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NATIONAL DAM SAFETY PROGRAM. CLEARVIEW LAKE DAM (NJ 00147), PAS--ETC(U)
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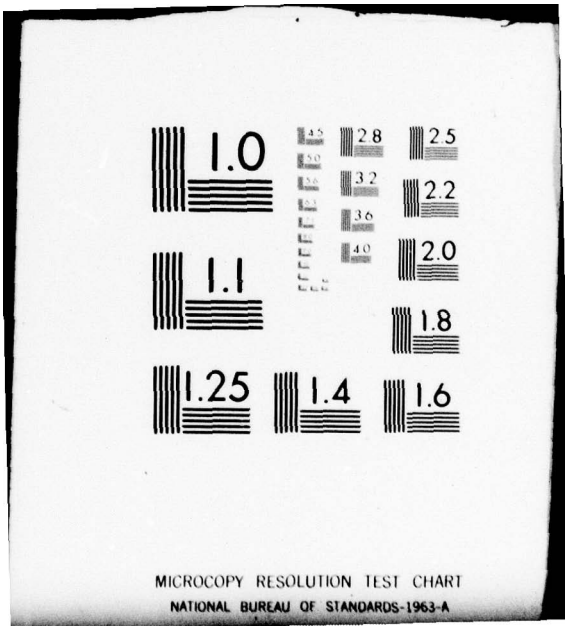
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PHASE 1 INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

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DEPARTMENT OF THE ARMY
Philadelphia District
Corps of Engineers
Philadelphia, Pennsylvania

79 09 24 034

August, 1979

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Clearview Lake Dam
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Passaic River Basin, Paulins Kill
Tributary, Sussex County, New Jersey.
Phase 1 Inspection Report.

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Copies are obtainable from Naticnal Technical Information Service, Springfield, Virginia, 22151.

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Spillway
Dams
Structural analysis
Visual inspection
National Dam Inspection Act Report
Clearview Lake Dam, N.J.

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

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report.

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DEPARTMENT OF THE ARMY
PHILADELPHIA DISTRICT, CORPS OF ENGINEERS
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PHILADELPHIA, PENNSYLVANIA 19106

IN REPLY REFER TO
NAPEN-D

17 SEP 1979

Honorable Brendan T. Byrne
Governor of New Jersey
Trenton, NJ 08621

Dear Governor Byrne:

Inclosed is the Phase I Inspection Report for Clearview Lake Dam in Sussex County, New Jersey which has been prepared under authorization of the Dam Inspection Act, Public Law 92-367. A brief assessment of the dam's condition is given in the front of the report.

Based on visual inspection, available records, calculations and past operational performance, Clearview Lake Dam, initially listed as a high hazard potential structure, but reduced to a low hazard potential structure as result of this inspection, is judged to be in poor overall condition. The dam's spillway is considered inadequate since 5 percent of the Spillway Design Flood--SDF - would overtop the dam. (The SDF, in this instance, is the One Hundred Year Flood). The following remedial actions could be undertaken:

a. The spillway's adequacy and any necessary remedial measures should be determined by a qualified professional consultant engaged by the owner using more sophisticated methods, procedures, and studies.

b. The upstream slopes of the dam embankment should be regraded, compacted and protected with additional riprap around the spillway entrance.

c. The trees should be removed from the downstream slopes and the disturbed areas regraded, compacted and seeded.

d. The auxiliary spillway gate should be rehabilitated.

e. The spillway bridge substructure, culvert walls and footings should be rebuilt or extensively repaired and the piping channels sealed off.

79 09 24 034

NAPEN-D
Honorable Brendan T. Byrne

f. Because no O/M procedures are in evidence at the present time, the owners should develop a check list for periodic maintenance inspections so a record of conditions can be maintained. Further, because no Dam Application is on file and no records are available in Trenton, the NJDEP should review the legal status of this dam to insure it is in compliance with all State regulations and statutes (especially since it serves as a public-travelled way).

A copy of the report is being furnished to Mr. Dirk C. Hofman, New Jersey Department of Environmental Protection, the designated State Office contact for this program. Within five days of the date of this letter, a copy will also be sent to Congressman James A. Courter of the Thirteenth District. Under the provision of the Freedom of Information Act, the inspection report will be subject to release by this office, upon request, five days after the date of this letter.

Additional copies of this report may be obtained from the National Technical Information Services (NTIS), Springfield, Virginia 22161 at a reasonable cost. Please allow four to six weeks from the date of this letter for NTIS to have copies of the report available.

An important aspect of the Dam Safety Program will be the implementation of the recommendations made as a result of the inspection. We accordingly request that we be advised of proposed actions taken by the State to implement our recommendations.

Sincerely,

JOEL T. CALLAHAN
Lieutenant Colonel, Corps of Engineers
Acting District Engineer

1 Incl
As stated

Copies furnished:
Dirk C. Hofman, P.E., Deputy Director
Division of Water Resources
N.J. Dept. of Environmental Protection
P.O. Box CN029
Trenton, NJ 08625

John O'Dowd, Acting Chief
Bureau of Flood Plain Management
Division of Water Resources
N.J. Dept. of Environmental Protection
P.O. Box CN029
Trenton, NJ 08625

CLEARVIEW LAKE DAM (NJ00147)

CORPS OF ENGINEERS ASSESSMENT OF GENERAL CONDITIONS

This dam was inspected on 30 April 1979 by Louis Berger and Associates, Inc. under contract to the State of New Jersey. The State, under agreement with the U.S. Army Engineer District, Philadelphia, had this inspection performed in accordance with the National Dam Inspection Act, Public Law 92-367.

Clearview Lake Dam, initially listed as a high hazard potential structure, but reduced to a low hazard potential structure as result of this inspection, is judged to be in poor overall condition. The dam's spillway is considered inadequate since 5 percent of the Spillway Design Flood--SDF - would overtop the dam. (The SDF, in this instance, is the One Hundred Year Flood). The following remedial actions could be undertaken:

a. The spillway's adequacy and any necessary remedial measures should be determined by a qualified professional consultant engaged by the owner using more sophisticated methods, procedures, and studies.

b. The upstream slopes of the dam embankment should be regraded, compacted and protected with additional riprap around the spillway entrance.

c. The trees should be removed from the downstream slopes and the disturbed areas regraded, compacted and seeded.

d. The auxiliary spillway gate should be rehabilitated.

e. The spillway bridge substructure, culvert walls and footings should be rebuilt or extensively repaired and the piping channels sealed off.

f. Because no O/M procedures are in evidence at the present time, the owners should develop a check list for periodic maintenance inspections so a record of conditions can be maintained. Further, because no Dam Application is on file and no records are available in Trenton, the NJDEP should review the legal status of this dam to insure it is in compliance with all State regulations and statutes (especially since it serves as a public-travelled way).

APPROVED: _____

JOEL T. CALLAHAN
Lieutenant Colonel, Corps of Engineers
Acting District Engineer

DATE: 13 September 79

PHASE I REPORT
NATIONAL DAM INSPECTION PROGRAM

Name of Dam Clearview Lake Dam Fed ID# NJ 00147

State Located New Jersey
County Located Sussex
Coordinates Lat. 4106.9 - Long. 7446.1
Stream Tributary Paulins Kill
Date of Inspection 30 April 1979

ASSESSMENT OF GENERAL CONDITIONS

Clearview Lake Dam is judged to be in poor overall condition. The spillway/vehicular bridge substructure is severely undermined and is in imminent danger of collapse. However, it is not anticipated that a failure of the spillway would result in loss of life or significant economic loss in the downstream area and it is recommended that the dam be reclassified as low hazard. Remedial actions to be undertaken in the future include 1) regrading the embankment slopes and removing the secondary growth, 2) placing additional riprap protection around the main spillway inlet, 3) rehabilitating the auxiliary spillway gate, and 4) repairing or replacing the main spillway.

The dam presently has inadequate spillway capacity, being able to accomodate only 4% of the 100 year frequency design flood.

F. Keith Jolls P.E.
Project Manager

STATE OF KENTUCKY
F. KEITH JOLLS
5432
REGISTERED PROFESSIONAL ENGINEER

OVERVIEW OF CLEARVIEW LAKE DAM

APRIL, 1979

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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 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. 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. 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.

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM
NAME OF DAM: CLEARVIEW LAKE DAM FED #NJ 00147

SECTION 1 - PROJECT INFORMATION

1.1 GENERAL

a. Authority

This report is authorized by the Dam Inspection Act, Public Law 92-367, and has been prepared in accordance with Contract FPM-36 between Louis Berger & Associates, Inc. and the State of New Jersey and its Department of Environmental Protection, Division of Water Resources. The State, in turn, is under agreement with the U.S. Army Corps of Engineers, Philadelphia to have this inspection performed.

b. Purpose of Inspection

The purpose of this inspection is to evaluate the structural and hydraulic condition of the Clearview Lake Dam and appurtenant structures, and to determine if the dam constitutes a hazard to human life or property.

1.2 DESCRIPTION OF PROJECT

a. Description of Dam and Appurtenances

Clearview Lake Dam is a straight, 250 foot long, low earth embankment built across the east end of the reservoir. It carries a two lane gravel road across the 18 foot wide crest and has a small steel and concrete I-beam bridge built 3 feet above the main spillway. The spillway consists of a 7.5 foot wide concrete sill with an 18 foot long concrete apron and side walls. Additionally, the dam contains an inoperable 24"x 42" concrete arch outlet located 70 feet from the right abutment.

b. Location

The dam is located on an unnamed tributary of Paulins Kill about 4 miles north of Newton in Hampton Township, Sussex County.

c. Size Classification

The dam at Clearview Lake has a maximum height of 9.7 feet and a maximum storage capacity of 125 acre-feet. Accordingly, it is placed in the small size category as defined by the criteria in the Recommended Guidelines for Safety Inspection of Dams (storage less than 1,000 acre-feet and height less than 40 feet).

d. Hazard Classification

The area immediately downstream consists of undeveloped marshland and wooded areas as far as the Morris Turnpike and the Sussex County Health Farm (about a mile downstream). While there is also a library and juvenile home in the same general downstream area, both appear to be well above the flood plain. Since the height of this dam is quite modest and the size of the downstream absorptive area considerable, it is unlikely that excessive downstream property damage would result from a collapse. Accordingly, it is recommended that this structure be downgraded to a low hazard category as it does not constitute a serious hazard to the downstream development.

e. Ownership

This dam is owned by the Central Sussex Land Corp., Box P, Branchville, New Jersey.

f. Purpose of Dam

The dam at Clearview Lake was constructed to create a lake for recreational and residential development purposes.

g. Design and Construction History

The dam was built approximately 20 years ago according to its present owners. No further information was available concerning its design or construction as the ownership has changed hands since its original installation.

h. Normal Operating Procedures

Nothing is known about the operations (see Section 4).

1.3 PERTINENT DATA

a. Drainage Area

Clearview Lake Dam has a drainage area of 3.5 square miles which consists primarily of woodlands and some recent residential development around the lake.

b. Total spillway capacity at maximum pool elevation - 222 cfs

c. Elevations (ft. above MSL)

Top of dam - 535
Principal spillway crest - 530 (without flashboards)
Streambed at centerline of dam - 525.3±

d. Reservoir

Length of maximum pool (top of dam) - 2600 feet

Length of recreation pool - 2,200 feet

e. Storage (acre-feet)

Top of dam - 125
Recreation pool - 55

f. Reservoir Surface (acres)

Top of dam - 17
Recreation pool - 11

g. Dam

Type - Earth with box culvert spillway and gated auxilary outlet.

Length - 250 feet

Height - 9.7 feet

Top Width - 18 feet

Side Slopes - variable (approx. 2H:IV in upper zones).

Zoning - Unknown

Impervious Core - Unknown

Cutoff - Unknown

Grout curtain - Unknown

h. Diversion and Regulating Tunnel - None

i. Spillway

Type - Steel and concrete box culvert sill at elevation 530±

Culvert width - 7.5 feet

Gates - Stop logs to elevation 532 (Missing)

D/S Channel - Concrete apron empties into rock-bottomed stream.

j. Regulating Outlets

24" x 42" concrete arch conduit. Exit invert at Elevation 526.5. Gated entrance conditions unknown.

SECTION 2 - ENGINEERING DATA

2.1 DESIGN

No design was located relative to the dam and no records were available at the NJDEP. There is hearsay information that an inspection by a professional engineer was performed about 10 years ago with the intent of repairing the dam. However, details of the proposed repairs were not located. A review of geotechnical literature pertaining to this general area provided some information concerning foundation conditions but it appears that the dam is not founded in bedrock. The overburden in this area is generally greater than 10 feet thick and consists of stratified sands and gravels. These stream deposits are underlain by a heterogeneous mixture of soils which mark the location of a recessional moraine of the Wisconsin glacier. The underlying bedrock is composed of a gray, cherty limestone known as the Kittatinny formation which is Cambro-Ordovician in age.

2.2 CONSTRUCTION

No information regarding the date of installation, name of the general contractor, permit application data or construction inspections was available. However, field measurements provided sufficient data to assess the present hydraulic and hydrologic conditions. (see Section 5).

2.3 OPERATION

No information is available (see Section 4).

2.4 EVALUATION

a. Availability

While nothing is known regarding the original design and construction, the field reconnaissance is believed sufficient to assess the continued stability of the existing spillway structure and the feasability of rehabilitating the intake structure of the low-level drain. (see Section 7)

b. Adequacy

It is believed that the data gathered by the field inspection team is adequate, especially in view of the low overall height of embankment and lack of downstream hazard.

c. Validity

No meaningful statement can be made in view of the complete lack of engineering data.

SECTION 3 - VISUAL OBSERVATIONS

3.1 FINDINGS

a. General

Visual inspection of the Clearview Lake Dam was conducted on April 30, 1979. While the embankment appeared to be in a generally fair and stable condition, the outlet structures are in an advanced stage of deterioration. Photographs taken during an earlier preliminary reconnaissance showed the lake level approximately two feet higher than at the time of inspection and the presence of stop logs (which had been removed when the inspection team visited the site). The owners disclaimed any knowledge of the removal.

b. Dam

The embankment is straight and level and functions as an access road to homes on the north side of the lake. The earth crest is 18 feet wide and has a fairly uniform horizontal alignment although dotted with potholes. The crest rises slightly at each abutment. The upstream face has a thin grass cover between the crest and normal pool elevation. Severe erosion, surface cracking and sloughing were noted behind both wingwalls at the outlet bridge while smaller gullies occur along the entire upstream face. The entire downstream slope is covered with a heavy growth of brush and trees. A cavity over two feet deep and about 2 feet in diameter was observed behind the left upstream wingwall and appears to be the result of severe piping behind the foundation wall. This opening appears to extend toward the downstream side of the dam where a very heavy seep, estimated at 2 to 4 gallons per minute, was discharging from behind and under the left downstream timber wingwall. Seepage was also noted along the downstream toe from the right abutment to the outlet channel of the low level drain.

Heavy stone and concrete rubble has been dumped on the upstream face of the dam in the area of the outlet conduit's gate frame. Both side slopes of the embankment are very irregular and do not appear to have been built to any exact design slope.

c. Appurtenant Structures

The primary spillway is located about 150 feet from the right abutment and consists of a 3 feet high x 7.5 feet wide steel I-beam and concrete bridge with a paved invert. Discharge through the outlet flows down a short concrete apron to the rock-strewn downstream channel. The upstream wingwalls are masonry while railroad ties form the downstream retaining wingwalls. The upstream wingwalls are in an advanced state of deterioration and are completely undercut. Stoplog slots, located at the junction of the wingwalls and the culvert sidewalls are demolished. The sidewalls are severely spalled and cracked and at the downstream ends, have separated from the sill. The outlet apron has broken away from the sill and is partially collapsed. Although the timber cribbing of the downstream retaining wingwalls appears in fair condition, the concrete footings under the cribbing are undermined and the walls tilted toward the channel. The 9 inch thick concrete deck slab is spalled along its edges and fascia and the steel I-beams are rusted.

In general, the spillway structure is in an advanced stage of deterioration and its long-term stability is questionable. At the time of inspection, there were no stop logs in place and the culvert discharge was about 20 cfs.

The concrete auxiliary outlet pipe is located about seventy feet from the right abutment and is approximately 8.5 feet below the crest elevation. The outlet protrudes from the downstream slope of the embankment without a headwall and is severely spalled and deteriorated. There are several inches of silt and sediment in the bottom of the pipe. The inlet conditions are buried and could not be observed but the riser gate frame is twisted, badly rusted and appears

inoperable. The type of gate could not be determined and it was noted that it is fixed to a non-standard size (24" x 42") conduit.

d. Reservoir Area

There are several homes on the south shore and scattered across the slopes on both sides of the lake although the area is not heavily developed. Some debris was noted in the vicinity of the dam but on the whole, the lake is relatively clean. It appears that the reservoir is normally maintained at an elevation approximately 2 feet higher than that observed at the time of the inspection.

e. Downstream Channel

Below the dam, the natural channel enters a marsh which extends several hundred feet downstream. Some debris was noted along the banks of the stream. About 400 feet downstream from the dam, a small tributary joins the channel and the combined flow continues unimpeded to the Frankford Township boundary about 4,000 feet downstream.

SECTION 4 - OPERATIONAL PROCEDURES

4.1 PROCEDURES

Operational procedures were not observed by the inspection team and there is no available information which might indicate the existence of a formal operation or maintenance program.

4.2 MAINTENANCE OF DAM

There is no physical evidence that the dam is being maintained at regular intervals. Communication with a local engineer who inspected the dam about 10 years ago indicated the dam and outlet facilities were in need of extensive rehabilitation at that time. From all appearances, the recommended repairs were never made and the deterioration has continued.

4.3 MAINTENANCE OF OPERATING FACILITIES

There are no indications that the outlet facilities are being maintained. Discussions with a representative of the corporation which owns the dam reveal there is no formal program nor does there appear to be any one person presently responsible for the upkeep of the gates.

4.4 DESCRIPTION OF ANY WARNING SYSTEM IN EFFECT

There is no warning system in effect at this dam. However, in view of the modest height of embankment and the lack of downstream hazard, the absence of a warning system is not considered a serious defect.

4.5 EVALUATION OF OPERATIONAL ADEQUACY

Since the discharge is presently flowing uncontrolled thru the spillway, formal operational procedures would appear unnecessary. However, the complete lack of maintenance is considered a major deficiency. While there is little potential for downstream damage resulting from a failure, the culvert footings, which are in an advanced state of deterioration, could collapse at any time. In summary, the complete lack of operational or maintenance procedures is considered inadequate.

SECTION 5 - HYDRAULIC/HYDROLOGIC

5.1 EVALUATION OF FEATURES

a. Design Data

Based on the criteria in the Recommended Guidelines for Safety Inspection of Dams, the 100-year frequency event was selected as the design storm by the inspecting engineer. Precipitation data was obtained from Technical Paper 40 and NOAA Technical Memorandum NWS Hydro 35. Inflow to the reservoir for the selected 100-year storm was computed utilizing the HEC-1 computer program. This gave a peak inflow to the reservoir of 5463 cfs. Routing this through the reservoir reduced the peak to 5351 cfs. The spillway has a maximum discharge capacity of approximately 222 cfs before overtopping occurs and can therefore accommodate only 4% of the design flood.

b. Experience Data

Nothing was located regarding the past hydrologic history of the dam. It appears the spillway (especially with the 2 foot flashboards in place) was not designed by any normally accepted engineering procedure to accommodate a design flow of a 3.5 sq. mile drainage area.

c. Visual Observations

At the time of an earlier inspection the water level was flowing over the flashboards and the lake level was approximately 2 feet higher than on 30 April. With the flashboards removed, the outlet was flowing freely but as previously stated the exit velocities have completely undercut the abutment footings.

d. Overtopping Potential

Although there are no indications that the dam has been recently overtopped, the appended analysis indicates that the dam would be over-

topped by approximately 4 feet for the 100 year flood. Accordingly, the discharge capacity is inadequate in the terms of the Guidelines criteria.

e. Drawdown Potential

Using the auxiliary sluice gate (at El. 526.5), it would take approximately 21 hours to dewater the reservior. As previously noted, this gate is inoperable at the present time.

SECTION 6 - STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations

The bridge substructure is in an advanced stage of decay and should be replaced. There is evidence of seepage and piping in and around the entire substructure and the apron slab and footings are undercut. The undermining of the walls and footings indicate that excessive exit velocities are occuring here quite frequently and the attempt to stabilize the condition with timber cribbing and protective stone have proved inadequate. The piping holes observed in the dam crest indicate that the condition in the immediate vicinity of the spillway structure is deteriorating quite rapidly. The remainder of the dam embankment is judged to be in fair and stable condition although the slopes are covered with vegetation and minor seepage was noted along the downstream toe. As previously stated, the major seepage is concentrated immediately behind the walls of the spillway.

Summarizing Section 3, the spillway is in an advanced stage of deterioration and collapse of the substructure walls is immiment.

b. Design and Construction Data

As no design or construction data was available to review, the structural stability evaluation is based entirely on field observations. Due to its age and condition, the continued stability and safety (to vehicular traffic) of the spillway bridge is suspect.

c. Operating Records

No formal operating records exist. As previously stated, the dam appears to have operated satisfactorily as there is no recent hearsay information of the roadway having been overtopped.

d. Post Construction Changes

Nothing is known about any post construction changes except it appears that the broken concrete slab riprap on the slopes has been dumped there at some later date following the initial construction.

e. Seismic Stability

The dam is located in Seismic Risk Zone 1 and has negligible damage vulnerability due to its low height. Experience indicates dams in Zone 1 will have adequate stability under dynamic loads if stable under static loading conditions. In the opinion of the inspection team, the low embankment is stable under static loading conditions.

SECTION 7 - ASSESSMENTS/RECOMMENDATIONS/ REMEDIAL MEASURES

7.1 DAM ASSESSMENT

a. Safety

Subject to the inherent limitations of the Phase I visual inspection, the Clearview Lake Dam is classified as being in a generally poor condition. The spillway bridge carrying vehicular traffic over the main discharge outlet is adjudged to be in need of complete replacement. The spillway is hydraulically inadequate, being able to accommodate only 4% of the 100 year design flood. However, the possibility of a dam failure or overtopping is not considered particularly hazardous due to the modest dam height and almost complete lack of downstream development. Improvements to the culvert walls and footings are recommended since the bridge carries vehicular traffic and the continued integrity of the spillway structure is in doubt if conditions remain as they now exist.

b. Adequacy of Information

The information gathered in the field for the Phase I inspection is deemed to be adequate to assess the structural stability of the dam. However, no surveys or inspections have been recorded since 1969 and the spillway bridge has undergone serious deterioration since that time.

c. Urgency

It is recommended that the remedial measures enumerated below be taken under advisement in the near future.

d. Necessity for Further Study

Due to the low hazard classification, further engineering studies under the purview of the P.L. 92-367, are not recommended. It is determined that the dam does not constitute a

high hazard to human life or property but as previously stated, requires a replacement or reconstruction of the spillway substructure to safely maintain through traffic. It is further recommended that additional hydraulic/ hydrologic studies be undertaken by the owner to increase the spillway capacity.

7.2 RECOMMENDATIONS/REMEDIAL MEASURES

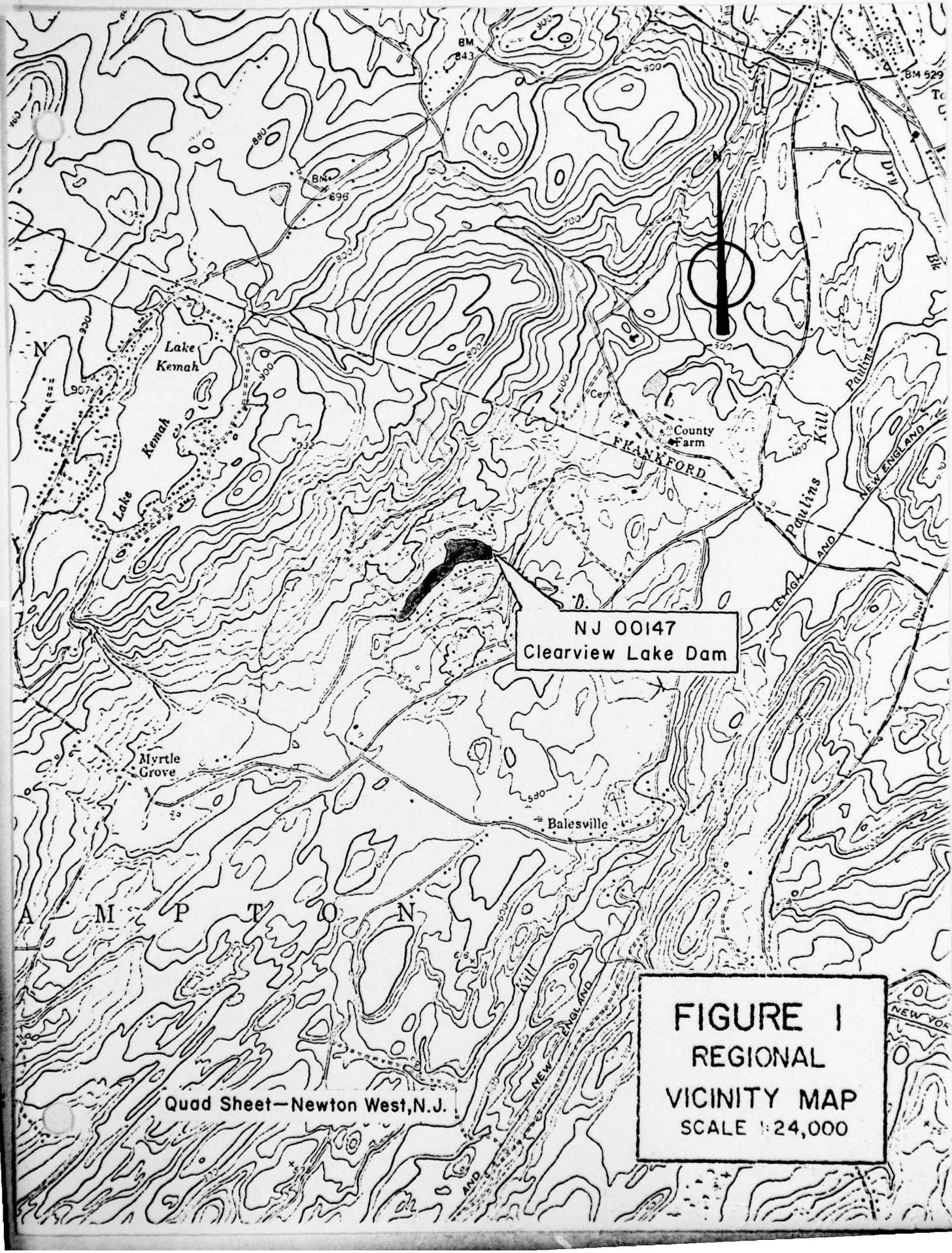
As previously stated, it is recommended that the vehicular bridge be replaced or reconstructed in the near future.

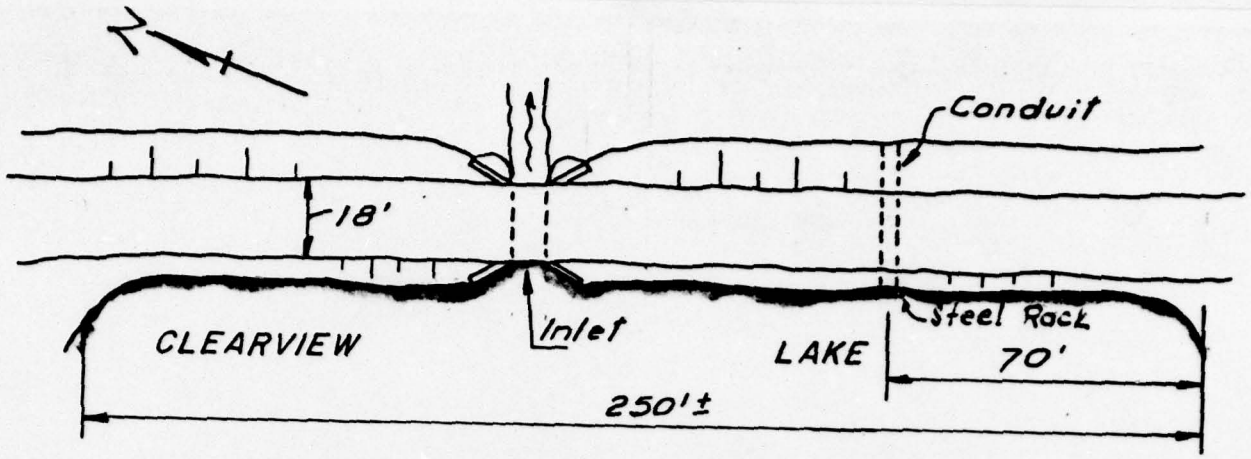
a. Remedial Measures

- The upstream slopes of the dam embankment should be regraded, compacted and protected with additional riprap around the spillway entrance.
- The trees should be removed from the downstream slopes and the distrubed areas regraded, compacted and seeded.
- The auxiliary spillway gate should be rehabilitated.
- The spillway substructure should be rebuilt or extensively repaired and the piping channels sealed off.

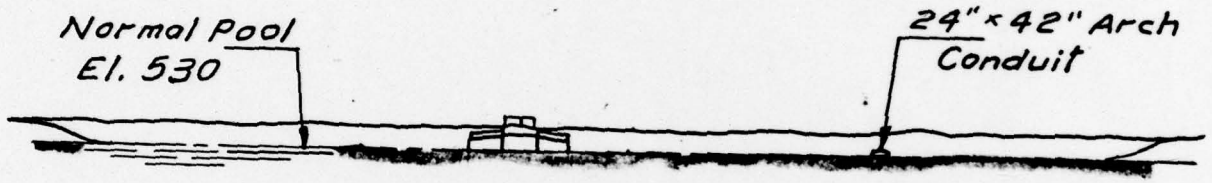
b. O&M Maintenance and Procedures

Because no O/M procedures are in evidence at the present time, the owners should develop a check list for periodic maintenance inspections so a record of conditions can be maintained. Further, because no Dam Application is on file and no records are available in Trenton, the NJDEP should review the legal status of this dam to insure it is in compliance with all State regulations and statutes (especially since it serves as a public-travelled way).


NJ 00147
Clearview Lake Dam
Lake Kemah
Lake Kemah
FRANKFORD
County Farm
Paulins Kill
Paulins
NEW ENGLAND
LEHIGH AND
Myrtle Grove
Balesville
AMPTON
Quad Sheet—Newton West, N.J.
FIGURE 1
REGIONAL
VICINITY MAP
SCALE 1:24,000

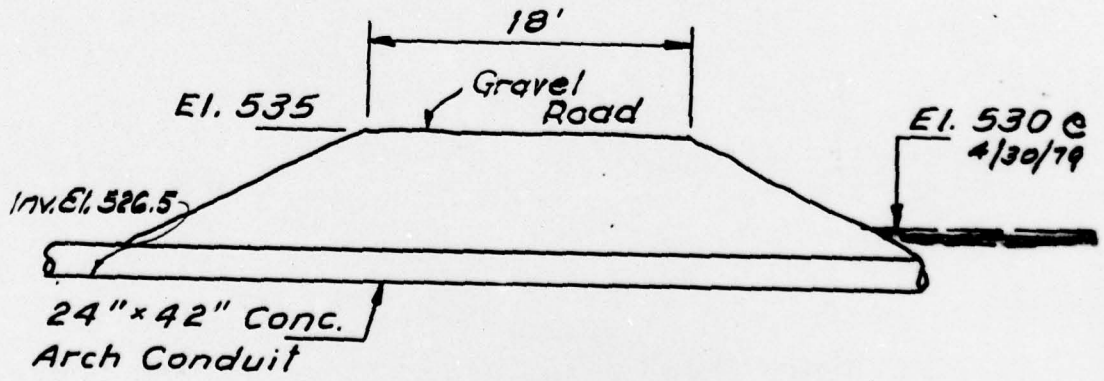


PLAN



ELEVATION

Not to Scale



SECTION THRU DAM

FIG. 2

Check List
Visual Inspection
Phase 1

Name Dam Clearview Lake County Sussex State New Jersey Coordinators NJDEP

Date(s) Inspection 4/30/79 Weather Clear Temperature 75°

Pool Elevation at Time of Inspection 530.5 M.S.L. Tailwater at Time of Inspection 526 M.S.L.

Inspection Personnel:

T. Chapter
K. Jolls
M. Carter
D. Mulligan
R. Greenfield

T. Chapter Recorder

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	Cracks and light sloughing behind both wingwalls and along upstream face.	Sloughed areas should be backfilled, graded and stabilized.
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	A marsh is located below the downstream toe of the central portion of the dam.	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	Structural failure at bridge abutment on both sides. Severe erosion behind both wingwalls. Severe erosion downstream side of bridge.	Abutments should be stabilized eroded areas need backfill.
VERTICAL AND HORIZONTAL ALINEMENT OF THE CREST	Irregular, potholed, well compacted gravel. Uniform horizontally, irregular face.	Potholes should be filled.
RIPRAP FAILURES	No riprap.	

EMBANKMENT

ISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
EXCESSIVE SHRUB GROWTH, TREES, ETC.	Heavy growth on downstream slopes and toe. Light grass cover on face.	Clear heavy vegetation
UNCTION OF EMBANKMENT ND ABUTMENT, SPILLWAY ND DAM	Embankment grades smoothly into both abutments. Junction of embankment and bridge abutments badly deteriorated.	Reconstruct deteriorated elements.
NY NOTICEABLE SEEPAGE	Seepage at right downstream toe between conduit and abutment. Rubble dumped on upstream face opposite seepage. Very heavy flow behind and under left downstream wingwall (20 gpm).	Investigate seepage and methods of control
TAFF GAGE AND RECORDER	None	
RAINS	None	

GATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SILL	Cracked. Concrete inlet apron broken and spalled.	Requires reconstruction.
APPROACH CHANNEL	Wingwalls undercut and pulling away from side walls. Footing completely spalled and deteriorated on bottom.	Requires reconstruction
DISCHARGE CHANNEL	Collapsed apron is broken away from crest slab; footings and side walls undercut, broken, spalled and generally deteriorated.	Requires reconstruction
BRIDGE AND PIERS	Sidewalls are concrete. Bridge is 9" thick concrete slab supported on steel "I" beams.	
Gates and Operation Equipment	Stop logs missing. Concrete slot spalled and broken.	Stop logs were in place the month prior to the inspection as indicated by preliminary reconnaissance photographs.

OUTLET WORKS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	End of outlet crumbled and broken; badly spalled and deteriorated.	Several inches of sediment in bottom of the conduit. Invert about 8.5' below dam crest.
INTAKE STRUCTURE	Destroyed and useless	Gate rack/slide twisted and bent. Appears completely inoperable.
OUTLET STRUCTURE	None	
OUTLET CHANNEL	Merges with swamp below toe of dam.	
EMERGENCY GATE		

INSTRUMENTATION

VISUAL EXAMINATION	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	None	
OBSERVATION WELLS	None	
WEIRS	None	
PIEZOMETERS	None	
OTHER		

RESERVOIR

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	Gradual on south side with homes along the shoreline.	Steeper and wooded on north side of lake.
SEDIMENTATION	Unknown. Appears to be considerable sedimentation in lake, immediately in front of each abutment zone.	

DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	Natural stream in flat marshy area.	Man-made lake.
SLOPES	Gradual to steep and wooded away from swamp.	
APPROXIMATE NO. OF HOMES AND POPULATION	No development for at least 2,000 feet downstream. Morris Trpk., Sussex County Health Farms, juvenile detention home, and library about 1 mile downstream.	Recommended: low hazard class.

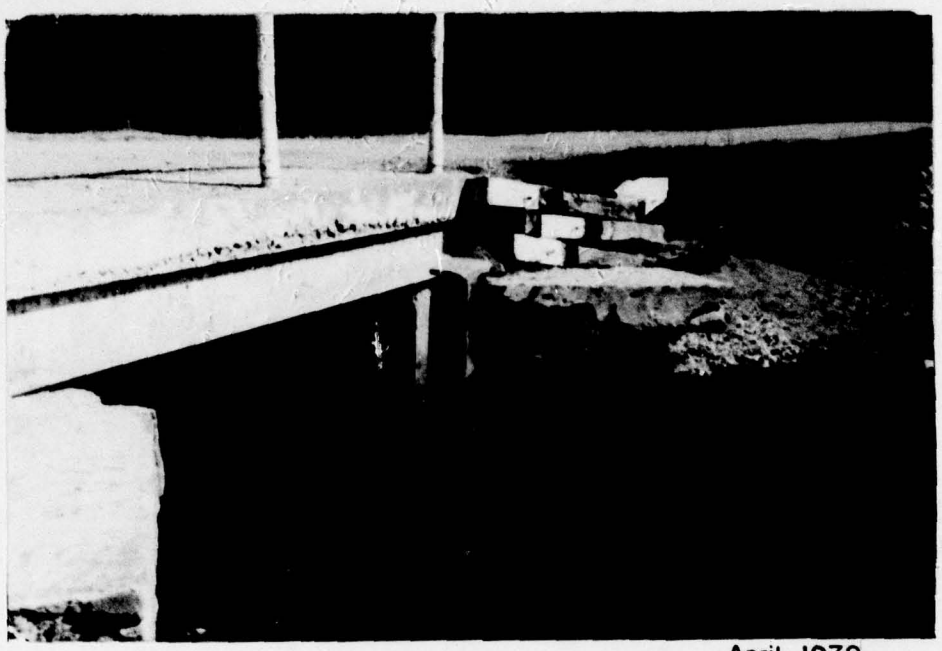
CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION

ITEM	REMARKS
PLAN OF DAM	Not available
REGIONAL VICINITY MAP	Available - USGS Quad. - Newton West, New Jersey
CONSTRUCTION HISTORY	Not available
TYPICAL SECTIONS OF DAM	Not available
HYDROLOGIC/HYDRAULIC DATA	" "
OUTLETS - PLAN	" "
- DETAILS	" "
-CONSTRAINTS	" "
-DISCHARGE RATINGS	" "
RAINFALL/RESERVOIR RECORDS	" "

ITEM	REMARKS
SPILLWAY PLAN	Not available
SECTIONS	" "
DETAILS	" "
OPERATING EQUIPMENT	" "
PLANS & DETAILS	" "

ITEM	REMARKS
DESIGN REPORTS	Not available
GEOLOGY REPORTS	" "
DESIGN COMPUTATIONS	" "
HYDROLOGY & HYDRAULICS	" "
DAM STABILITY	" "
SEEPAGE STUDIES	" "
MATERIALS INVESTIGATIONS	" "
BORING RECORDS	" "
LABORATORY	" "
FIELD	" "
POST-CONSTRUCTION SURVEYS OF DAM	Not available
BORROW SOURCES	Not available

ITEM	REMARKS
MONITORING SYSTEMS	None
MODIFICATIONS	Unknown
HIGH POOL RECORDS	Not available
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	" "
PRIOR ACCIDENTS OR FAILURE OF DAM	Unknown
DESCRIPTION	Not available
REPORTS	" "
MAINTENANCE	" "
OPERATION	" "
RECORDS	" "



April, 1979

View of Spillway Inlet

April, 1979

View of Spillway Outlet

April, 1979

View of Drain Gate Structure

April, 1979

View of Drain Outlet

April, 1979

View of Erosion and Piping - Left Bridge Abutment

View of Downstream Channel

April, 1979

CHECK LIST
HYDROLOGIC AND HYDRAULIC DATA
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: 3.5 sq. mi.

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): 530 MSL (55 acre-feet)

ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): N/A

ELEVATION MAXIMUM DESIGN POOL: N/A

ELEVATION TOP DAM: 535 MSL

CREST: Concrete sill

a. Elevation 530.0 MSL
b. Type Bridge culvert
c. Width 7.5 feet
d. Length 18 feet
e. Location Spillover 150 feet from right abutment
f. Number and Type of Gates stop logs to El. 532 (missing)

OUTLET WORKS:

a. Type Arch pipe culvert 42" x 24" (inoperable gate)
b. Location 70 feet from right abutment
c. Entrance inverts Unknown
d. Exit inverts 526.5
e. Emergency draindown facilities Unknown

HYDROMETEOROLOGICAL GAGES: None

a. Type
b. Location
c. Records

MAXIMUM NON-DAMAGING DISCHARGE: 222 cfs.

BY D.J.M. DATE 7-79 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. A1 OF
CHKD. BY DATE CLEARVIEW LAKE DAM PROJECT C234
SUBJECT

Time of concentration:

length along longest watercourse = 3.25 miles = 17,160 feet
$\Delta H = 370'$

$$\text{Slope} = \frac{370 \times 100}{17{,}160} = 2.16\ \%$$

Assume velocity = 3 feet s^{-1}

$$\therefore t_c = \frac{17{,}160}{3 \times 3600} = 1.59 \text{ hours}$$

By California Culverts Method:

$$t_c = \left(\frac{11.9 \times 3.25^3}{370}\right)^{0.385} = 1.04 \text{ hours}$$

Another alternate method:

$$t_c = \frac{L^{1.15}}{7700\, H^{0.38}} = \frac{17160^{1.15}}{7700 \times 370^{0.38}}$$

$$= 1.02 \text{ hours}$$

take average $t_c = (1.02 + 1.04 + 1.59)/3 = 1.22$ hours

$$t_p = \frac{0.25}{2} + 0.6 \times 1.22 = 0.86 \text{ hours}$$

$$Q_p = \frac{484 \times 3.5}{0.86} = 1965 \text{ cfs}$$

use time interval = 0.25 hour

BY H.E.M. DATE 2-78 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. A-2 OF

CHKD. BY ____ DATE ____ CLEARVIEW LAKE DAM PROJECT ____

SUBJECT ____

Unitgraph

Time Hours	T/Tp	Dimensionless Ordinate (Do)	Q (cfs) = Qp x Do
0.25	0.29	0.15	295
0.50	0.58	0.56	1100
0.75	0.87	0.95	1267
1.00	1.16	0.946	1859
1.25	1.45	0.706	1387
1.50	1.74	0.45	884
1.75	2.03	0.306	601
2.00	2.33	0.199	391
2.25	2.62	0.126	247
2.50	2.91	0.084	165
2.75	3.19	0.057	112
3.00	3.48	0.037	73

$\Sigma Q = 8981$

Check:

$$\frac{8981 \times 12 \times 3600}{3.5 \times 5280^2 \times 4} = .994$$

BY D.J.M. DATE 5-79 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. 0

CHKD. BY ..... DATE ..... N.J. NORTH DAM INSPECTIONS PROJECT 6234

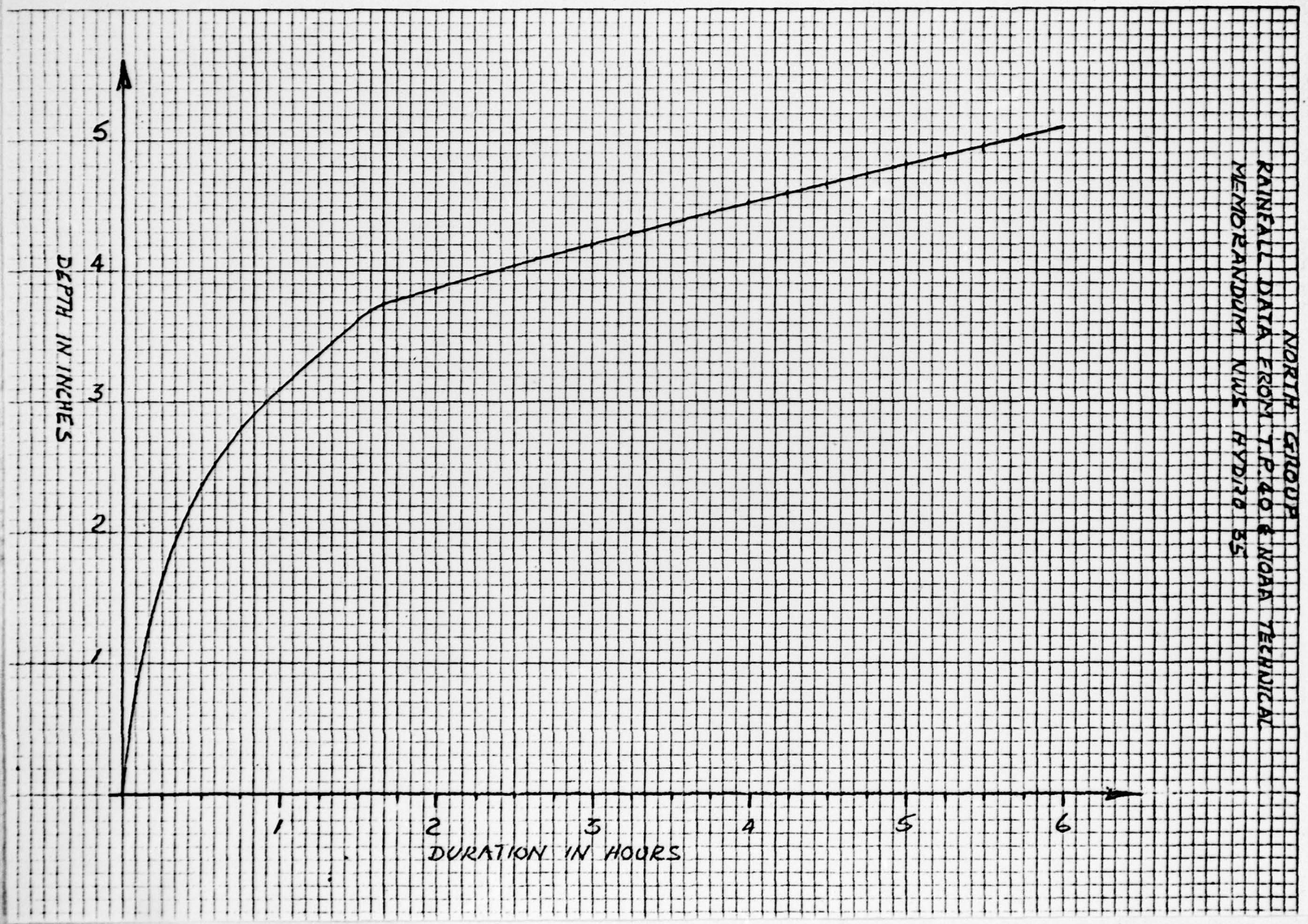
SUBJECT RAINFALL DATA FROM T.P. 40 & NOAA TECH. MEMO. NWS HYDRO 35

100 YEAR FREQUENCY EVENT :

Time (hrs)	Precipitation (inches)	Δ (inches)	Rearrange Δ (inches)
0.25	1.65	1.65	0.07
0.50	2.36	0.71	0.07
0.75	2.80	0.44	0.08
1.00	3.10	0.30	0.08
1.25	3.37	0.27	0.08
1.50	3.61	0.24	0.08
1.75	3.78	0.17	0.08
2.00	3.87	0.09	0.09
2.25	3.96	0.09	0.24
2.50	4.04	0.08	0.30
2.75	4.12	0.08	0.71
3.00	4.20	0.08	1.65
3.25	4.28	0.08	0.44
3.50	4.36	0.08	0.27
3.75	4.44	0.08	0.17
4.00	4.52	0.08	0.09
4.25	4.60	0.08	0.08
4.50	4.68	0.08	0.08
4.75	4.76	0.07	0.08
5.00	4.82	0.07	0.08
5.25	4.89	0.07	0.07
5.50	4.96	0.07	0.07
5.75	5.03	0.07	0.07
6.00	5.10	0.07	0.07

K•E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0706



BY R.L.M DATE 7-79 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. A-3 OF
CHKD. BY DATE CLEARVIEW LAKE DAM PROJECT C-234
SUBJECT

Spillway discharge

over spillway as weir L = 7.5H

H	C	Q
0		
1	3.2	24
2	3.2	68
3	3.2	125

over spillway as culvert A = 22.5ft²

H	C	Q
4	.55	198
5	.55	222
6	.55	243
7	.55	263
8	.55	281

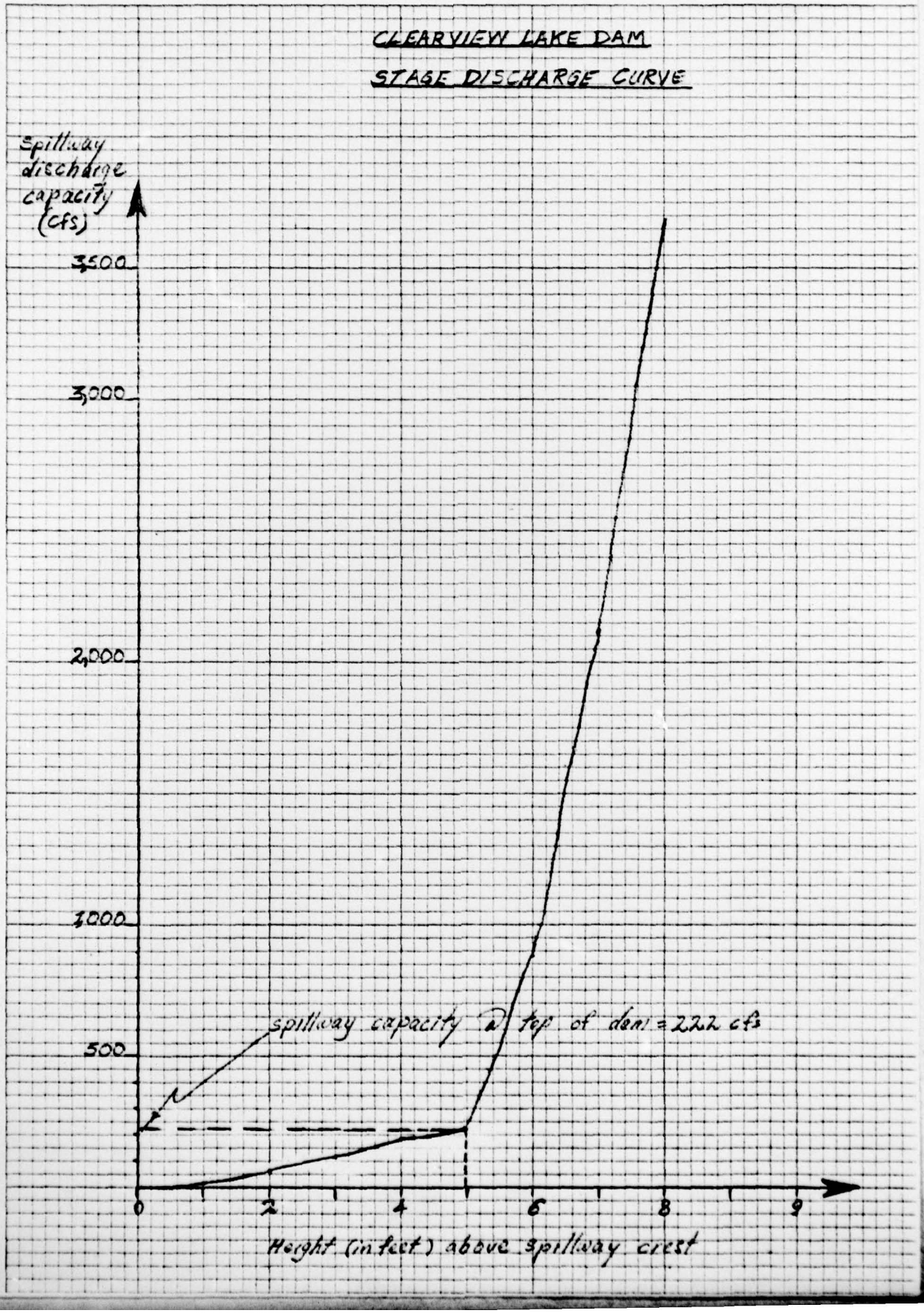
flow over dam L = 242.5 ft.

H	C	Q
1	2.7	655
2	2.7	1852
3	2.7	3402

ΣQ

*H	Q
0	0
1	24
2	68
3	125
4	198
5	222
6	898
7	2115
8	3683

*Head in feet above spillway.



46 0706
10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

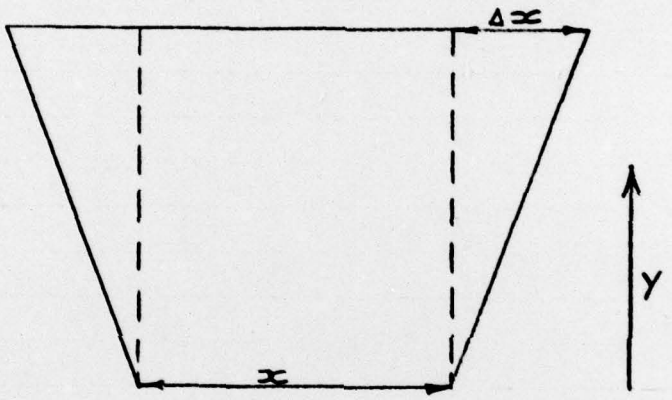
BY D J M DATE 7-79 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. A5 OF

CHKD. BY ____ DATE ____ CLEARVIEW LAKE DAM PROJECT C234

SUBJECT ____

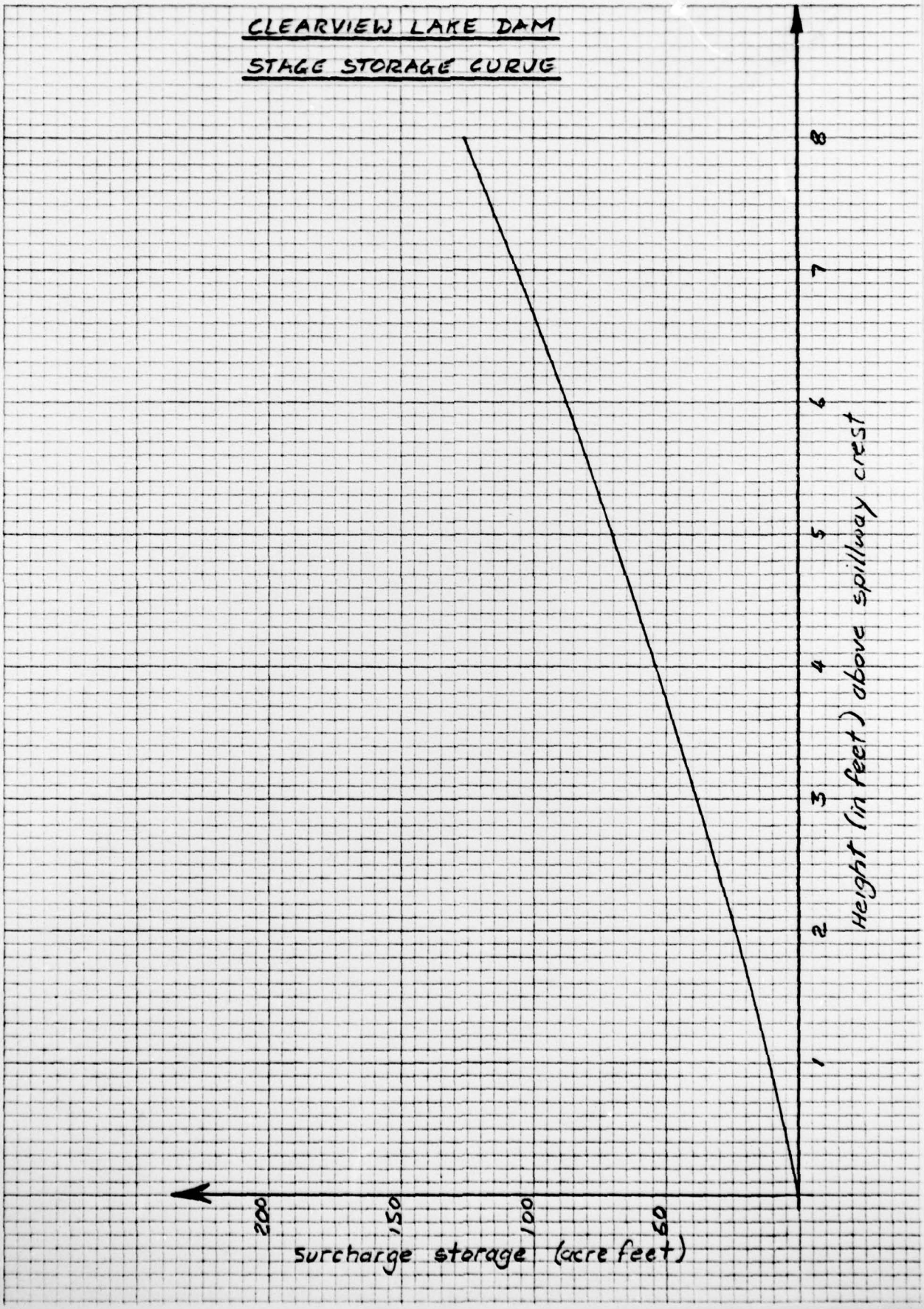
SURCHARGE STORAGE :

Area of lake @ normal pool ≈ 11 acres
Area of lake @ top of dam ≈ 17 acres
Area of 540' contour = 23 acres



Increment in volume $\Delta v = (x + \Delta x)\, Y$

Height in feet above spillway crest	Surcharge storage (acre feet)
0	0
1	12
2	24
2.5	31
3	38
4	54
5	70
6	88
7	106
8	126
9	148



46 0706
KE 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

BY D J M DATE 7-79 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. A7 OF

CHKD. BY ____ DATE ____ CLEARVIEW LAKE DAM PROJECT 2.34

SUBJECT Approximate drawdown calculations

Available head on pipe = 3.5'

Normal pool storage = 55 acrefeet = 2,395,800 feet^3

Drawdown in one stage assuming no inflow and no tailwater

Average head = 1.75'

Q = 32.7 cfs

$$\therefore \text{time} = \frac{2395800}{32.7 \times 3600}$$

$$= 20.35 \text{ hours}$$

Say 21 hours

BY D.J.M. DATE 8-79 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. A8 OF.

CHKD. BY DATE CLEARVIEW LAKE DAM PROJECT C234

SUBJECT

CLEARVIEW LAKE DAM
BY D.J.M.
JULY 11 1979

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
100	0	15	0	0	0	0	0	0	0

JOPER 3 NWT 0

********** *********** ********** ********* **********

SUB-AREA RUNOFF COMPUTATION

INFLOW TO RESERVOIR

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
1	0	0	0	0	0	1

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
0	-1	3.50	0.0	3.50	0.0	0.0	0	0	0

PRECIP DATA

NP	STORM	DAJ	DAK
24	0.0	0.0	0.0

PRECIP PATTERN

0.07	0.07	0.08	0.08	0.08	0.08	0.08	0.09	0.24	0.30
0.71	1.65	0.44	0.27	0.17	0.09	0.08	0.08	0.08	0.08
0.07	0.07	0.07	0.07						

LOSS DATA

STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0.0	0.0	1.00	0.0	0.0	1.00	0.50	0.10	0.0	0.0

GIVEN UNIT GRAPH, NUHGG= 12

295.	1100.	1867.	1859.	1387.	884.	601.	391.	247.	165.
112.	73.								

UNIT GRAPH TOTALS 8981. CFS OR 0.99 INCHES OVER THE AREA

RECESSION DATA

STRTQ= 0.0 QRCSN= 0.0 RTIOR= 1.00

END-OF-PERIOD FLOW

TIME	RAIN	EXCS	COMP Q
1	0.07	0.00	0.
2	0.07	0.00	0.
3	0.08	0.00	0.
4	0.08	0.00	0.
5	0.08	0.00	0.
6	0.08	0.00	0.
7	0.08	0.03	8.
8	0.09	0.06	49.
9	0.24	0.21	186.

10	0.30	0.27	490.
11	0.71	0.68	1065.
12	1.65	1.62	2260.
13	0.44	0.41	4072.
14	0.27	0.24	5457.
15	0.17	0.14	5463.
16	0.09	0.06	4537.
17	0.08	0.05	3412.
18	0.08	0.05	2531.
19	0.08	0.05	1846.
20	0.08	0.05	1370.
21	0.07	0.05	1063.
22	0.07	0.05	843.
23	0.07	0.05	674.
24	0.07	0.05	508.
25	0.0	0.0	441.
26	0.0	0.0	365.
27	0.0	0.0	288.
28	0.0	0.0	180.
29	0.0	0.0	115.
30	0.0	0.0	73.
31	0.0	0.0	45.
32	0.0	0.0	27.
33	0.0	0.0	16.
34	0.0	0.0	8.
35	0.0	0.0	3.
36	0.0	0.0	0.
37	0.0	0.0	0.
38	0.0	0.0	0.
39	0.0	0.0	0.
40	0.0	0.0	0.
41	0.0	0.0	0.
42	0.0	0.0	0.
43	0.0	0.0	0.
44	0.0	0.0	0.
45	0.0	0.0	0.
46	0.0	0.0	0.
47	0.0	0.0	0.
48	0.0	0.0	0.
49	0.0	0.0	0.
50	0.0	0.0	0.
51	0.0	0.0	0.
52	0.0	0.0	0.
53	0.0	0.0	0.
54	0.0	0.0	0.
55	0.0	0.0	0.
56	0.0	0.0	0.
57	0.0	0.0	0.
58	0.0	0.0	0.
59	0.0	0.0	0.
60	0.0	0.0	0.
61	0.0	0.0	0.
62	0.0	0.0	0.
63	0.0	0.0	0.
64	0.0	0.0	0.
65	0.0	0.0	0.
66	0.0	0.0	0.
67	0.0	0.0	0.
68	0.0	0.0	0.
69	0.0	0.0	0.
70	0.0	0.0	0.

71	0.0	0.0	0.
72	0.0	0.0	0.
73	0.0	0.0	0.
74	0.0	0.0	0.
75	0.0	0.0	0.
76	0.0	0.0	0.
77	0.0	0.0	0.
78	0.0	0.0	0.
79	0.0	0.0	0.
80	0.0	0.0	0.
81	0.0	0.0	0.
82	0.0	0.0	0.
83	0.0	0.0	0.
84	0.0	0.0	0.
85	0.0	0.0	0.
86	0.0	0.0	0.
87	0.0	0.0	0.
88	0.0	0.0	0.
89	0.0	0.0	0.
90	0.0	0.0	0.
91	0.0	0.0	0.
92	0.0	0.0	0.
93	0.0	0.0	0.
94	0.0	0.0	0.
95	0.0	0.0	0.
96	0.0	0.0	0.
97	0.0	0.0	0.
98	0.0	0.0	0.
99	0.0	0.0	0.
100	0.0	0.0	0.
SUM	5.10	4.12	37381.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	5463.	1555.	389.	374.	37383.
INCHES		4.13	4.14	4.14	4.14
AC-FT		771.	773.	773.	773.

HYDROGRAPH ROUTING

ROUTING THROUGH RESERVOIR

ISTAO	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
11	1	0	0	0	0	1

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME
0.0	0.0	0.0	1	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA
1	0	0	0.0	0.0	0.0	0.

STORAGE=	0.	12.	24.	38.	54.	70.	88.	106.	126.	0.
OUTFLOW=	0.	24.	68.	125.	198.	222.	898.	2115.	3683.	0.

TIME	EOP STOR	AVG IN	EOP OUT
1	0.	0.	0.
2	0.	0.	0.
3	0.	0.	0.

4	0.	0.	0.
5	0.	0.	0.
6	0.	0.	0.
7	0.	4.	0.
8	1.	29.	1.
9	3.	118.	6.
10	10.	338.	19.
11	25.	778.	72.
12	56.	1663.	202.
13	101.	3166.	1792.
14	135.	4765.	4424.
15	147.	5460.	5351.
16	143.	5000.	5037.
17	131.	3975.	4086.
18	118.	2972.	3089.
19	108.	2189.	2283.
20	100.	1608.	1714.
21	94.	1217.	1305.
22	90.	956.	1018.
23	86.	762.	836.
24	83.	591.	699.
25	79.	474.	573.
26	77.	403.	478.
27	74.	316.	388.
28	72.	224.	296.
29	70.	147.	222.
30	67.	94.	218.
31	64.	59.	213.
32	60.	36.	207.
33	56.	21.	202.
34	53.	12.	192.
35	49.	6.	175.
36	46.	2.	159.
37	42.	0.	145.
38	40.	0.	132.
39	37.	0.	121.
40	35.	0.	111.
41	32.	0.	102.
42	30.	0.	94.
43	28.	0.	86.
44	27.	0.	79.
45	25.	0.	73.
46	24.	0.	67.
47	22.	0.	62.
48	21.	0.	58.
49	20.	0.	53.
50	19.	0.	50.
51	18.	0.	46.
52	17.	0.	43.
53	16.	0.	39.
54	15.	0.	37.
55	15.	0.	34.
56	14.	0.	31.
57	13.	0.	29.
58	13.	0.	27.
59	12.	0.	25.
60	12.	0.	24.
61	11.	0.	23.
62	11.	0.	22.
63	10.	0.	21.
64	10.	0.	20.

65	10.	0.	19.
66	9.	0.	18.
67	9.	0.	18.
68	8.	0.	17.
69	8.	0.	16.
70	8.	0.	16.
71	7.	0.	15.
72	7.	0.	14.
73	7.	0.	14.
74	7.	0.	13.
75	6.	0.	13.
76	6.	0.	12.
77	6.	0.	12.
78	6.	0.	11.
79	5.	0.	11.
80	5.	0.	10.
81	5.	0.	10.
82	5.	0.	9.
83	5.	0.	9.
84	4.	0.	9.
85	4.	0.	8.
86	4.	0.	8.
87	4.	0.	8.
88	4.	0.	7.
89	4.	0.	7.
90	3.	0.	7.
91	3.	0.	7.
92	3.	0.	6.
93	3.	0.	6.
94	3.	0.	6.
95	3.	0.	6.
96	3.	0.	5.
97	3.	0.	5.
98	2.	0.	5.
99	2.	0.	5.
100	2.	0.	5.
SUM			37276.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	5351.	1458.	388.	373.	37276.
INCHES		3.88	4.13	4.13	4.13
AC-FT		724.	771.	771.	771.

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RUNOFF SUMMARY, AVERAGE FLOW

		PEAK	6-HOUR	24-HOUR	72-HOUR	AREA
HYDROGRAPH AT	1	5463.	1555.	389.	374.	3.50
ROUTED TO	11	5351.	1458.	388.	373.	3.50