MOHAWK RIVER BASIN

COLONIE DAM
SARATOGA COUNTY, NEW YORK
INVENTORY NO. N.Y. 204

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

APPROVED FOR PUBLIC RELEASE;
DISTRIBUTION: UNLIMITED
CONTRACT NO. DACW 51-78-C-0035,

NEW YORK DISTRICT CORPS OF ENGINEERS
AUGUST, 1978
Best Available Copy
# Phase I Inspection Report

**Colonie Dam**

Mohawk River Basin, Saratoga County, New York

Inventory No. N.Y. 204

**AUTHOR:**

George Koch P.E.

**PERFORMING ORGANIZATION NAME AND ADDRESS:**

New York State, Department or Environmental Conservation

50 Wolf Road

Albany, NY 12233

**CONTROLLING-OFFICE NAME AND ADDRESS:**

New York State Department of Environmental Conservation

50 Wolf Road

Albany, NY 12233

**DEPARTMENT OF THE ARMY NAME AND ADDRESS (If different from Controlling Office):**

Department of the Army

26 Federal Plaza/ New York District, CofE

New York, New York 10007

**REPORT DATE:**

27 September 1978

**NUMBER OF PAGES:**

6

**DISTRIBUTION STATEMENT:**

Approved for public release; Distribution unlimited.

**SECRETARY OF DEFENSE DESIGNATION:**

DACW-51-78-C-0935

**DISTRIBUTION STATEMENT (of the Report):**

Approved for public release; Distribution unlimited.

**DISTRIBUTION STATEMENT (of the Report):**

Approved for public release; Distribution unlimited.

**LEVEL:**

UNCLASSIFIED

**SUPPLEMENTARY NOTES:**

National Dam Safety Program. Colonie Dam (Inventory Number NY 204), Mohawk River Basin, Saratoga County, New York. Phase I Inspection Report

**KEY WORDS (Continue on reverse side if necessary and identify by block number):**

- Dam Safety Colonie Dam
- National Dam Safety Program Saratoga County
- Visual Inspection Stony Creek
- Hydrology, Structural Stability

**ABSTRACT (Continue on reverse side if necessary and identify by block number):**

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. Colonie Dam was judged to be unsafe non-emergency due to a deteriorated spillway channel and eroded downstream channel, as well as seepage along the downstream face and South abutment.
**TABLE OF CONTENTS**

| ASSESSMENT | - |
| OVERVIEW PHOTOGRAPH | - |
| 1 PROJECT INFORMATION | 1 |
| 1.1 GENERAL | 1 |
| a. Authority | 1 |
| b. Purpose of Inspection | 1 |
| 1.2 DESCRIPTION OF PROJECT | 1 |
| a. Description of the Dam and Appurtenant Structures | 1 |
| b. Location | 2 |
| c. Size Classification | 2 |
| d. Hazard Classification | 2 |
| e. Ownership | 2 |
| f. Purpose of Dam | 2 |
| g. Design and Construction History | 2 |
| h. Normal Operating Procedures | 2 |
| 1.3 PERTINENT DATA | 2 |
| a. Drainage Area | 2 |
| b. Discharge at Dam Site | 3 |
| c. Elevation | 3 |
| d. Reservoir | 3 |
| e. Storage | 3 |
| f. Dam | 3 |
| g. Spillway | 3 |
| h. Regulating Outlets | 3 |
| 2 ENGINEERING DATA | 4 |
| 2.1 DESIGN | 4 |
| a. Geology | 4 |
| b. Subsurface Investigations | 4 |
| c. Embankments and Appurtenant Structures | 4 |
| 2.2 CONSTRUCTION RECORDS | 4 |
| 2.3 OPERATION RECORD | 5 |
| 2.4 EVALUATION OF DATA | 5 |
3 VISUAL INSPECTIONS

3.1 FINDINGS
   a. General
   b. Embankment and Abutments
   c. Spillway
   d. Regulating Outlets
   e. Downstream Channel
   f. Reservoir

3.2 EVALUATION OF OBSERVATIONS

4 OPERATION AND MAINTENANCE PROCEDURES

4.1 PROCEDURES

4.2 MAINTENANCE OF DAM

4.3 MAINTENANCE OF OPERATING FACILITIES

4.4 WARNING SYSTEMS IN EFFECT

4.5 EVALUATION

5 HYDRAULIC/HYDROLOGIC

5.1 DRAINAGE AREA CHARACTERISTICS

5.2 ANALYSIS CRITERIA

5.3 SPILLWAY CAPACITY

5.4 RESERVOIR CAPACITY

5.5 FLOODS OF RECORD

5.6 OVERTOPPING POTENTIAL

5.7 EVALUATION

6 STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY
   a. Visual Observations
   b. Design and Construction Data
   c. Operating Records
   d. Post-Construction Changes
   e. Seismic Stability

7 ASSESSMENT/RECOMMENDATIONS

7.1 ASSESSMENT
   a. Safety
   b. Adequacy of Information
   c. Urgency
   d. Need for Additional Investigations
7.2 RECOMMENDED MEASURES

APPENDIX

A. DRAWINGS
   (a) Vicinity Map
       Topographic Map (USGS)
   (b) List of Drawings

B. PHOTOGRAPHS

C. ENGINEERING DATA CHECKLIST

D. VISUAL INSPECTION CHECKLIST

E. HYDROLOGIC DATA AND COMPUTATIONS

F. LIST OF REFERENCES
Name of Dam: Colonie Dam (I.D. No. NY 204: Mohawk W.S.)
State Located: New York
County Located: Saratoga
Stream: Stony Creek (tributary of the Mohawk River)
Dates of Inspection: June 28 and July 6, 1978

ASSESSMENT

Colonie Dam is composed of an earth embankment and a concrete spillway structure, the visual inspection of which revealed the following deficiencies:

(1) The spillway slabs have cracked and settled indicating the presence of voids beneath. Subsurface investigation of the slab foundation is required to determine the extent and origin of the voids.

(2) Seepage along the toe of the downstream face and at the south abutment should be periodically and systematically observed and measured.

The total discharge capacity of the spillway is inadequate to pass the Probable Maximum Flood (PMF). The spillway is capable of discharging one half the PMF without flashboards, but not with flashboards.

George Koch
Chief, Dam Safety Section
New York State Department of Environmental Conservation
NY License No. 45937

Approved By: Col. Clark H. Benn
New York District Engineer

Date: 27 September 1978
PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
COLONIE DAM, I.D. NO. NY 204
MOHAWK WATERSHED
SARATOGA COUNTY, NEW YORK

SECTION I: PROJECT INFORMATION

1.1 GENERAL

a. Authority
The Phase I Inspection reported herein was authorized by the Department of the Army, New York District, Corps of Engineers, to fulfill the requirements of the National Dam Inspection Act, Public Law 92-367.

b. Purpose of Inspection
Evaluation of the existing conditions of the subject dam to identify deficiencies and hazardous conditions, determine if they constitute hazards to life and property and recommend remedial measures where necessary.

1.2 DESCRIPTION OF PROJECT

a. Description of the Dam and Appurtenant Structures
The Colonie Dam is composed of an 807 foot long earth embankment and a 119 foot wide concrete spillway north of the embankment.

The maximum height of the embankment above the old stream bed, which is located slightly south of the center of the embankment, is 47 feet. The crest of the embankment is 20 feet wide, the upstream slope is 1 vertical on 2.5 horizontal and the downstream slope is 1 vertical on 2 horizontal. The spillway is located in a cut section north of the embankment. The exposed slopes and crest of the dam are covered with grass. The submerged portion of the upstream slope which was visible, is protected by riprap. A concrete core wall is located along the centerline of the dam approximately 807 feet long, top elevation 260.0, extending to elevation 207.0 in a stepped manner. The wall rests on a footing with a maximum dimension of 5 feet in width and 1.5 feet thick. The thickness of wall varies from a maximum of 2 feet at the lowest elevation of the wall to 1 foot at the top. The plans indicate that the footing is supported on impervious material and Bethlehem steel sheet piling SP-4 or equivalent. The sheet piling is intended to act as a cut off wall beneath the core wall. The sheet piling extends to bedrock, refusal or 25 feet below the core wall footing. The ungated spillway is constructed of reinforced concrete. The elevation of the spillway crest is 255.0. Flashboards measuring 2.7 feet in height were in place at the time of the inspection beneath a steel bridge. The bridge spans the entire spillway with an intermediate pier located in the center of the spillway. An unobstructed channel of 58.5 feet exists on each side of the center pier. The bottom of the bridge steel is at elevation 263, which corresponds to the top of dam elevation.
The intake structure is a reinforced concrete tower located near the upstream toe of the embankment. From this tower a 30 inch cast iron pipe carries the flow through the concrete core wall to the downstream toe of the embankment where the flow bifurcates into 2 - 24 inch cast iron pipes. One pipe directs flow into a plunge pool to dewater the reservoir, and the other directs flow to a control building. From the control building, the flow is directed to the water treatment facility on River Road in the Town of Colonie.

b. Location
Colonie Reservoir is located on the Stony Creek, a tributary of the Mohawk River, 0.6 miles northeast of the intersection of Crescent and Vischer Ferry Roads. The nearest village is Vischer Ferry located 0.5 miles southwest of the intersection. This is the only settlement between the dam and the Mohawk River.

c. Size Classification
The dam is 47 feet high and is classified as an "intermediate" dam (between 40 and 100 feet high).

d. Hazard Classification
The dam is classified "high" hazard because of the presence of approximately 35 homes immediately downstream.

e. Ownership
Colonie Dam is owned and operated by the Latham Water District of the Town of Colonie.

f. Purpose of Dam
The dam provides storage for the Town of Colonie water supply system.

g. Design and Construction History
The dam and its appurtenant structures were designed by Keis & Holroyd, Consulting Engineers, in 1950. No information was available on the award of the construction contract.

The dam was put into operation in 1954.

h. Normal Operating Procedures
Water is released from the reservoir either by the low level outlets or over the spillway. Two low level outlets are located in the control tower at elevations 234.0 and 250.0. An additional intake located at elevation 226.0 is operational but not in use. The water is pre-chlorinated near the toe of the dam and piped to the water treatment plant.

1.3 PERTINENT DATA

a. Drainage Area (sq. mi.) 11.2
b. Discharge at Dam Site (cfs)
   Maximum known flood (May 7, 1958 and Feb. 1960) 10
   Maximum pool (El. 263) 10,800
   Maximum Pool w/flashboards 5,800
Maximum capacity of low level outlets (Estimated) 9
Total Discharge at Max. Pool (El. 263) W/flashboards 5,809
Average daily discharge 3.9 to 4.7

c. Elevation (USGS datum)
   Top of dam 263.0
   Spillway crest 255.0
   Tailrace channel 221.0 ±
   Invert low level outlet 226.0
   Inlets of Control Tower 234.0 and 250.0

d. Reservoir
   Length of maximum pool, miles 2.2
   Length of shoreline (spillway crest), miles 7.0
   Surface area (spillway crest), acres 295.0

e. Storage (acre-feet)
   Spillway crest 5,500
   Top of flashboards 6,300
   Top of dam 8,100

f. Dam
   Embankment type: Earth fill with central concrete corewall
   resting on cut-off wall of steel sheet piling
   Embankment length, ft. 807
   Upstream slope 1 on 2.5
   Downstream slope 1 on 2.0
   Impervious core: reinforced concrete core wall
   Length (ft.) 807
   Top Elevation 260.0
   Max. bottom elevation 207.0
   Max. footing width (ft.) 5.0
   Max. wall bottom width 2.0
   Max. wall top width 1.0
   Cut-Off Wall: steel sheet piling Bethlehem SP-4 or equivalent
   extending to bedrock, refusal or 25 feet below
   footing of core wall.
   Crest width, ft. 20
   Grout curtain none

g. Spillway
   Type: Ungated, reinforced concrete
   Length, ft. 119
   Crest elevation (USGS) 255.0
   Upstream channel: Riprapped
   Downstream channel: Irregular riprap and crushed
   stone, discharge into Stony Creek

h. Regulating Outlets
   Upstream - Control tower located near toe of upstream
   30 inch cast iron pipe between control
   tower and downstream toe.
   Downstream - Two 24 inch cast iron pipe branches from
   30 inch cast iron pipe, each subdivided by 2-
   24 inch gate valves. A 4-inch cast iron
   pipe carries flow to treatment plant. The
   other is used to drain the reservoir.
SECTION 2: ENGINEERING DATA

2.1 DESIGN

a. Geology
The Colonie Dam lies within the "Hudson Mohawk Lowlands" physiographic province of New York State. The general topography of this area resulted from erosion along outcrop belts of weak rocks. The topography is of low elevation and relief. Bedrock in the vicinity of the dam is primarily Ordovician (500 - 435 million years ago) shale and sandstones which have been exposed by westward and southward stripping-off of Silurian and Devonian Limestones. The present surficial soil deposits have resulted from glaciations during the Cenozoic Era (most recent 65 million year period), the last of which was the Wisconsin ice sheet approximately 11,000 years ago. These soils were deposited during the existence of glacial Lake Albany. The Mac Gregor Fault is located in the vicinity of the dam. It is a normal fault caused by gravity forces.

b. Subsurface Investigations
Three subsurface investigations were conducted in 1949 and 1950. The first by Keis & Holroyd in October 1949, the second by Claude S. Young in February 1950, and the third in March or April 1950, by Keis & Holroyd. A subsurface exploration location plan and soil profile has been included in the Appendix A for the first and third investigations. The second investigation may have been conducted at an alternate location as the soil profiles do not agree with those prepared by Keis & Holroyd. The boring logs of the second investigation have been included in Appendix A for informational purposes.

In general, the surficial soils at the project site consist of a thin layer of fine sand, over yellow and blue clay, over fine sand, over hard sand and gravel with decomposed shale fragment. Borings were progressed to refusal. Although no coring below refusal elevation was undertaken, the bottom of borings is assumed to be bedrock. The assumed bedrock surface is first encountered at elevation 170 near the edge of the spillway at the north end of the embankment, then drops to elevation 167 in the next boring and gradually increases to elevation 196 near the old stream channel of Stony Creek.

c. Embankments and Appurtenant Structures
The dam was designed by Keis and Holroyd, Consulting Engineers, of Troy, NY. Forty drawings were prepared for this contract and included the construction of the treatment plant. Selected drawings have been included in Appendix A. The design of this dam includes the use of a concrete core wall and a steel sheet piling cut-off wall to control seepage thru and under the dam. Subsurface information reveals varying thicknesses of permeable sand and soft consolidation prone clay beneath the embankment. The concrete core wall could have sustained damage during consolidation of this clay increasing the potential for seepage. In addition, the cut-off wall is not water tight and does not extend completely thru the sandy subsoil.

2.2 CONSTRUCTION RECORDS
Photographs were reviewed at the Town of Colonie Latham Water District and are available for future investigations. Two of these have been included in Section B of the Appendix. No other information regarding
the construction of the dam was available.

2.3 OPERATION RECORD
The reservoir level and discharge into the water supply system are recorded daily. No maintenance or operation manual has been prepared. All maintenance and repair work records are filed in the Latham Water District headquarters. The dam is visually inspected on an irregular basis.

2.4 EVALUATION OF DATA
The data presented in this report has been made available by the Town of Colonie. In addition, the personnel of the Latham Water District have contributed valuable observations of the structure's performance, operation and maintenance. This information has been invaluable in the preparation of this report and appears adequate and reliable for Phase I inspection purposes.
SECTION 3: VISUAL INSPECTIONS

3.1 FINDINGS

a. General
Visual inspections of Colonie Dam and the surrounding watershed were conducted on June 28 and July 7, 1978. The weather was clear and temperatures ranged in the seventies. The inspections were conducted during a basically dry period during which intermittent thunderstorms occurred. The reservoir level at the time of inspection was 2.6 feet above the spillway crest level due to the presence of flashboards. These flashboards were leaking such that approximately one-half inch of water was flowing down the spillway.

b. Embankment and Abutments
The earth embankment, which was completed in June 1953, shows no signs of distress. The vertical and horizontal alignment of the crest appears to be unchanged, with no visible cracks on the embankment slopes or crest. There is no evidence of sliding or sloughing and no depressions observed. Grass covers the exposed portions of the embankment with some vegetative growth of shrubs and small trees near and along the walls of the spillway. Visual inspection of the surface beyond the toe of the dam could not be completed due to the presence of dense vegetation west of the service road. The following conditions were observed:

(1) Seepage appears along the south abutment contact and 1 to 3 feet above the toe of the downstream slope near the center of the embankment. No particle removal was observed, however, the seepage near the abutment had a rusty appearance and some surface scum was noted. A toe drain was constructed in 1973 to collect seepage from 3/4 inch copper tubing installed to remove seepage from springs encountered during construction. Maintenance personnel have observed seepage along the toe of the downstream face since the construction of the dam. This drain consisted of a 6 inch perforated corrugated metal pipe imbedded in crushed stone and pitched to an open grated manhole near the south center of the embankment. The drain flows from both the north and south toward the manhole. A 12 inch corrugated metal pipe directs the seepage beneath the service road and in an open channel west of the service road. At the time of the inspection, approximately 2 to 3 gallons per minute were flowing into the 12-inch pipe. The drain was installed primarily to facilitate mowing operations, since equipment was having difficulty traversing the slope.

A soft wet area was also observed approximately 50 feet west of the embankment toe near the outlet of an 8 inch clay pipe below the south wall of the spillway. No flow was observed from this area. The 8 inch pipe located about 10 feet west of this area was flowing one-half full. The purpose of this pipe is unclear and should be investigated to determine its source.
c. Spillway

The spillway is constructed of mesh reinforced concrete slabs on earth with two reinforced concrete walls retaining the embankment on the south and the original grade on the north. The spillway was constructed in a cut section. The spillway slabs do not appear to be adequately supported and some cracking of the walls of the spillway were observed.

The following deficiencies are noted:

(2) The spillway slabs are distorted and broken with a maximum differential settlement of 4 inches between slabs. Expansion joints were permitting vegetative growth indicating the development of cracks between the slabs. Cracks were observed within the slabs indicating loss of foundation support.

(3) A core drilling program was conducted under the owner's supervision in the late 1950's to determine the cause of these problems. The large voids encountered were filled with a concrete slurry. Additional voids were found and a bituminous material was injected. Water was observed during the inspection, flowing from two of these core holes to a maximum height of 6 inches above the slab. Probing in joints and cracks indicates voids beneath these slabs. Maximum probe depth before reaching refusal was 1.6 feet below the top of slab. Water was also observed flowing from the slab joint below the core holes.

(4) Flashboards 2.7 feet in height are being used to increase the capacity of the reservoir, raising the reservoir elevation to 257.7. The steel bars used to retain the flashboards are bent slightly downstream. It could not be determined if these bars were designed to fail at a specific discharge. The oak flashboards are scheduled for replacement this summer.

d. Regulating Outlets

A reinforced concrete control tower, located near the upstream toe of the dam and center of the dam, is used to draw off water from the reservoir through 3 - 24 inch diameter inlets controlled by 24 inch gate valves. The tower has an inside diameter of 10 feet and an outside diameter of 14 feet at the base and 12 feet at the top. The intakes are located at elevations 226, 234 and 250. The lower intake is not in use but is in operating condition. Valve operation is by mechanical means. The upper intakes are in constant use and regularly maintained. Access to the control tower is from the top of the dam via a 120 feet long steel walkway.

e. Downstream Channel

The downstream channel of the spillway is in poor condition. The following deficiencies were noted:

(5) Extensive erosion of the channel bed and banks was observed such that the end of the spillway was being undermined and the easily eroded silty, clay subsoil was exposed.
riprap had been placed at the end of the spillway and along the channel. Timber cribbing had also been used approximately 200 feet downstream to protect the 24 inch water supply pipe from the erosion of the spillway. This cribbing is being breached on the north end. Crushed stone was unsuccessfully placed to control this problem. Excavation and trenching operations were evident adjacent to the channel for the purpose of controlling channel flow within the stream bed.

(6) At the extreme northern end of the spillway edge considerable flow was observed. It is believed that this may be flow from beneath the spillway slabs.

f. Reservoir
There are no noticeable signs of landslides or instability in the reservoir area. Some minor sloughing along the eastern shoreline was observed.

3.2 EVALUATION OF OBSERVATIONS
Although deficiencies were observed, there are no indications that the dam is in imminent danger. Some deficiencies are minor and may be corrected by the maintenance forces. The more serious deficiencies represent conditions which have a potential for deterioration and should be further investigated.

The most significant observations are the presence of seepage at the south abutment and the toe of downstream slope, the deteriorated spillway channel, and the eroded downstream channel. Serious erosion could result if investigation and remedial measures are not initiated.
SECTION 4: OPERATION AND MAINTENANCE PROCEDURES

4.1 PROCEDURES
The Colonie Reservoir discharges approximately 2.5 to 3 million gallons per day, into the water supply system of the Town of Colonie. The maximum flow, with booster pumps, is 6 million gallons per day. The Reservoir is a secondary system to the treated water obtained from the Mohawk River. The rate of flow is set by gate valves at the control tower. The flow can be directed through the system toward the treated plant or blown-off through a 24 inch cast iron pipe into a plunge pool formed in the old Stony Creek bed west of the downstream toe.

4.2 MAINTENANCE OF DAM
The dam and appurtenants are maintained in good operational condition. All inlet valves are tested and any debris collected is blown-off by compressed to clear inlet pipes. Staff is maintained on around the clock basis.

4.3 MAINTENANCE OF OPERATING FACILITIES
The operating facilities are maintained by Latham Water District of the Town of Colonie.

4.4 WARNING SYSTEMS IN EFFECT
No warning system is present.

4.5 EVALUATION
The dam and appurtenant works are maintained in good condition. Estimated drawdown capacity is 9 million gallons per day if the ungated spillway is not utilized. The lowest water level recorded in the reservoir was elevation 248.9 on February 24, 1965.
SECTION 5: HYDRAULIC/HYDROLOGIC

5.1 DRAINAGE AREA CHARACTERISTICS
The Colonie Reservoir is located on the Stony Creek, a small tributary of the Mohawk River. The total drainage area at Colonie Dam is 11.2 square miles. According to the original report, there are 33 homes downstream of the dam and there is little new development apparent in the area. The topography is characterized by gentle slopes running in a general north-south direction interspersed with a few swamps.

5.2 ANALYSIS CRITERIA
No hydrologic data is available for the dam. For the purpose of this investigation, the dam and the spillway were analyzed with respect to their flood control potential and were assessed through the development of Probable Maximum Flood (PMF) for the watershed. The hydrologic analysis was based on the Synthetic Hydrograph method of the Soil Conservation Service (SCS). This SCS method establishes the hydrograph peak inflow. A short-cut, approximation method of flood routing is then used to determine the reservoir storage/peak outflow relationship.

The Probable Maximum Precipitation (PMP) was determined to be 21.5 inches for a 6 hour duration, 10 square mile basin and runoff was estimated at 15.3 inches taking into account the type of soil and land use development within the watershed. Peak rate of inflow was estimated at 14,200 cfs.

A further analysis was performed using the Snyder's Synthetic Unit Hydrograph Method and the peak rate of inflow was determined to be 14,200 cfs. The estimated quantity of inflow for both analyses is identical.

5.3 SPILLWAY CAPACITY
The spillway is ungated and its overall length is 119 feet. A 2 feet wide pier at the center of the spillway divides it into two equal sections of 58.5 feet. The nearly flat crest is topped by 2.7 feet high flashboards. The maximum head possible between the crest and the top of the dam is 8 feet. The design indicates 2.0 feet high flashboards, but this was modified prior to construction and 2.5 feet high flashboards were installed. At some later date the flashboards were rehabilitated and extended to their present height of 2.7 feet, reducing the maximum head possible to 5.3 feet. No data was available on the discharge rating of the spillway, therefore the weir coefficient was given assumed values ranging from 3.41 to 4.08 depending upon discharge head. The computed capacities at the maximum head (top of dam) are 10,800 cfs without flashboards and 5800 cfs with flashboards.

5.4 RESERVOIR CAPACITY
The length of the reservoir is 2.2 miles and the length of shoreline is approximately 7 miles at spillway crest. The surface area at spillway crest is 295 acres and the reservoir capacity is 5500 acre-feet. The surface area with the existing 2.7 feet high flashboards is 314 acres and the reservoir capacity is 6300 acre-feet. The reservoir capacity at the top of the dam is 8100 acre-feet. This results in a surcharge storage of 2,600 acre-feet above spillway crest and is equivalent to a runoff depth of 4.35 inches over the drainage area.
5.5 FLOODS OF RECORD
The highest water levels recorded since completion of Colonie Dam (June 1953) occurred in May, 1958 and February, 1960.

The records of these levels at the dam are as follows:

<table>
<thead>
<tr>
<th>Date</th>
<th>Elev. (feet)</th>
<th>Discharge (cfs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 7, 1958</td>
<td>257.8</td>
<td>10</td>
</tr>
<tr>
<td>Feb. 12, 1960</td>
<td>257.8</td>
<td>10</td>
</tr>
</tbody>
</table>

5.6 OVERTOPPING POTENTIAL
The maximum capacities of the spillway are 10,800 cfs without flashboards and 5,800 cfs with flashboards. The Probable Maximum Flood peak outflow is 14,200 cfs. Half of the Probable Maximum Flood outflow is 7,100 cfs resulting in an overtopping of the dam by 7 inches.

5.7 EVALUATION
The capacity of the spillway is adequate to pass standard Project Flood, which is usually half of PMF, but inadequate with the installed flashboards. Flashboards with spring mechanism that fail under specific head should be installed if storage above crest level is required.
SECTION 6: STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations
Visual observations did not indicate any signs of major distress in connection with the earth embankment. The spillway slabs, however, do show signs of differential movement and loss of foundation support. Some minor cracking of the spillway and seepage at the south abutment and along the toe of the downstream slope was also evident.

b. Design and Construction Data
No design computations or other data regarding the structural stability of the spillway or earth embankment are available. Other than construction photographs, information concerning the construction of the dam could not be located.

c. Operating Records
Records of operation and repairs which were located are available at the Latham Water District headquarters. No major operational problems which would affect the stability of the dam were reported.

d. Post-Construction Changes
The toe drain described in Section 3.1b was installed in 1973.

Flashboards 2 feet in height were originally designed and installed on the spillway crest. These were replaced at a later date with flashboards 2.7 feet in height. Removal and replacement of existing flashboards is anticipated this summer.

A coring program was initiated in the late 1950's to determine the foundation conditions beneath the spillway slab. Voids found were filled with a concrete slurry and bituminous grout placed where voids were of limited depth. A cut-off wall was also installed at the edge of the spillway slab near the crest. This wall is 18 inches wide and extends vertically five feet below the top of slab and laterally to each spillway wall.

e. Seismic Stability
The dam is located near the boundary between seismic zones No. 1 and 2, therefore, no seismic analyses are warranted. There is minimal information available on the activity of the Mac Gregor Fault. The general consensus of opinion is that the fault does not constitute a threat to the safety of the dam.
SECTION 7: ASSESSMENT/RECOMMENDATIONS

7.1 ASSESSMENT

a. Safety
The Phase I inspection of Colonie Dam did not indicate conditions which constitute an immediate hazard to human life or property. The earth embankment is not considered to be unstable. However, seepage beneath the concrete slabs of the spillway channel may lead to the development of hazardous conditions.

For the aforementioned reasons, Colonie Dam requires certain measures and improvements in connection with the most serious deficiencies, some of which should be carried out immediately.

b. Adequacy of Information
The information reviewed is adequate to prepare the Phase I inspection report, with the following exceptions: Conditions beneath the spillway slabs, subsurface and embankment investigations and construction history.

c. Urgency
The stability of the spillway should be investigated immediately. Monitoring of observed seepage should commence immediately. Rehabilitation of the downstream channel should be completed before the next spring run-off period commences.

d. Need for Additional Investigation
To prevent the development of potentially hazardous conditions, investigations should be undertaken to determine the exact nature and cause of the observed seepage and foundation condition of the spillway slab. These investigations should commence immediately and include, but not necessarily be limited to:

1. subsurface investigations of the spillway and its foundation including all sampling and laboratory testing necessary to perform a complete stability analysis of the existing structure and determine the integrity of the existing embankment and foundation materials.

2. periodic and systematic observations and measurements of the quantity of seepage

The first priority item should be investigation of the condition of the spillway slab and the presence of voids and seepage encountered beneath.

7.2 RECOMMENDED MEASURES

a. Results of the aforementioned investigations will determine the remedial measures required for the spillway and the control of the observed seepage.

Additional improvements listed below can be accomplished by the maintenance forces:

b. Erosion protection of downstream channel with filter cloth and stone fill of sufficient thickness and size to prevent movement
of stone and loss of clay foundation soil.

c. Extend the toe drain toward the south abutment to collect the water which was ponded.

d. The gate operating structure and appurtenant valves should be inspected periodically and systematically repaired as required.

e. Vegetative growth on the embankment and along the spillway walls should be removed.

f. Animal burrows on the downstream face should be backfilled and areas seeded.

g. Spillway walls should be repaired and expansion joints in the spillway slab recaulked.
SECTION "A-A"
DETAILS OF PIER

SCALE 1/4" = 1'-0"

LATHAM WATER DISTRICT
ADDITIONAL WATER SUPPLY FROM STONY CREEK
SARATOGA COUNTY N.Y.

WALKWAY OVER SPILLWAY
PLANS, SECTIONS, DETAILS

RECEIVED AS NOTAR
NOVEMBER

F. E. HOBBOYD
CONSULTING ENGINEER
TROY, NEW YORK

1949

ECK
Typical Detail of Foot Rail

1\(^{\circ}\) bar cast into wall.

For long lengths of rail cast additional supports in wall & weld to rail.

Concrete valve bracket.
ARRANGEMENT OF REINFORCING STEEL IN FOOTING

Scale 1/8" = 1'-0"

NOTE

3 REINFORCING BARS SAME SIZE AS WALL STEEL TO BE PLACED CONCENTRIC WITH WALL PIPE AT EACH OPENING.
PLAN OF WALKWAY FOOTING

SECTION: Z-Z

SCALE: \( \frac{\text{in}}{\text{ft}} = 1 - 0 \)
**LATHAM WATER DISTRICT**

**ADDITIONAL WATER SUPPLY FROM STONY CREEK**

**SARATOGA COUNTY, N.Y.**

**SECTION & DETAILS OF DAM**

<table>
<thead>
<tr>
<th>SHEET AS NOTED</th>
<th>NOVEMBER 1948</th>
<th>KEIS &amp; HOLROOD CONULTING ENGINEERS, TROY, NEW YORK</th>
<th>SHEET OF</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>40</td>
</tr>
</tbody>
</table>
PROFILE ON 4 OF DAM

SCALE:
HORIZ. 1" = 50'
VERT. 1" = 10'

CYCLIND. PENCE WITH GATE AT C
WALKWAY TO OUTLET WORKS

TOP OF CORE WALL 200.0

EXISTING GROUND

90°. 6. PIPE

EXCAVATE INTO IMP.
SUBACTION OR SHLE.

SHEET PILING EXTEND TO SHALE
SECTION THROUGH FOOTING

SCALE: 1" = 1'-0"

LATHAM WATER DISTRICT
ADDITIONAL WATER SUPPLY FROM STONY CREEK SABATOGA COUNTY, N.Y.
PLAN AND PROFILE OF DAM

SCALE AS NOTED
NOVEMBER 1949
CONSULTING ENGINEERS TROY, NEW YORK

17, 1950
APPENDIX A

b. List of Drawings Included for the Phase I Investigation of Colonie Dam

<table>
<thead>
<tr>
<th>Drawings</th>
<th>Drawing No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan and Profile of DAM</td>
<td>2 of 40</td>
</tr>
<tr>
<td>Sections &amp; Details of DAM</td>
<td>3 of 40</td>
</tr>
<tr>
<td>Outlet Works</td>
<td>4 of 40</td>
</tr>
<tr>
<td>Plans, Sections, Details</td>
<td></td>
</tr>
<tr>
<td>Walkway Over Spillway</td>
<td>5 of 40</td>
</tr>
<tr>
<td>Plans, Sections, Details</td>
<td></td>
</tr>
<tr>
<td>Proposed Spillway</td>
<td>6 of 40</td>
</tr>
<tr>
<td>Plans, Sections, Profile</td>
<td></td>
</tr>
<tr>
<td>Subsurface Exploration for Colonie DAM</td>
<td>---</td>
</tr>
</tbody>
</table>
Log of Boring. Hole "A"

Proposed Stony Creek Dam, Clifton Park, NY

Location on hole, 6 feet East of creek on Axis.

Elevation top of ground, 220' Date 8:45 AM 2/4/50

1. Surface
2. Top soil
3. Soft sand and shale
4.
5.
6.
7.
8. Quick sand
9. Core sand and soft shale
10.
11.
12.
13.
14.
15.
16.
17. Top of hard pan, Feels like a gravel or rusted shale.
Log of Hole "A"  
Proposed Stony Creek Dam, Cliffon Park, NY  
Location of Hole, 100 feet West of Hole "A" This hole on the west side of creek.  
Elev. 220 top of hole. Date 3.30 PM 2/4/50.  

1. Surface soil  
2  
3  
4  
6  
7  
8  
9  
10  
11. Brown Shale steak of sand  
12  
13  
14  
15.7 Top of hardpan. A gravely had shale.  

Note. Water standing 10" from top of hole.
Claude S. Young

Log of Hole "2A"

Proposed Stony Creek Dam, Clifton Park, NY

Location of hole. 100 feet West of Hole "1A"

Elev top of hole 222.6. Date 4 PM 2/4/50

1. Surface.

2.

5. Soft brown plastic shale

6. Shale

7. Very soft plastic shale with sand lenses and water

8.

9.

10.

11.

12.

13.

14.

15.

16.

17.

18.

19.

20.

21.

22.

23.

24. Quit in soft plastic shale 5:30 PM

25. Picked up hole at 11:20 AM 2/5/50

26. Soft dark brown shale

27.

28.

29.

30. Water sand and shale soft

31.

32.

32.6 Top of hardpan. A gravelly hard shale.
Claude S. Young

Log of Hole "3A"

Proposed Stony Creek Dam, Clifton Park, NY

Location of hole 100 feet west of Hole "2A" on Axis.

Elev top of hole 230.1. Date 2/5/50

1. Surface
2. Sandy shale
3. Soft brown shale, drills like cheese
4. Water rose to 18" from surface.
5. Sandy brown shale
6. Very soft streak with water, very fine round sand.
7. Soft shale
8. Very soft streak
9. Soft brown shale
10. Soft brown plastic semi fluid shale
11. Quit hole, out of drill stop at 41.9 feet from top on in brown shale, that weathers to a bluish color then exposed to air.

Note: This lower portion of the hole to the depth of 41.9 feet is brownish clay with alternating brown and very fine at times with considerable silt.
Log of Boring Hole "B"

Proposed Stony Creek Dam, Clifton Park NY.

Location of hole. 50 East of hole "A" on Axis.

Elev top hole 222' Date 9.25 AM 2/4/50

1. Surface
2
4. Yellow Clay
5
7
8. Dark brown soft shale
9
10
11
12.1
13
14
15.1
16
17
18. Very soft shale with quick sand
19
20
21
21.3 Hard gravely shale. 11.20 finished hole.
Claude S. Young.

Log of Boring Hole "C"

Proposed Stony Creek Dam. Clifton Park, NY

Location of hole, 50 feet East of Hole "B" on Axis.

Elev top hole 228.85, Date 2/4/50.

1 Surf
2 Sandy clay
3
4
5
6
7 Yellow Clay
8
9
10
11
12
13 Brown very soft shale
14
15
16
17
18
19
20
21 Fluid shale bit went down three feet
22
23
24
25
26
27 Soft brown shale
28.5 Quick sand
29
30
31 Soft Shale
32 Very soft shale
33
34 Top of hardpan, Gravely shale. (quit hole)

Note water level 13" below surface.
Claude S. Young
Log of Boring Hole "D"

Proposed Stony Creek Dam, Clifton Park N.Y.
Elev of top of hole 238' Date 11:45 AM 2/4/50
Location of hole. 50 feet East of Hole "C"

1. Surface
2. Light shale and sand
3.
5.
7.
8.
9.
10.
11. Brown soft Shale
12.
13.
14.
15.
16.
17.
18.
19.
20.
21. Quit hole as we needed the drill stem for hole on other side of Stony Creek
22.

Quit is soft brown shale. Water level 17" below surface.
Toe Drain Looking North

Spillway with Flashboards
Spillway Chute Looking West

Tailrace Channel Looking South
<table>
<thead>
<tr>
<th>Item</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Plans</strong></td>
<td><strong>Details</strong></td>
</tr>
<tr>
<td><strong>Dam</strong></td>
<td><strong>Yes</strong></td>
</tr>
<tr>
<td><strong>Spillway(s)</strong></td>
<td><strong>Yes</strong></td>
</tr>
<tr>
<td><strong>Outlet(s)</strong></td>
<td><strong>Yes</strong></td>
</tr>
<tr>
<td><strong>Design Reports</strong></td>
<td><em>not available</em></td>
</tr>
<tr>
<td><strong>Design Computations</strong></td>
<td><em>not available</em></td>
</tr>
<tr>
<td><strong>Discharge Rating Curves</strong></td>
<td><em>not available or not completed</em></td>
</tr>
<tr>
<td><strong>Dam Stability</strong></td>
<td>unknown</td>
</tr>
<tr>
<td><strong>Seepage Studies</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Subsurface and Materials Investigations</strong></td>
<td><em>3 studies completed for subsurface investigation in 1949 &amp; 1950, 1st &amp; 3rd by Kels &amp; Holroyd, 10/49 &amp; 4/50, 2nd by Claude Young 2/50</em></td>
</tr>
<tr>
<td>Item</td>
<td>Remarks</td>
</tr>
<tr>
<td>------</td>
<td>---------</td>
</tr>
<tr>
<td>Construction History</td>
<td>Construction photographs, no other reproducible information. Some verbal comments about springs encountered near south abutment during construction.</td>
</tr>
<tr>
<td>Surveys, Modifications, Post-Construction Engineering Studies and Reports</td>
<td>None</td>
</tr>
<tr>
<td>Accidents or Failure of Dam Description, Reports</td>
<td>None</td>
</tr>
<tr>
<td>Operation and Maintenance Records Operation Manual</td>
<td>Daily water level records, all other information about maintenance and operation: verbal.</td>
</tr>
</tbody>
</table>
VISUAL INSPECTION CHECKLIST

APPENDIX D
VISUAL INSPECTION CHECKLIST

1) Basic Data
   a. General
      Name of Dam  Colonie
      I.D. #  N.Y. 204  DEC 201-1903 Mohawk ws
      Location: Town Clifton Park  County Saratoga
      Stream Name  Story Creek
      Tributary of  Mohawk River
      Longitude (W), Latitude (N) 73°49'02"  42°48'24"
      Hazard Category  High
      Date(s) of Inspection  4/28/78 & 7/7/78
      Weather Conditions  Clear  75°F
   b. Inspection Personnel  George Koch, Ken Hamner, Muhammed Islam
                            Walt Lynch, Robert McCarthy
   c. Persons Contacted  Warren Lavery - Superintendent Latham Water
                         District, Donald Berthaume - Dam Maintenance (518-783-2750)
   d. History:
      Date Constructed  1952-1953
      Owner  Latham Water District  Town of Colonie
      Designer  Keis & Hedaya
      Constructed by  Unknown

2) Technical Data
   Type of Dam  Earth Embankment
   Drainage Area  11.7 sq mi
   Height  47 ft  Length 807' earth 119' spillway
   Upstream Slope 1:2.5, Downstream Slope 1:2
2) Technical Data (Cont'd.)

External Drains: on Downstream Face __________ @ Downstream Toe __________

Internal Components:
  Impervious Core __________ Reinforced Concrete __________
  Drains __________ None __________
  Cutoff Type __________ Steel Sheet Piling - Bekleken S.P.A. __________
  Grout Curtain __________ None __________
3) Embankment

a. Crest

(1) Vertical Alignment

(2) Horizontal Alignment

(3) Surface Cracks

(4) Miscellaneous

b. Slopes

(1) Undesirable Growth or Debris, Animal Burrows

(2) Sloughing, Subsidence or Depressions

(3) Slope Protection

(4) Surface Cracks or Movement at Toe

(5) Seepage

(6) Condition Around Outlet Structure
c. Abutments

Earth embankment keyed into existing grade with wire wall and cut-off sheeting

1. Erosion at Embankment and Abutment Contact - none observed

2. Seepage along Contact of Embankment and Abutment - boundary of ponded water with vegetation associated with continued wet conditions, no flow. Area had surface seep after heavy rainfall and a newly appeared, all new South Abutment - now wet at north Abutment

3. Seepage at toe or along downstream face - Seepage from toe drain and one area slightly above toe drain on slope section below

d. Downstream Area - below embankment

1. Difficult to observe due to dense growth of vegetation west of service road

2. Seepage, unusual growth - considerable growth masked the area, however a small wet area was observed approximately 50 feet west of the south spillway wall near outlet of 8" clay pipe

3. Evidence of surface movement beyond embankment toe - none observed

4. Miscellaneous - purpose of 8" clay pipe approximately 50 feet west of south spillway wall could not be determined. Pipe was flowing but full

e. Drainage System

A new drain on the downstream face was installed in 1973 consisting of 8"-6" mesh perforated clay pipes in crushed stone. Sloped to an open grouted manhole slightly south of center of dam, then 12" wide embankment road to an open channel.
(1) Condition of relief wells, drains, etc.

---

Good condition of all drains

---

(2) Discharge from Drainage System
day drain discharge:

2 to 3 gpm

---

Note: 'X' indicates seepage or wet area
4) **Instrumentation**

(1) Monumentation/Surveys  
**Level in place:**

(2) Observation Wells  **NONE**

(3) Weirs  **NONE**

(4) Piezometers  **NONE**

(5) Other

5) **Reservoir**

a. Slopes  
Slopes appear stable, some minor sloughing observed probably due to wave action and/or surface runoff

b. Sedimentation  **NONE observed**
6) **Spillway(s) (including tail race channel)**

- Ungated - reinforced concrete, bridge over spillway
- 8' clearance, 2' wide center per. 2 areas 58.5' wide each side

a. **General**
   - 2 J foot high flashboards in place - oak plank
   - Walls slightly bent downstream 2 minor cracks
   - On spillway walls, some debris & men with small trees along walls

b. **Principle Spillway**
   - Riprap approach channel in good condition
   - Spillway crest in good condition, spillway chute in poor condition, cracked & broken slabs, maximum differential 4 inch, 2 springs making up from core holes 26' high
   - Also spring along joint of slab, numerous core holes evident
   - Grass & vegetation in joints of slab, ponded 16' below top of slab in 1 joint

c. **Emergency or Auxiliary Spillway**
   - None
   - “b. east wing” cut off wall installed in late 1950's with
   - Problems with slabs were observed (38' wide 5' deep for each
   - Spillway wall @ edge of approach channel), quantity of
   - Flow observed at end of spillway chute near north wall, possible seepage

d. **Condition of Tail race channel**
   - Some debris, recently eroded
   - Channel exposing silt clay bang of stream, some logs used
   - to retain so. 1 around 24" CIP under supply main, logs were
   - being breached on north end. Due to loss of riprap spillway
   - is beginning to be undermined

e. **Stability of Channel side/slopes**
   - Over-steepened: 1:2.5 slopes
   - Undisturbed by erosion & loss of riprap, channel needs
   - to be cleaned of debris, place filter cloth then
   - heavy stone fill placed over complete channel to
   - a distance below water supply main, remove logs
7) Downstream Channel

   Stony creek bed no problem areas

   a. Condition (debris, etc.) Some debris  Some minor
      Sloughing  no major problems

   b. Slopes Generally adequate

   c. Approximate number of homes Design report stated 33 homes downstream
      primarily in village of Vischer Ferry. Little new development
      evident since that time.

8) Miscellaneous
9) Structural:
   a. Concrete Surfaces ________________________
   Generally in good condition

   b. Structural Cracking
   2 cracks observed in spillway walls (miger)
   Numerous cracks in spillway slabs of spillway

   c. Movement - Horizontal & Vertical Alignment (Settlement)
   Maximum differential settlement of spillway slabs

   d. Junctions with Abutments or Embankments ________________________
   Generally good condition

   e. Drains - Foundation, Joint, Face ________________________

   f. Water passages, conduits, sluices
   Outlet & low level reservoir drain in good condition
   All valves reported to be in good working operation

   g. Seepage or Leakage
   Excessive seepage below spillway
   Slabs - investigate this, could develop into serious problem
h. Joints - Construction, etc.  
   Good condition except
   for spillway slabs

i. Foundation  
   Good condition except for void beneath
   spillway slabs & erosion of tailrace channel which
   could undermine spillway slabs & walls.
   Condition of core wall & cut-off plugging could not be observed.

j. Abutments  
   No concrete obstructions

k. Control Gates  
   Good condition

l. Approach & Outlet Channels  
   Spillway chute in poor condition.
   Seepage at sides of spillway slab, riprap in
   good shape on approach channel

m. Energy Dissipators (plunge pool, etc.)  
   No structural elements
   below spillway chute - riprap only - in poor
   condition

n. Intake Structures  
   Good condition - 3 intakes
   Good maintenance to clear debris, etc.

o. Stability  
   Except for spillway slabs appears good

p. Miscellaneous
HYDROLOGIC DATA AND COMPUTATIONS

APPENDIX E
### AREA-CAPACITY DATA:

<table>
<thead>
<tr>
<th>Description</th>
<th>Elevation (ft.)</th>
<th>Surface Area (acres)</th>
<th>Storage Capacity (acre-ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Top of Dam</td>
<td>263.0</td>
<td>351</td>
<td>100</td>
</tr>
<tr>
<td>2) Design High Water (Max. Design Pool)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3) Auxiliary Spillway Crest</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4) Pool Level with Flashboards</td>
<td>257.7</td>
<td>314</td>
<td>6300</td>
</tr>
<tr>
<td>5) Service Spillway Crest</td>
<td>255</td>
<td>295</td>
<td>5500</td>
</tr>
</tbody>
</table>

### DISCHARGES

<table>
<thead>
<tr>
<th>Description</th>
<th>Volume (cfs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Average Daily</td>
<td>3.9 to 4.7</td>
</tr>
<tr>
<td>2) Spillway @ Maximum High Water</td>
<td>5800</td>
</tr>
<tr>
<td>3) Spillway @ Design High Water</td>
<td></td>
</tr>
<tr>
<td>4) Spillway @ Auxiliary Spillway Crest Elevation</td>
<td></td>
</tr>
<tr>
<td>5) Low Level Outlet</td>
<td>9</td>
</tr>
<tr>
<td>6) Total (of all facilities) @ Maximum High Water</td>
<td>5809</td>
</tr>
<tr>
<td>7) Maximum Known Flood</td>
<td>10</td>
</tr>
<tr>
<td>CREST:</td>
<td>ELEVATION: 263</td>
</tr>
<tr>
<td>--------</td>
<td>---------------</td>
</tr>
<tr>
<td>Type:</td>
<td>Earth Embankt</td>
</tr>
<tr>
<td>Width:</td>
<td>26 ft</td>
</tr>
<tr>
<td>Length:</td>
<td>807 ft, 117 ft Spillway</td>
</tr>
<tr>
<td>Location:</td>
<td>North end of Embankt</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SPILLWAY:</th>
<th>PRINCIPAL</th>
<th>EMERGENCY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elevation</td>
<td>2.55</td>
<td>None</td>
</tr>
<tr>
<td>Type</td>
<td>Reinforced Concrete Chute</td>
<td></td>
</tr>
<tr>
<td>Width</td>
<td>119' x 2'</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of Control</th>
<th>Uncontrolled</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Controlled:</th>
<th>2.7' high Flashboards (Flashboards; gate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td></td>
</tr>
<tr>
<td>Size/Length</td>
<td>27' high 119' wide</td>
</tr>
<tr>
<td>Invert Material</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Anticipated Length of operating service</th>
<th>400 Ft. (Exit) Chute Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height Between Spillway Crest &amp; Approach Channel Invert</td>
<td>0</td>
</tr>
</tbody>
</table>

(Weir Flow)
OUTLET STRUCTURES/EMERGENCY DRAWDOWN FACILITIES:

<table>
<thead>
<tr>
<th>Type</th>
<th>Gate</th>
<th>Sluice</th>
<th>Conduit</th>
<th>Penstock</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shape</td>
<td>Road Replaced Concrete tower, Cast Iron Conduit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>Tower has 3-24&quot; gate valve inlet, 30'-2&quot; main conduit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elevations</td>
<td>Entrance Invert</td>
<td>226.0</td>
<td>234.0</td>
<td>250.5</td>
</tr>
<tr>
<td></td>
<td>Exit Invert</td>
<td>Not available</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tailrace Channel: Elevation</td>
<td>221.0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

HYDROMETEROLOGICAL GAGES:

| Type       | None |
|           |      |
| Location   |      |
| Records    |      |
| Date       | May 7, 1958 | Feb 12, 1960 |
| Max. Reading | 257.7 |

FLOOD WATER CONTROL SYSTEM:

| Warning System | None |
|               |      |
| Method of Controlled Releases (mechanisms): | Manually operated 24" and gate valves |
DRAINAGE AREA: ___________________________ 11.2 sq. miles

DRAINAGE BASIN RUNOFF CHARACTERISTICS:

Land Use - Type: ____________________________ Pasture/Farm/woods

Terrain - Relief: _____________________________ Gentle slopes

Surface - Soil: _______________________________ Maxima fine sand, medium fine sandy loam

Runoff Potential (existing or planned extensive alterations to existing
(surface or subsurface conditions)

Potential Sedimentation problem areas (natural or man-made; present or future)

Dikes - Floodwalls (overflow & non-overflow) - Low reaches along the
Reservoir perimeter:

Location: ____________________________ None

Elevation: ____________________________

Reservoir:

Length @ Maximum Pool ___________________________ 2.2 (Miles)

Length of Shoreline (@ Spillway Crest) ___________ 1.0 (Miles)
Soil Names and Hydrologic Classification

 Merrimac very fine sand 10%  
 Merrimac fine sand 80%  
 Suffield fine sandy loam 10%  

Land Use

Woods, fair  

USGS: NISKAYUNA

CN 36  

Since the ground freezes during the winter, it may not allow normal infiltration during the Spring thaw. Incidentally, one of the two floods of record occurred on February 12, 1960 during Spring thaw. Considering the above facts, CN selected is 60, instead of 36.
**SPILLWAY HYDROGRAPH**

Name of dam: COLONIE DAM

Dam number: N.Y. 204

Type of spillway: Chute

Hazard class: C

Drainage area: 11.2 square miles

Design flood: Probable Maximum Flood

Calculations by/date: Islam, July 78

Rainfall (P) = 21.5 inches

Curve No. (CN) = 60

Runoff (Q) = 15.3 inches

Hydrograph family No. = 2

Duration of excess rainfall (To) = 5.17 hrs.

Time of concentration (Tc) = 12.8 hrs.

Tp = 1.7 Tc = 17 x 12.82 = 8.97 hrs.

To = 5.17 / 0.58 = 8.97

Revised Tp = 1

Revised Tp = \( \frac{To}{Rev. \frac{Tc}{Tp}} = 5.17 \times 5.17 \)

Qp = \( \frac{484A}{Rev. Tp} = \frac{484 \times 11.2}{5.17} = 104.9 \)

Qqp = Q x Qp = 15.3 x 104.9 = 16050
<table>
<thead>
<tr>
<th>Line #</th>
<th>$\frac{t}{T_p}$</th>
<th>Rev. $T_p = 5:17$</th>
<th>$\frac{q_c}{q_p}$</th>
<th>$Q_{qp} = 16050$</th>
<th>Q</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>1.28</td>
<td>1.44</td>
<td>0.026</td>
<td>417</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>1.56</td>
<td>2.90</td>
<td>0.170</td>
<td>2729</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>1.84</td>
<td>4.34</td>
<td>0.480</td>
<td>7704</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>1.12</td>
<td>5.79</td>
<td>0.802</td>
<td>12872</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>1.40</td>
<td>7.24</td>
<td>1.885</td>
<td>14204</td>
<td></td>
<td>Max.</td>
</tr>
<tr>
<td>7</td>
<td>1.68</td>
<td>8.69</td>
<td>1.370</td>
<td>12359</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>1.96</td>
<td>10.13</td>
<td>1.550</td>
<td>8828</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>2.24</td>
<td>11.58</td>
<td>1.280</td>
<td>6099</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>2.52</td>
<td>13.03</td>
<td>1.257</td>
<td>4125</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>2.80</td>
<td>14.49</td>
<td>1.160</td>
<td>2464</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>3.08</td>
<td>15.92</td>
<td>1.130</td>
<td>1814</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>3.36</td>
<td>17.37</td>
<td>0.778</td>
<td>1253</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>3.64</td>
<td>18.82</td>
<td>0.552</td>
<td>835</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>3.92</td>
<td>20.27</td>
<td>0.334</td>
<td>546</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>4.20</td>
<td>21.71</td>
<td>0.230</td>
<td>369</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>4.48</td>
<td>23.16</td>
<td>0.150</td>
<td>241</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>4.76</td>
<td>24.61</td>
<td>0.099</td>
<td>144</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>5.04</td>
<td>26.04</td>
<td>0.004</td>
<td>64</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>5.32</td>
<td>27.50</td>
<td>0.002</td>
<td>32</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>5.60</td>
<td>28.95</td>
<td>0.001</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>5.88</td>
<td>30.40</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
P = 21.5 inches
Q = 15.3 inches

\[
\text{Reservoir Detention Volume} = \frac{1763.04}{15.3 \times 11.2 \times 640} = 0.193 \text{ in.}
\]

Since the above ratio is only 19 percent, no reduction of peak inflow is done.

PMF Peak Outflow is same as PMF Peak Inflow:

= 14,200 cfs.
Spillway Rating Curve

\[ Q = C \cdot L \cdot H^{1/2} \]

where:
- \( Q \) = Discharge over Spillway
- \( C \) = Coefficient of discharge
- \( L \) = Length of spillway
- \( H \) = Head of water over spillway
- \( P \) = Height from bottom to top of spillway

\[ C = 2.235 \cdot \frac{1}{60H^{1/2} - 156} + 428 \cdot \frac{H}{P} \text{ for rectangular channel} \]

<table>
<thead>
<tr>
<th>( H ) (ft.)</th>
<th>( P ) (ft.)</th>
<th>( C )</th>
<th>( L ) (ft.)</th>
<th>( Q ) (cfs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.083</td>
<td>2.7</td>
<td>3.47</td>
<td>117</td>
<td>10</td>
</tr>
<tr>
<td>1.0</td>
<td>2.7</td>
<td>3.41</td>
<td>117</td>
<td>3.99</td>
</tr>
<tr>
<td>2.0</td>
<td>2.7</td>
<td>3.62</td>
<td>117</td>
<td>1.98</td>
</tr>
<tr>
<td>3.0</td>
<td>2.7</td>
<td>3.72</td>
<td>117</td>
<td>2.362</td>
</tr>
<tr>
<td>4.0</td>
<td>2.7</td>
<td>3.87</td>
<td>117</td>
<td>3.622</td>
</tr>
<tr>
<td>5.0</td>
<td>2.7</td>
<td>4.03</td>
<td>117</td>
<td>5.292</td>
</tr>
<tr>
<td>5.3</td>
<td>2.7</td>
<td>4.08</td>
<td>117</td>
<td>5.825</td>
</tr>
<tr>
<td>8.0</td>
<td>Without</td>
<td>4.08</td>
<td>117</td>
<td>10,800</td>
</tr>
<tr>
<td></td>
<td>Flashboards</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Storage Capacity Curve

<table>
<thead>
<tr>
<th>ELEVATION (FEET)</th>
<th>INCREMENT (ACRE- FEET)</th>
<th>TOTAL VOLUME (ACRE- FEET)</th>
</tr>
</thead>
<tbody>
<tr>
<td>255.00</td>
<td>0</td>
<td>5520</td>
</tr>
<tr>
<td>257.77</td>
<td>822</td>
<td>6342</td>
</tr>
<tr>
<td>257.88</td>
<td>854</td>
<td>6374</td>
</tr>
<tr>
<td>258.00</td>
<td>916</td>
<td>6436</td>
</tr>
<tr>
<td>259.10</td>
<td>1236</td>
<td>6756</td>
</tr>
<tr>
<td>260.00</td>
<td>1563</td>
<td>7063</td>
</tr>
<tr>
<td>261.00</td>
<td>1897</td>
<td>7917</td>
</tr>
<tr>
<td>262.00</td>
<td>2237</td>
<td>7757</td>
</tr>
<tr>
<td>263.00</td>
<td>2585</td>
<td>8105</td>
</tr>
</tbody>
</table>
LIST OF REFERENCES

APPENDIX F
APPENDIX F

REFERENCES


