam Elevation = 256.00; Spillway Crest Elevation = 253.00

Length of Dam= 100 feet

Name of Dam	Test Flood Qp_1		Inflow Characteristics		Outflow Characteristics First Approximation			Outflow Characteristics Second Approximation			Outflow Characteristics Third Approximation		
	CSM	CFS	h_1 in feet	S_1 in inc.	Qp_2 CFS	h_2 in feet	S_2 in inc	S_3 in inc	h_3 in ft.	Qp_3 CFS	S_4 in inc.	h_4 in ft.	Qp_4 CFS
1	2	3	4	5	6	7	8	9	10	11	12	13	14
WHEELER POND DAM	830	7545	10.30	2.96	7545	10.30	2.96	1.81	9.54	6515	1.88	9.92	6995

Qp = Discharges; h = surcharge height S = Storage in inches

Overtopping Potential

Spillway crest elevation = 253.00 M.S.L.

Top of dam elevation = 256.00 M.S.L.

Maximum discharge capacity of Spillway without overtopping = 934 C.F.S.

"Test flood" outflow discharge = 6995 C.F.S.

% of "Test flood" carried by Spillway without overtopping = 13.3% 1

"Test flood" outflow discharge which flows over the dam = 6061 C.F.S.

= 86.7 % of "Test flood" 2

1 + 2 = 100%

"Rule of Thumb Guidance for Estimating
Downstream Dam Failure Hydrograph"

BASIC DATA

Name of dam WHEELER POND DAM Name of town MONTVILLE, CT

Drainage area = 9.09 SQ. MI Top of dam 256.0

Spillway type = OGEE AND BROAD CRESTED Crest of spillway 253.0

Surface area at crest elevation = 92.0 ACRES

Reservoir bottom near dam = 242.60

Assumed side slopes of embankments = 1:2

Depth of reservoir at dam site 17.0 y_o = 17.0 FT.

Mid-height elevation of dam =

Length of dam at crest = 54.0 FT.

Length of dam at mid-height = 44.0 FT

40% of dam length at mid-height = W_b = 17.6 FT

Stream height of dam = 21.0 FT.

Hydraulic height of dam = 17.0 FT.

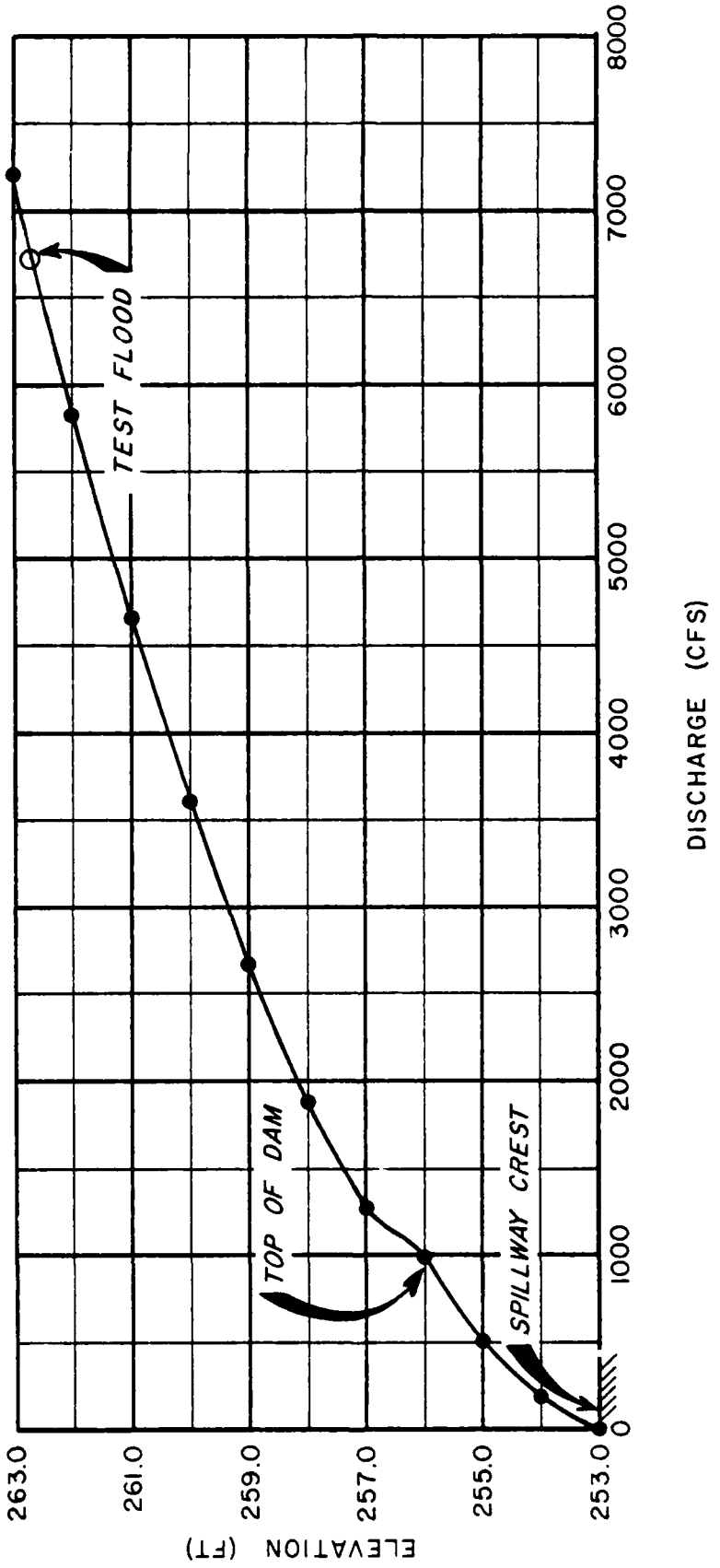
Step 1:

Elevation M.S.L.	Reservoir Estimated Storage In AC-ft.	Remarks
— — —	— 92.0 Ac-Ft	

Step 2:

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

$$= 1.68\, W_b\, y_o^{3/2} = 2072 \text{ CFS}$$



SPILLWAY RATING CURVE
WHEELER POND DAM

APPENDIX E

INFORMATION AS CONTAINED IN

THE NATIONAL INVENTORY OF DAMS

INVENTORY OF DAMS IN THE UNITED STATES

STATE	IDENTITY NUMBER	DIVISION	STATE	COUNTY	CONGR DIST.	STATE	COUNTY	CONGR DIST.	NAME	LATITUDE (NORTH)	LONGITUDE (WEST)	REPORT DATE DAY	MO	YR
CT	259	NED	CT	011	02				WHEELER POND DAM	4127.4	7208.6	15	AUG	78

POPULAR NAME	NAME OF IMPOUNDMENT
	WHEELER POND

REGION	BASIN	RIVER OR STREAM	NEAREST DOWNSTREAM CITY-TOWN-VILLAGE	DIST FROM DAM (MI.)	POPULATION
01	07	OXOBOXO BROOK	MONTVILLE	1	15000

TYPE OF DAM	YEAR COMPLETED	PURPOSES	STRUCTURAL HEIGHT (FT.)	HYDRAULIC HEIGHT (FT.)	IMPOUNDING CAPACITIES MAXIMUM (ACRE-FT.)	IMPOUNDING CAPACITIES NORMAL (ACRE-FT.)	DIST	OWN	FED R	PRV/FED	SCS A	VER/DATE
CTRAMG	1810	SR	25	24	1276	1000	NED	N	N	N	N	07AUG78

REMARKS

U/S HAS	SPILLWAY CREST LENGTH	SPILLWAY TYPE	SPILLWAY WIDTH (FT.)	MAXIMUM DISCHARGE (FT.)	VOLUME OF DAM (CY)	POWER CAPACITY INSTALLED (MW)	POWER CAPACITY PROPOSED (MW)	NAVIGATION LOCKS NO.	LENGTH (FT.)	WIDTH (FT.)	LENGTH (FT.)	WIDTH (FT.)	LENGTH (FT.)	WIDTH (FT.)	LENGTH (FT.)	WIDTH (FT.)
1	54	U	54	934	200											

OWNER	ENGINEERING BY	CONSTRUCTION BY
THEODORE WISNIEWSKI		

REGULATORY AGENCY			
DESIGN	CONSTRUCTION	OPERATION	MAINTENANCE
NONE	NONE	CONN PAPERBOARD CO	STATE OF CT

INSPECTION BY	INSPECTION DATE DAY	MO	YR	AUTHORITY FOR INSPECTION
C-E MAGUIRE, INC	14	JUN	78	PL 92-367

REMARKS

END

FILMED

9-84

DTIC