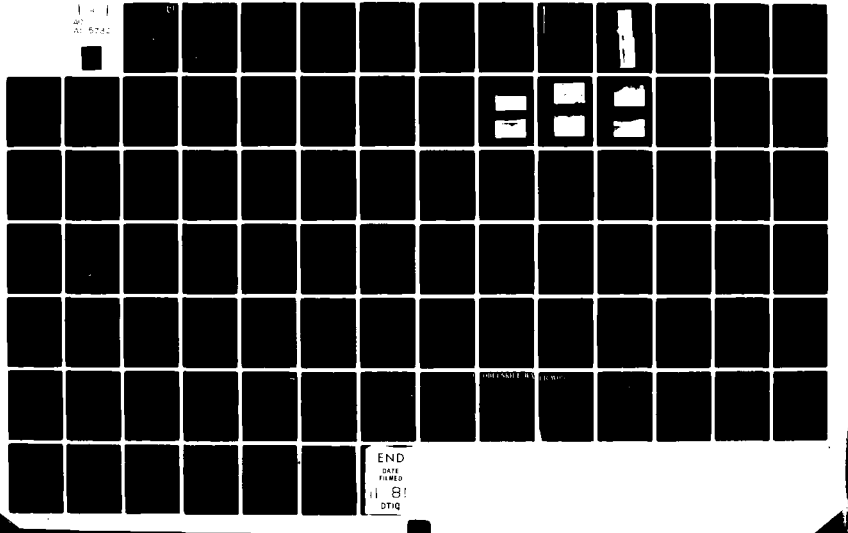
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MOHAWK RIVER BASIN

COBLESKILL LOWER RESERVOIR DAM

SCHOHARIE COUNTY, NEW YORK
INVENTORY NO. N.Y. 657

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

Cobleskill Lower Reservoir Dam (Inventory Number N.Y. 657), Mohawk River Basin, Schoharie County, New York. Phase I Inspection Report.



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(15) DACW51-79-C-0001

(10) George Koch

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NEW YORK DISTRICT CORPS OF ENGINEERS

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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

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4. TITLE (and Subtitle) Phase I Inspection Report Cobleskill Reservoir Dam No. 2 Mohawk River Basin, Schoharie County, N.Y. Inventory No. 657		5. TYPE OF REPORT & PERIOD COVERED Phase I Inspection Report National Dam Safety Program 6. PERFORMING ORG. REPORT NUMBER
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Hydrology, Structural Stability
Cobleskill Reservoir
Dam No. 2
Schoharie County
Mohawk River Basin

20. 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.

The examination of documents and the visual inspection of the Cobleskill Lower Reservoir Dam did not reveal conditions which constitute an immediate hazard to human life or property. However, the dam has some problem areas which require additional studies to jointly evaluate conditions affecting the dam.

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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

Using the Corps of Engineers' "screening criteria" for the initial review of spillway adequacy, it has been determined that the embankment would be overtopped for all storms in excess of 14% of the Probable Maximum Flood. The spillway is adjudged as "seriously inadequate" and the dam is assessed as unsafe non-emergency.

The classification "unsafe" applied to a dam because of a "seriously inadequate" spillway is not meant to connote the same degree of emergency as would be associated with an "unsafe" classification applied for a structural deficiency. It does mean that there appears to be a serious deficiency in spillway capacity and if a severe storm were to occur, overtopping and failure of the dam could take place, significantly increasing the hazard to loss of life downstream of the dam.

It is, therefore, recommended that within 3 months of notification to the owner, detailed hydrological/hydraulic investigations of the structure should be undertaken to more accurately determine the site specific characteristics of the watershed and their affect upon the overtopping potential of the dam. The results of these investigations will determine the appropriate remedial measures which will be required to achieve a spillway capacity adequate to safely discharge the outflow from at least the 1/2 Probable Maximum Flood. In the interim, a detailed emergency action plan must be developed and implemented during periods of unusually heavy precipitation. Also, around-the-clock surveillance of the structure must be provided during these periods.

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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 a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

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

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

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

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
COBLESKILL LOWER RESERVOIR DAM
I.D. No. NY 657 DEC No. 174A-3138A
MOHAWK RIVER BASIN
SCHOHARIE COUNTY, NEW YORK

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PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam:	Cobleskill Lower Reservoir Dam
State Located:	New York
County:	Schoharie
Watershed:	Mohawk River Basin
Stream:	Dow Brook (tributary to Cobleskill Creek)
Date of Inspection:	October 30, 1980

ASSESSMENT

The exaimination of documents and the visual inspection of the Cobleskill Lower Reservoir Dam did not reveal conditions which constitute an immediate hazard to human life or property. However, the dam has some problem areas which require additional studies to jointly evaluate conditions affecting the dam.

Using the Corps of Engineers' "screening criteria" for the initial review of spillway adequacy, it has been determined that the embankment would be overtopped for all storms in excess of 14% of the Probable Maximum Flood. The spillway is adjudged as "seriously inadequate" and the dam is assessed as unsafe non-emergency.

The classification "unsafe" applied to a dam because of a "seriously inadequate" spillway is not meant to connote the same degree of emergency as would be associated with an "unsafe" classification applied for a structural deficiency. It does mean that there appears to be a serious deficiency in spillway capacity and if a severe storm were to occur, overtopping and failure of the dam could take place, significantly increasing the hazard to loss of life downstream of the dam.

It is, therefore, recommended that within 3 months of notification to the owner, detailed hydrological/hydraulic investigations of the structure should be undertaken to more accurately determine the site specific characteristics of the watershed and their affect upon the overtopping potential of the dam. The results of these investigations will determine the appropriate remedial measures which will be required to achieve a spillway capacity adequate to safely discharge the outflow from at least the 1/2 Probable Maximum Flood. In the interim, a detailed emergency action plan must be developed and implemented during periods of unusually heavy precipitation. Also, around-the-clock surveillance of the structure must be provided during these periods.

In addition, the dam has a number of problem areas, which if left uncorrected, have the potential for the development of hazardous conditions and must be corrected within 1 year. The conditions are:

1. Repair gate house and access bridge or replace.

2. Repair or replace deteriorated and collapsed spillway walks.

3. Remove the trees and brush from the slopes of the embankment, abutments, spillway channel, and downstream channel. Provide a periodic cutting and mowing of these surfaces.

4. Backfill and seed the depressions and animal burrows noted:

5. Provide a program of periodic inspection and maintenance of the dam and appurtenances, including yearly operation and lubrication of all gates and valves. Document this information for future reference.

6. An emergency action plan must be developed.

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

Approved By:

Col. W. M. Smith Jr.
New York District Engineer

05 AUG 1981

Date:

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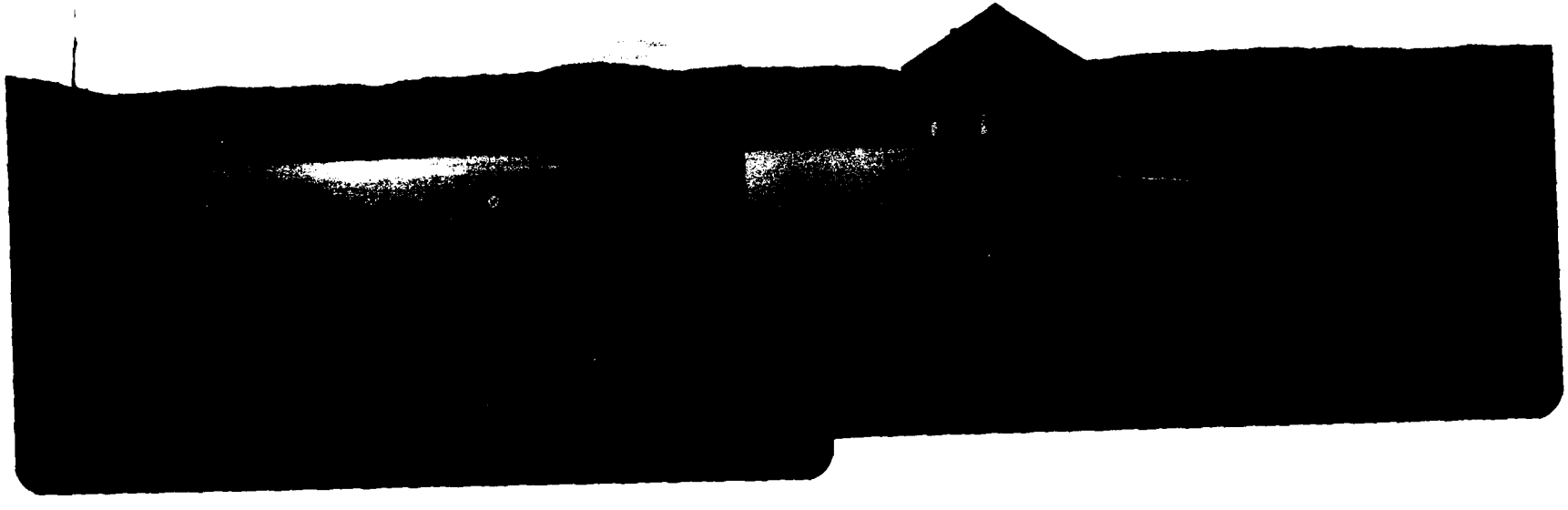


PHOTO #1.
OVERVIEW - COBLESKILL LOWER RESERVOIR DAM

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
COBLESKILL LOWER RESERVOIR DAM
I.D. No. NY 657 DEC No. 174A - 3138A
MOHAWK RIVER BASIN
SCHOHARIE COUNTY, NEW YORK

SECTION 1: 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 fullfill 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 human life and property and recommend remedial measures where necessary.

1.2 DESCRIPTION OF PROJECT

a. Description of Dam and Appurtenances

The Cobleskill Lower Reservoir Dam is a 26 feet high earth embankment, believed to have a concrete masonry core wall. It creates a 30 acre water supply reservoir for the village of Cobleskill. The impoundment is located on Dow Brook approximately 2 miles southeast of Cobleskill. The slopes of the embankment are 1:2 1/2 upstream and 1:2 downstream. The upstream slope is protected with a one foot thick rip rap facing. The primary spillway is a 20" drop inlet concrete structure adjacent to the gate house located over the original stream channel. The secondary spillway is a 36.5 feet long uncontrolled overflow section. It is of laid up stone construction. The depth of flow available is 2.4 feet before overtopping of the dam occurs. The reservoir is adjacent to the Cobleskill Upper Reservoir located immediately to the west. The water treatment plant is located just below the lower reservoir dam.

b. Location

The dam is located on Dow Brook, a tributary of Cobleskill Creek and Mohawk River approximately 2 miles southeast of Cobleskill, NY.

c. Size

The dam is 26 feet high and impounds 272. acre feet at normal pool elevation. Therefore, it is classified as "small" in size (less than 40 feet in height).

d. Hazard Classification

The dam is classified as high hazard due to its location above several homes in Mineral Springs, NY. The reservoir is also a major part of the Cobleskill, NY water supply system.

e. Ownership

The dam is owned and operated by the Village of Cobleskill, NY 12093. The Water Supervisor, Mr. John Barber was the contact with the village. He can be reached at the Village of Cobleskill, Cobleskill, NY (518) 234-2195.

f. Purpose of the Dam
The dam provides storage for the Cobleskill water supply.

g. Design and Construction History
The dam was constructed in 1886 by Stanton and Doyle Contractors, Cohoes, NY. It was designed by W.N. Roberts.

h. Normal Operating Procedures
Water releases from the Cobleskill Lower Reservoir are normally passed through the intake and into the water supply system. Any excess flow goes through the uncontrolled primary and secondary spillways.

1.3 PERTINENT DATA

a. Drainage Area (Sq. mi.)	1.78
b. Height of Dam (ft.)	26.
c. Discharge at Dam Site (cfs.)	
Spillway Total at Top of Dam	454.
Spillway at Auxilary Spillway Crest	32.
Reservoir Drain	25.
d. Elevation (ft., U.S.G.S.)	
Top of Dam	1173.0
Auxiliary Spillway Crest	1170.5
Primary Spillway Crest	1170.0
Low Level Outlet	1150.
e. Storage (acre Feet)	
Top of Dam	365.
Auxiliary Spillway Crest	287.
Primary Spillway Crest.	272.

f. Dam
Type: Homogenous earth believed to have a concrete/masonry core wall.

Length (Ft.):	
Upstream Slope:	1:2 1/2
Downstream Slope	1:2
Crest Width (ft):	10

g. Spillway
Type: Concrete, drop inlet adjacent to gate house, 20" orifice inlet. Masonry overflow auxiliary spillway.

Weir length (auxiliary spillway, ft.)	36.5

h. Reservoir Drain
Type: 16" cast iron pipe from the gate house through the embankment.

Maximum Capacity (cfs.)	25.

SECTION 2: ENGINEERING DATA

2.1 GEOLOGY

The Lower Cobleskill Dam is located in the glaciated portion of the Appalachian Uplands (northern extreme of the Appalachian Plateau) physiographic province of New York State. These uplands were formed by the dissection of the uplifted but flat lying sandstones, siltstones, and shales of the Lower and Middle Devonian Period (395 to 365 million years ago.) The plateau surface is represented by flat-topped divides with drainage generally northward toward the Mohawk River.

Glacial cover is generally thin, the deposits of which have resulted from glaciations during the Wisconsin glaciation, approximately 11,000 years ago.

The "Preliminary Brittle Structures Map of New York" prepared by Yngvar W. Isachsen and William G. McKendrea (dated 1977) indicates the presence of a subsurface fault, showing relative movement as inferred from drill hole data, and a topographic linear feature observed on one or more of the following: topographic map, Landsat (ERTS), Skylab, or U-2 photographic product, within the drainage area of the reservoir.

2.2 SUBSURFACE INVESTIGATION

No subsurface investigation could be located for the design of this dam. Two borings were located for the design of the upper dam. These explorations indicate that the soils encountered are varying mixtures of clay, siltsand, and gravel with boulders of glacial till origin. No water table is indicated. The boring logs are included in Appendix E.

2.3 DAM AND APPURTENANT STRUCTURES

The dam was erected in 1886 by Stanton & Doyle contractors, Cohoes, NY. The dam was designed by W.N. Roberts, Engineer. The design of the dam includes an earth embankment located on the right side of a masonry walled spillway.

2.4 CONSTRUCTION RECORDS

No construction records were available.

2.5 OPERATION RECORDS

All operation records are maintained at the treatment plant below the dam.

2.6 EVALUATION

The data presented in this report has been compiled from information obtained from Mr. John Barber, Water Supervisor, Village of Cobleskill, NY, and the NYS DEC files. This information appears adequate and reliable for Phase I Inspection purposes.

SECTION 3: VISUAL INSPECTION

3.1 FINDINGS

a. General

Visual inspection of the Lower Cobleskill Reservoir Dam and the surrounding watershed was conducted on October 30, 1980. The weather was cloudy and the temperature ranged in the thirties. The reservoir level at the time of the inspection was approximately 4.5 feet below the spillway crest.

b. Embankment

The earth embankment shows no signs of major distress. The downstream slope is irregular and exhibits depressions which have existed for many years as evidenced by the numerous mature trees growing withing these areas. Extensive tree and brush growth was observed on the downstream slope at the abutments and along the upper portion of the upstream slope above the riprap. Animal burrows were also evident near the upper portion of the embankment. The crest of the dam appeared to be in good condition. No evidence of seepage was observed on the embankment or beyond the toe of the dam. A valve box was noted at the downstream toe of the embankment which appeared to be in good condition. Additional valves located downstream supply water to the treatment plant.

c. Spillway

The primary drop inlet spillway is in need of maintenance. The masonry walled riprapped bottom auxiliary spillway is in very poor condition. The masonry walls have deteriorated substantially and portions have collapsed. Extensive vegetation was noted in the channel bottom.

d. Downstream Channel

The downstream channel is narrow and heavily vegetated. Muddy water was observed in a ponded area below the spillway. No evidence of seepage was noted and the origin is believed to be related to the previous rain.

e. Reservoir

No sediment or instability problems were reported within the reservoir area.

f. Appurtenant Structures

The gate house intake system and all associated valves are reported to be operational. The structural condition of the gate house and access bridge is very poor. Immediate repairs are required to prevent collapse of the bridge and building.

3.2 EVALUATION OF OBSERVATIONS

The problem areas observed during the inspection and the recommended remedial measures are as follows:

1. The gate house and access bridge are in very poor structural condition. These areas must be repaired as soon as possible.

2. The masonry walls of both the primary and auxiliary spillway have deteriorated and collapsed. The walls must be repaired immediately.

3. Extensive tree and brush growth was observed on the slopes of the embankment, at the abutments, in the spillway channel, and in the downstream channel. Remove this vegetation and provide a program of periodic cutting and mowing of these surfaces.

4. Depressions and animal burrows were noted on the earth embankment. After removal of the vegetation backfill, these areas to provide a uniform slope and seed the exposed soil.

5. Provide a program of periodic inspection and maintenance of the dam and appurtenances including yearly operation and lubrication of all gates and valves. Document this information for future reference.

6. Develop an emergency action plan for notification of downstream residents and the proper governmental authorities.

SECTION 4: OPERATION AND MAINTNEANCE PROCEDURES

4.1 PROCEDURES

The normal water surface elevation is approximated by the crest of the drop inlet spillway. The reservoir level may be lower than the crest if flows to the treatment plant exceed the rate of inflow.

4.2 MAINTENANCE OF THE DAM

Maintneance of the dam is provided by the owner, the Village of Cobleskill, NY. Maintenance is not considered satisfactory as evidenced by the extensive tree and brush growth, deterioration of spillway walls, depressions and animal burrows on the embankment, and deterioration of the gate house and access bridge.

4.3 WARNING SYSTEM

There is no warning system in effect or in preparation.

4.4 EVALUATION

The dam and appurtenances have been maintained in unsatisfactory condition as noted in "Section 3: Visual Inspection".

SECTION 5: HYDRAULICS/HYDROLOGY

5.1 DRAINAGE AREA CHARACTERISTICS

The Cobleskill Lower Dam is located on Dow Brook adjacent to the Upper Reservoir. Dow Brook has a drainage area of 1.78 square miles at the site and a tributary of Cobleskill Creek and Mohawk River. The watershed is primarily wooded with some pasture in the lower, flatter portions. The cover is glacial till and generally thin.

5.2 ANALYSIS CRITERIA

The analysis of the spillway capacity of the dam and storage of the reservoir was performed using the Corps of Engineers HEC-1 computer model. The unit hydrograph was defined by the Snyder Synthetic Unit Hydrograph method, and the Modified Puls routing procedure was incorporated. The Probable Maximum Precipitation (PMP) was 19.5 inches (24 hrs., 200 square miles) from Hydrometerological Report #33 in accordance with the recommended guidelines of the Corps of Engineers. Several floods (%'s of the Probable Maximum Flood (PMF)) were selected for analysis. The full PMF inflow of 3369 cfs was routed through the reservoir and found to produce an outflow of 3355 cfs.

5.3 SPILLWAY CAPACITY

The spillway is a 20" drop inlet structure adjacent to the gate house, the crest elevation is 1170.0 feet U.S.G.S. There is an auxiliary uncontrolled overflow spillway with a crest elevation of 1170.5 feet. There is 2.5 feet of flow through the auxiliary spillway before overtopping occurs. Maximum flow through the primary spillway before the auxiliary spillway begins to flow is 32 cfs. The maximum total spillway capacity is 454 cfs. before dam overtopping.

5.4 RESERVOIR CAPACITY

The reservoir capacity at the crest of the spillway and at the top of the dam are 272 acre feet and 365 acre feet respectively. Surcharge storage between spillway and top of dam is equivalent to 0.98 inches of runoff from the watershed area.

5.5 FLOODS OF RECORD

There are no gaging station located on or near the dam site nor are there any accounts of high flows or levels.

5.6 OVERTOPPING POTENTIAL

The maximum capacity of the spillway before overtopping occurs is 454. cfs, which is 14% of the routed PMF inflow of 3369 cfs. The dam is overtopped by 0.7 feet during the 1/2 PMF of 1684 cfs and 1.3 feet during the full PMF.

5.7 EVALUATION

The spillway is inadequate to pass all storms in excess of 14% of the PMF. According to the Corps of Engineers, this is considered "seriously inadequate". Although the structural stability did not receive a detailed investigation, it appears to be stable under high flow conditions. However, overtopping could cause rapid failure of this structure. In the event of dam failure, the flood wave would pose significant danger to the residents and water treatment plant. The spillway is, therefore, adjudged as seriously inadequate.

and the dam is assessed as unsafe, non-emergency.

SECTION 6: STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations

No signs of major distress were observed in connection with the earth embankment. The gate house and access bridge are in very poor condition. The masonry walls of the spillway are deteriorated and portions have collapsed. Depressions and animal burrows were boserved on the embankment.

b. Design and Construction Data

No information could be located concerning the structural stability of the embankment portion of the dam.

c. Post Construction Changes

No post construction changes were initiated.

SECTION 7: ASSESSMENT/RECOMMENDATIONS

7.1 ASSESSMENT

a. Safety

The Phase I Inspection of Lower Cobleskill Reservoir Dam revealed that the spillway is "seriously inadequate", based upon the Corps of Engineers "screening criteria", and outflows from any storm in excess of 14% of the PMF will overtop the dam. This overtopping could cause breaching of the dam and resulting flood-wave would significantly increase the hazard to downstream residents. For these reasons, the dam has been assessed as unsafe, non-emergency.

b. Adequacy of Information

The information reviewed is considered adequate for Phase I Inspection purposes.

c. Need for Additional Investigation

Since the spillway is considered "seriously inadequate", additional hydrologic/hydraulic investigations are required to more accurately determine the site specific characteristics of the watershed. After these investigations have been completed, remedial measures must be initiated to provide spillway capacity sufficeint to discharge the outflow from the 1/2 PMF event.

d. Urgency

The additional required investigations must be initiated within 3 months from the date of notification. Within 1 year, remedial measures as a result of these investigations must be initiated, with completion of the measures during the following year. In the interim, develop an emergency action plan for the notificaiton of downstream residents and the proper governmental authorities in the event of overtopping, and provide around-the-clock surveillance of the dam during periods of extremely heavy run-off. The problem ares listed below must be corrected within 1 year from notification.

7.2 RECOMMENDATIONS

1. The results of the aforementioned investigations will determine the appropriate remedial actions required.

2. Repair the gate house and access bridges as soon as possible.

3. Repair the deteriorated and collapsed spillway walls as soon as possible.

4. Remove the trees and brush from the slopes of the embankment, abutments, spillway channel, and downstream channel. Provide a program of periodic cutting and mowing of these surfaces.

5. Backfill and seed the depressions and animal burrows noted on the embankment.

6. Provide a program of periodic inspection and maintenance of the dam and appurtenances, including yearly operation and lubrication of all gates and valves. Document this information for future reference.

7. The emergency action plan described in Section 7.1 d, should be maintain and periodically updated during the life of the structure.

APPENDIX A

PHOTOGRAPHS

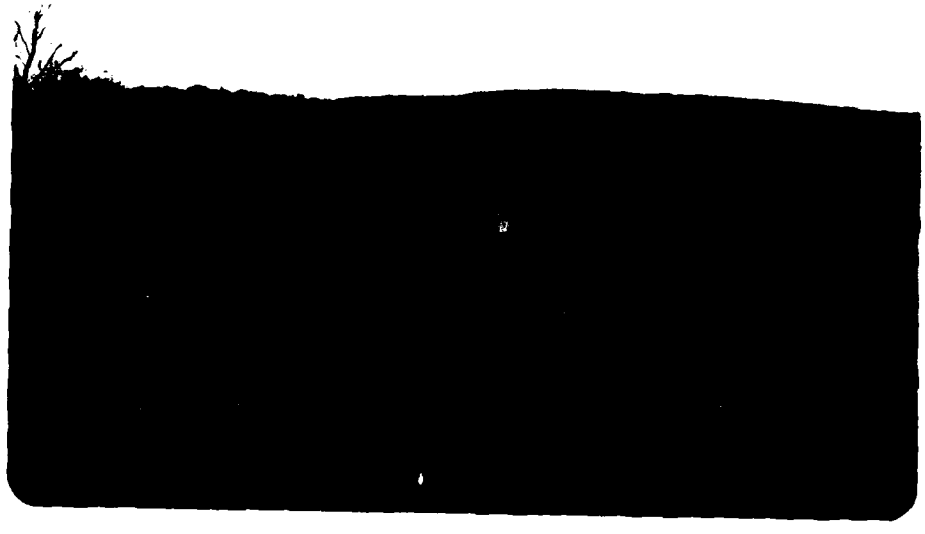


PHOTO #2.
View from western end of embankment.

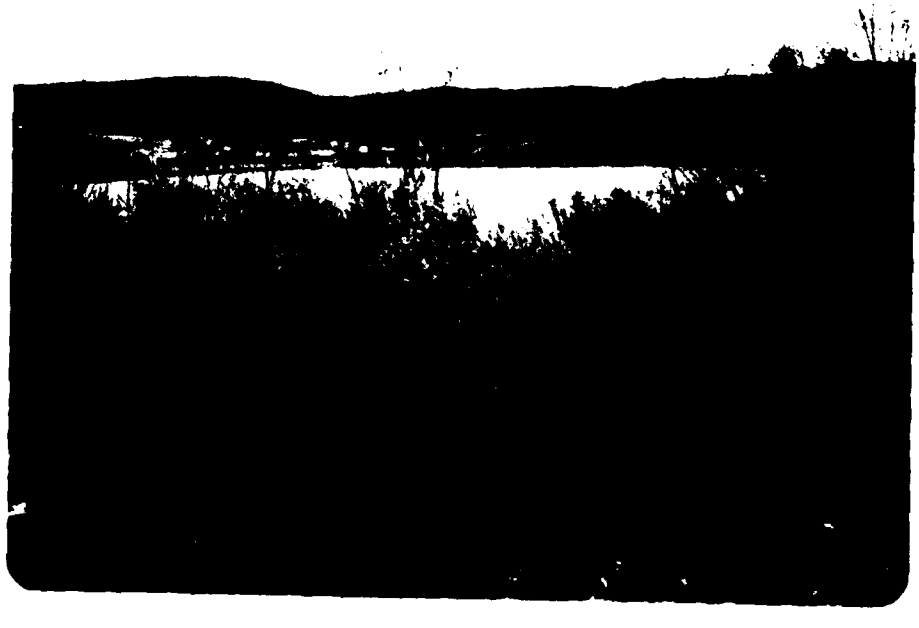


PHOTO #3.
Auxiliary spillway. Note heavy vegetation and deteriorated walls.



PHOTO #4.
Auxiliary spillway outlet channel.

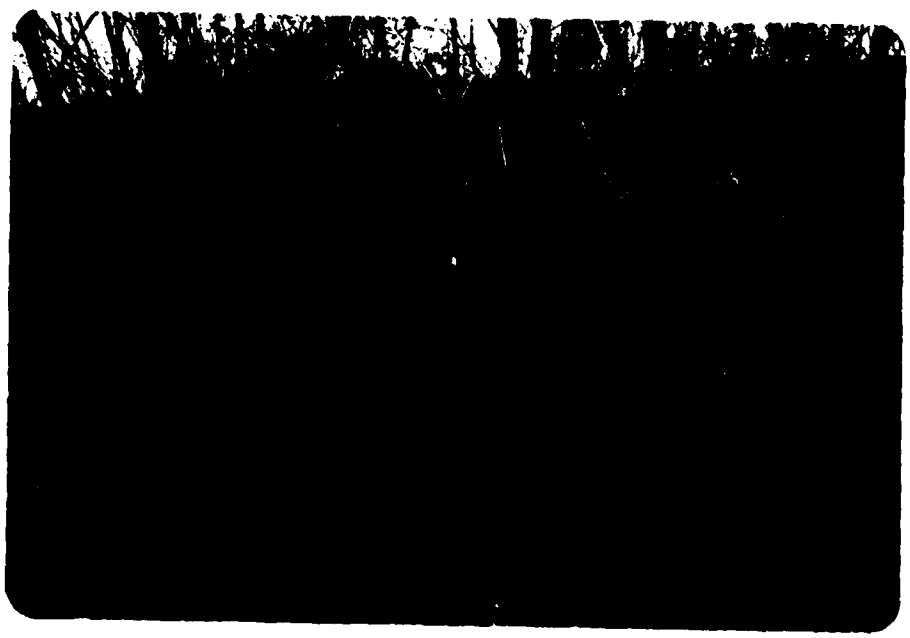


PHOTO #5.
Downstream slope of embankment. Note heavy tree growth.



PHOTO # 6.
Drain tile located on eastern end of embankment.
No sign of material movement.

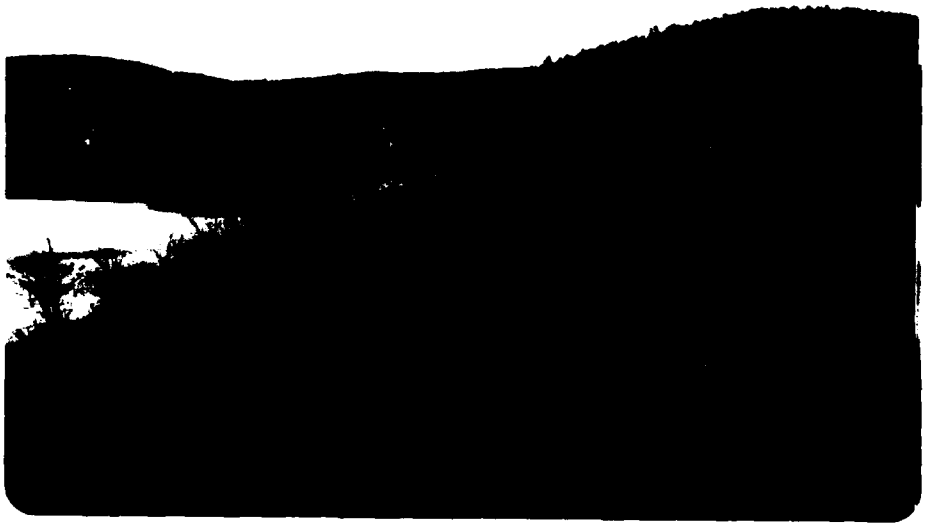


PHOTO #7.
Embankment between Cobleskill Upper and
Lower Reservoirs.

APPENDIX B

VISUAL INSPECTIÓN CHECKLIST

93-15-3(9/80)

VISUAL INSPECTION CHECKLIST

1) Basic Data

a. General

Name of Dam Cobleskill Lower DAM

Fed. I.D. # NY 657 DEC Dam No. 174A - 3138A

River Basin MOHAWK.

Location: Town Cobleskill County SCHOHARIE

Stream Name Dow Brook

Tributary of Cobleskill Creek

Latitude (N) 42° 40' Longitude (W) 74° 27'

Type of Dam homogeneous earth fill (possible corewall)

Hazard Category C

Date(s) of Inspection Oct 30, 1980

Weather Conditions cloudy 30's.

Reservoir Level at Time of Inspection 4.5 feet below spillcrest

b. Inspection Personnel R. M'Carty, J. Veitch

c. Persons Contacted (Including Address & Phone No.)

John Barber, Water Supr.
Village of Cobleskill
Cobleskill NY 12093
(518) 234-2185

d. History:

Date Constructed 1886 Date(s) Reconstructed

Designer

Constructed By

Owner Village of Cobleskill

93-15-3(9/80)

2) Embankment

a. Characteristics

(1) Embankment Material homogeneous earth fill

(2) Cutoff Type ?

(3) Impervious Core possible concrete/masonry

(4) Internal Drainage System ?

(5) Miscellaneous

b. Crest

(1) Vertical Alignment good

(2) Horizontal Alignment good

(3) Surface Cracks —

(4) Miscellaneous some depressions, animal burrows

c. Upstream Slope

(1) Slope (Estimate) (V:H)

(2) Undesirable Growth or Debris, Animal Burrows much tree & brush growth

(3) Sloughing, Subsidence or Depressions

(4) Slope Protection good

(5) Surface Cracks or Movement at Toe none

d. Downstream Slope

(1) Slope (Estimate - V:H)

(2) Undesirable Growth or Debris, Animal Burrows both tree and brush growth, animal burrows

(3) Sloughing, Subsidence or Depressions depressions (old, grown in)

(4) Surface Cracks or Movement at Toe none.

(5) Seepage none - some water found @ toe felt to be local runoff

(6) External Drainage System (Ditches, Trenches; Blanket) need cleaning out

(7) Condition Around Outlet Structure brush removal

(8) Seepage Beyond Toe none.

e. Abutments - Embankment Contact

good

93-15-3(9/80)

(1) Erosion at Contact none.

(2) Seepage Along Contact none

3) Drainage System

a. Description of System ?

b. Condition of System

c. Discharge from Drainage System

4) Instrumentation (Momumentation/Surveys, Observation Wells, Weirs, Piezometers, Etc.)

none.

93-15-3(9/80)

5) Reservoir

a. Slopes stable

b. Sedimentation due to age - heavy sediment

c. Unusual Conditions Which Affect Dam —

6) Area Downstream of Dam

a. Downstream Hazard (No. of Homes, Highways, etc.) Mineral Springs 6-8 homes

b. Seepage, Unusual Growth none

c. Evidence of Movement Beyond Toe of Dam none

d. Condition of Downstream Channel heavy brush trees

7) Spillway(s) (Including Discharge Conveyance Channel)

primary & aux in need of repair

a. General inadequate - in disrepair

b. Condition of Service Spillway needs maintenance

93-15-3(9/80)

c. Condition of Auxiliary Spillway & masonry walls falling in crest grown over with trees & brush

d. Condition of Discharge Conveyance Channel heavy brush & tree growth, walls caving in

8) Reservoir Drain/Outlet

Type: Pipe ✓ Conduit _____ Other _____

Material: Concrete _____ Metal ✓ Other _____

Size: 16" Length _____

Invert Elevations: Entrance est. 1130. Exit _____

Physical Condition (Describe): operable Unobservable ✓

Material: _____

Joints: _____ Alignment _____

Structural Integrity: —

Hydraulic Capability: 25 cfs

Means of Control: Gate _____ Valve ✓ Uncontrolled _____

Operation: Operable ✓ Inoperable _____ Other _____

Present Condition (Describe): is in operation (?)

9) Structural

a. Concrete Surfaces masonry in bad shape

b. Structural Cracking in spillway and gate house

c. Movement - Horizontal & Vertical Alignment (Settlement) and spillway walls.

d. Junctions with Abutments or Embankments good.

e. Drains - Foundation, Joint, Face ?

f. Water Passages, Conduits, Sluices —

g. Seepage or Leakage none apparent.

h. Joints - Construction, etc. repointing necessary

i. Foundation —

j. Abutments good

k. Control Gates operable

l. Approach & Outlet Channels heavy brush & trees

m. Energy Dissipators (Plunge Pool, etc.) none

n. Intake Structures need maintenance

o. Stability good

p. Miscellaneous

10) Appurtenant Structures (Power House, Lock, Gatehouse, Other)

a. Description and Condition gate house - is badly deteriorated spillway walls falling in, tree & brush growth.

11) Operation Procedures (Lake Level Regulation):

Water supply normally at or below crest.

APPENDIX C

HYDROLOGIC / HYDRAULIC

ENGINEERING DATA AND COMPUTATIONS

CHECK LIST FOR DAMS
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

AREA-CAPACITY DATA:

	Elevation (ft.)	Surface Area (acres)	Storage Capacity (acre-ft.)
1) Top of Dam	1173.0	2.38.	365.0
2) Design High Water (Max. Design Pool)			—
3) Auxiliary Spillway Crest	1170.6	1.32.0	25?.0
4) Pool Level with Flashboards	—		—
5) Service Spillway Crest	1170.0	1.0	272.0

DISCHARGES

	Volume (cfs)
1) Average Daily	2.
2) Spillway @ Maximum High Water	454.
3) Spillway @ Design High Water	—
4) Spillway @ Auxiliary Spillway Crest Elevation	21.
5) Low Level Outlet	35.
6) Total (of all facilities) @ Maximum High Water	48?.
7) Maximum Known Flood	—
8) At Time of Inspection	—

CREST: **ELEVATION:** 1172.0

Type: Uncontrolled Ogee

Width: [illegible] **Length:**

Spillover

Location At the junction of the natural channel

SPILLWAY:

SERVICE		AUXILIARY
1170.0	Elevation	1170.6
Morning glory	Type	over-flow
(1 x 12) 24" corrug	Width	36.5
	Type of Control	
✓	Uncontrolled	✓
	Controlled:	
—	Type (Flashboards; gate)	—
—	Number	—
—	Size/Length	—
	Invert Material	Stone masonry
	Anticipated Length of operating service	extended
75' 2" D.C.	Chute Length	
	Height Between Spillway Crest & Approach Channel Invert (Weir Flow)	1.5' slope

HYDROMETEROLOGICAL GAGES:

Type : none

Location: —

Records:

Date - —

Max. Reading - —

FLOOD WATER CONTROL SYSTEM:

Warning System: none

Method of Controlled Releases (mechanisms):

Flood water intake to filtration plant drain line &

DRAINAGE AREA: 1.7E Sq miles

DRAINAGE BASIN RUNOFF CHARACTERISTICS:

Land Use - Type: Local, heavily wooded hilly pasture

Terrain - Relief: steep to steep, moderate

Surface - Soil: thin glacial till, lots of weathered

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

~~None exist~~ No major changes exist

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

No

Potential Backwater problem areas for levels at maximum storage capacity including surcharge storage:

~~Low lying areas~~ None

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

Location: None

Elevation:

Reservoir:

Length @ Maximum Pool 1750' ~~(Miles)~~

Length of Shoreline (@ Spillway Crest) 4000' ~~(Miles)~~

APPENDIX D

REFERENCES

APPENDIX D

REFERENCES

1) U.S. Department of Commerce, Technical Paper No. 40, Rainfall Frequency Atlas of the United States, May 1961.

2) U.S. Department of Commerce, Hydrometeorological Report No. 33, Seasonal Variation of the Probable Maximum Precipitation East of the 105th Meridian for Areas from 10 to 1,000 Square Miles and Durations of 6, 12, 24, and 48 Hours; April 1956.

3) Soil Conservation Service, National Engineering Handbook, Section 4, Hydrology, August 1972 (U.S. Department of Agriculture).

4) H.W. King and E.F. Brater, Handbook of Hydraulics, 5th edition, McGraw-Hill, 1963.

5) T.W. Lambe and R.V. Whitman, Soil Mechanics, John Wiley and Sons, 1965.

6) W.D. Thornbury, Principles of Geomorphology, John Wiley and Sons, 1969.

7) University of the State of New York, Geology of New York, Education Leaflet 20, Reprinted 1973.

8) Cornell University Agriculture Experiment Station (compiled by M.G. Cline and R.L. Marshall), General Soil Map of New York State and Soils of New York Landscapes, Information Bulletin 119, 1977.

APPENDIX E

STABILITY ANALYSIS

Cobleskill Lower Reservoir DAM

DOWNBROOK - ADJACENT TO UPPER RES.

DRAINAGE AREA: $\frac{12.43 \text{ mi}^2 (24000)^2}{(144)(43560)} = 1141.4$ ACRES

$= 1.78 \text{ mi}^2$

$L = 5.50 \frac{(24000)}{12} = 11{,}000 \text{ ft.} = 2.08 \text{ mi.}$

$L_{ca} = 2.45(2000) = 4{,}900 \text{ ft} = 0.93 \text{ mi.}$

Crest ELEVATION = 1170.0 ' U.S.G.S. $S_L = \frac{2100 - 1170}{11{,}000} = .08$

$S_{ca} = \frac{1280 - 1170}{4900} = .02$

$t_p = C_t (L \times L_{ca})^{0.3} = 2.0 (2.08 \times 0.93)^{0.3}$

$= 2.44 \text{ hr.}$

$t_r = t_p / 5.5 = 0.44 \text{ hr.}$

$T_p = t_p + \frac{1}{2} t_r = 2.44 + .22 = 2.66 \text{ hrs.}$ $C_p = 0.625$

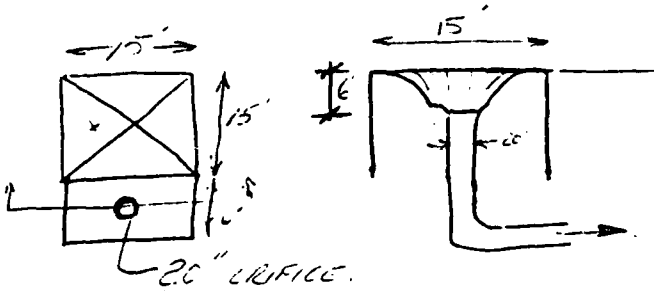
RESERVOIR CAPACITY

FROM PLANS

ELEVATION	USGS	AREA	$\bar{A}$	ΔV	Σ Volume
TOP OF DAM	1173				
341.6					
341.0 TOT. TO BOTTOM 88540000 GAL	~~1170.0~~ 1170.0	31.0	30.85	30.85	363
340.	~~1169.0~~ 1169.0	30.7	30.40	91.20	272
337.	~~1166.0~~ 1166.0	30.1	~~29.65~~	59.30	213
335.	~~1164.0~~ 1164.0	29.2	28.65	56.30	156
333.	~~1162.0~~ 1162.0	27.1	~~28.15~~		
1153	1152.0				

Cobleskill Lower Res.

Spillway Capacity



ELEVATIONS from Cobleskill Water Works PLAN MAR. 1934.

		USGS
primary spillway crest (20" drop inlet)	= 341.0	(=) 1170.0
Auxiliary " " (36.5' overflow)	= 341.6	(=) 1170.6
Top of Dam	= 344.0	(=) 1173.0

weir length = 27' - Use to trash racks + deteriorated crest

say $C = 3.1$ weir flow

- $C = .65$ orifice flow $A = \pi\left(\frac{16}{12}\right)^2 = 2.18$ ft²
- Rectan. $C = 4.0$; $A = .022$ neglect head

Bel. Top of Dam — Outlet El. 30 ft. Assume $C = 3.1$

El.	H_w	Q_w	H_{orf}	Q_{orf}	T_p	Q_p	H_A	Q	Q_{tot}
T.O.									
	.5	.5	11		27	67			10
	1.5	5	30	6.5	27				29
	1.75	1.75	54	6.75	32		.15	7	32
1171	1	89	7	32			.4	29	59
1172	2		8	32			1.4	187	219
1173	3		9	34	30	70	2.4	420	454
1174			10	36			3.4	709	745

Precipitation $\frac{1}{2}$" = 12.5" — 6 12 24 48 hrs } Imp

Dam Length = ~~1000~~ 600' $C = 3.1$ — 123 133 142 ft } Imp

```
**********************************
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  26 FEB 79
  MODIFIED FOR HONEYWELL APR 79
**********************************
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**********************************
NEW YORK STATE
DEPT OF ENVIRONMENTAL CONSERVATION
FLOOD PROTECTION BUREAU
**********************************
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```
    1              A1   COHLESKILL LOWER RESERVOIR DAM
    2              A2
    3              A3
    4              B    200       0       15        0        0        0        0        0        0        0
    5              B1     5
    6              J      1       6        1
    7              J1    .2      .4       .5       .6       .8        1
    8              K              1                          2                 1
    9              K1   INFLOW FROM SUB-BASIN
   10              M      1       1     1.78
   11              P             19.5     111      123      133      142
   12              T                                                 1.0      0.1
   13              W    2.66     0.63
   14              X     -2       2        1
   15              K      1       1                                          1
   16              K1   ROUTE TOTAL RUNOFF THROUGH LOWER RESERVOIR
   17              Y                                 1        1
   18              Y1     1                                          -1170      -1
   19              Y4   1170  1170.25   1170.5  1170.75     1171     1172     1173     1174
   20              Y5              10       29       37       59      219      454      745
   21              $S              34       91      150      241      272
   22              $E   1152     1162     1164     1166     1169     1170
   23              $$   1170
   24              $D   1173        3      1.5      600
   25              K      99
   26              A
   27              A
   28              A
   29              A
   30              A
```

PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

RUNOFF HYDROGRAPH AT	1
ROUTE HYDROGRAPH TO	1

END OF NETWORK

****
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION JULY 1978
LAST MODIFICATION 26 FEB 79
MODIFIED FOR HONEYWELL APR 79
****

****
NEW YORK STATE
DEPT OF ENVIRONMENTAL CONSERVATION
FLOOD PROTECTION BUREAU
****

RUN DATE 03/05/81

COBLESKILL LOWER RESERVOIR DAM

JOB SPECIFICATION

NC	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
200	0	15	0	0	0	0	0	0	0

JOPER	NWT	LROPT	TRACE
5	0	0	0

MULTI-PLAN ANALYSES TO BE PERFORMED
NPLAN= 1 NRTIO= 6 LRTIO= 1
RTIOS= 0.20 0.40 0.50 0.60 0.80 1.00

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

SUB-AREA RUNOFF COMPUTATION

INFLOW FROM SUB-BASIN

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1	0	0	0	2	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	1.78	0.	1.78	0.	0.	0	0	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.	19.50	111.00	123.00	133.00	142.00	0.	0.

TRSPC COMPUTED BY THE PROGRAM IS 0.600

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.	0.	1.00	0.	0.	1.00	1.00	0.10	0.	0.

UNIT HYDROGRAPH DATA
TP= 2.66 CP=0.63 NTA= 0

RECESSION DATA
STRTQ= -2.00 QRCSN= 2.00 RTIOR= 1.00
APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TC=11.95 AND R= 9.56 INTERVALS

UNIT HYDROGRAPH 58 END-OF-PERIOD ORDINATES, LAG= 2.65 HOURS, CP= 0.63 VOL= 1.00

6.	25.	59.	94.	131.	170.	208.	240.	262.	276.
281.	275.	255.	229.	206.	186.	167.	151.	136.	122.
110.	99.	89.	80.	72.	65.	59.	53.	48.	43.
39.	35.	31.	28.	25.	23.	21.	19.	17.	15.
14.	12.	11.	10.	9.	8.	7.	7.	6.	5.
5.	4.	4.	3.	3.	3.	3.	2.		

0 END-OF-PERIOD FLOW

1.01	0.15	1	0.00	0.	0.00	4.	1.02	1.15	101	0.03	0.00	0.03	7.
1.01	0.30	2	0.00	0.	0.00	4.	1.02	1.30	102	0.03	0.00	0.03	7.
1.01	0.45	3	0.00	0.	0.00	4.	1.02	1.45	103	0.03	0.00	0.03	7.
1.01	1.00	4	0.00	0.	0.00	4.	1.02	2.00	104	0.03	0.00	0.03	7.
1.01	1.15	5	0.00	0.	0.00	4.	1.02	2.15	105	0.03	0.00	0.03	7.
1.01	1.30	6	0.00	0.	0.00	4.	1.02	2.30	106	0.03	0.00	0.03	7.
1.01	1.45	7	0.00	0.	0.00	4.	1.02	2.45	107	0.03	0.00	0.03	7.
1.01	2.00	8	0.00	0.	0.00	4.	1.02	3.00	108	0.03	0.00	0.03	7.
1.01	2.15	9	0.00	0.	0.00	4.	1.02	3.15	109	0.03	0.00	0.03	7.
1.01	2.30	10	0.00	0.	0.00	4.	1.02	3.30	110	0.03	0.00	0.03	7.
1.01	2.45	11	0.00	0.	0.00	4.	1.02	3.45	111	0.03	0.00	0.03	7.
1.01	3.00	12	0.00	0.	0.00	4.	1.02	4.00	112	0.03	0.00	0.03	7.
1.01	3.15	13	0.00	0.	0.00	4.	1.02	4.15	113	0.03	0.00	0.03	8.
1.01	3.30	14	0.00	0.	0.00	4.	1.02	4.30	114	0.03	0.00	0.03	8.
1.01	3.45	15	0.00	0.	0.00	4.	1.02	4.45	115	0.03	0.00	0.03	8.
1.01	4.00	16	0.00	0.	0.00	4.	1.02	5.00	116	0.03	0.00	0.03	8.
1.01	4.15	17	0.00	0.	0.00	4.	1.02	5.15	117	0.03	0.00	0.03	8.
1.01	4.30	18	0.00	0.	0.00	4.	1.02	5.30	118	0.03	0.00	0.03	8.
1.01	4.45	19	0.00	0.	0.00	4.	1.02	5.45	119	0.03	0.00	0.03	8.
1.01	5.00	20	0.00	0.	0.00	4.	1.02	6.00	120	0.03	0.00	0.03	8.
1.01	5.15	21	0.00	0.	0.00	4.	1.02	6.15	121	0.08	0.05	0.03	8.
1.01	5.30	22	0.00	0.	0.00	4.	1.02	6.30	122	0.08	0.05	0.03	10.
1.01	5.45	23	0.00	0.	0.00	4.	1.02	6.45	123	0.08	0.05	0.03	13.
1.01	6.00	24	0.00	0.	0.00	4.	1.02	7.00	124	0.08	0.05	0.03	18.
1.01	6.15	25	0.01	0.	0.01	4.	1.02	7.15	125	0.08	0.05	0.03	25.
1.01	6.30	26	0.01	0.	0.01	4.	1.02	7.30	126	0.08	0.05	0.03	33.
1.01	6.45	27	0.01	0.	0.01	4.	1.02	7.45	127	0.08	0.05	0.03	44.
1.01	7.00	28	0.01	0.	0.01	4.	1.02	8.00	128	0.08	0.05	0.03	57.
1.01	7.15	29	0.01	0.	0.01	4.	1.02	8.15	129	0.08	0.05	0.03	70.
1.01	7.30	30	0.01	0.	0.01	4.	1.02	8.30	130	0.08	0.05	0.03	85.
1.01	7.45	31	0.01	0.	0.01	4.	1.02	8.45	131	0.08	0.05	0.03	99.
1.01	8.00	32	0.01	0.	0.01	4.	1.02	9.00	132	0.08	0.05	0.03	114.
1.01	8.15	33	0.01	0.	0.01	4.	1.02	9.15	133	0.08	0.05	0.03	127.
1.01	8.30	34	0.01	0.	0.01	4.	1.02	9.30	134	0.08	0.05	0.03	139.
1.01	8.45	35	0.01	0.	0.01	4.	1.02	9.45	135	0.08	0.05	0.03	150.
1.01	9.00	36	0.01	0.	0.01	4.	1.02	10.00	136	0.08	0.05	0.03	159.
1.01	9.15	37	0.01	0.	0.01	4.	1.02	10.15	137	0.08	0.05	0.03	168.
1.01	9.30	38	0.01	0.	0.01	4.	1.02	10.30	138	0.08	0.05	0.03	176.
1.01	9.45	39	0.01	0.	0.01	4.	1.02	10.45	139	0.08	0.05	0.03	183.
1.01	10.00	40	0.01	0.	0.01	4.	1.02	11.00	140	0.08	0.05	0.03	189.
1.01	10.15	41	0.01	0.	0.01	4.	1.02	11.15	141	0.08	0.05	0.03	195.
1.01	10.30	42	0.01	0.	0.01	4.	1.02	11.30	142	0.08	0.05	0.03	200.
1.01	10.45	43	0.01	0.	0.01	4.	1.02	11.45	143	0.08	0.05	0.03	205.
1.01	11.00	44	0.01	0.	0.01	4.	1.02	12.00	144	0.08	0.05	0.03	209.
1.01	11.15	45	0.01	0.	0.01	4.	1.02	12.15	145	0.43	0.41	0.02	216.
1.01	11.30	46	0.01	0.	0.01	4.	1.02	12.30	146	0.43	0.41	0.02	229.
1.01	11.45	47	0.01	0.	0.01	4.	1.02	12.45	147	0.43	0.41	0.02	253.
1.01	12.00	48	0.01	0.	0.01	4.	1.02	13.00	148	0.43	0.41	0.02	289.
1.01	12.15	49	0.03	0.	0.03	4.	1.02	13.15	149	0.52	0.49	0.02	339.
1.01	12.30	50	0.03	0.	0.03	4.	1.02	13.30	150	0.52	0.49	0.02	404.
1.01	12.45	51	0.03	0.	0.03	4.	1.02	13.45	151	0.52	0.49	0.02	485.
1.01	13.00	52	0.03	0.	0.03	4.	1.02	14.00	152	0.52	0.49	0.02	580.
1.01	13.15	53	0.04	0.	0.04	4.	1.02	14.15	153	0.65	0.62	0.02	687.
1.01	13.30	54	0.04	0.	0.04	4.	1.02	14.30	154	0.65	0.62	0.02	805.
1.01	13.45	55	0.04	0.	0.04	4.	1.02	14.45	155	0.65	0.62	0.02	932.
1.01	14.00	56	0.04	0.	0.04	4.	1.02	15.00	156	0.65	0.62	0.02	1063.
1.01	14.15	57	0.04	0.	0.04	4.	1.02	15.15	157	0.66	0.63	0.02	1195.
1.01	14.30	58	0.04	0.	0.04	4.	1.02	15.30	158	1.32	1.29	0.03	1328.
1.01	14.45	59	0.04	0.	0.04	4.	1.02	15.45	159	3.68	3.66	0.03	1492.
1.01	15.00	60	0.04	0.	0.04	4.	1.02	16.00	160	0.92	0.90	0.02	1701.
1.01	15.15	61	0.04	0.	0.04	4.	1.02	16.15	161	0.61	0.58	0.02	1936.
1.01	15.30	62	0.09	0.	0.09	4.	1.02	16.30	162	0.61	0.58	0.02	2183.
1.01	15.45	63	0.25	0.	0.25	4.	1.02	16.45	163	0.61	0.58	0.02	2433.
1.01	16.00	64	0.06	0.03	0.03	4.	1.02	17.00	164	0.61	0.58	0.02	2680.
1.01	16.15	65	0.04	0.02	0.03	5.	1.02	17.15	165	0.48	0.45	0.02	2907.

1.01	16.45	67	0.04	0.02	0.03	8.	1.02	17.45	167	0.48	0.45	0.02	3236.
1.01	17.00	68	0.04	0.02	0.03	10.	1.02	18.00	168	0.48	0.45	0.02	3329.
1.01	17.15	69	0.03	0.01	0.03	13.	1.02	18.15	169	0.04	0.01	0.03	3369.
1.01	17.30	70	0.03	0.01	0.03	17.	1.02	18.30	170	0.04	0.01	0.03	3341.
1.01	17.45	71	0.03	0.01	0.03	21.	1.02	18.45	171	0.04	0.01	0.03	3243.
1.01	18.00	72	0.03	0.01	0.03	24.	1.02	19.00	172	0.04	0.01	0.03	3103.
1.01	18.15	73	0.00	0.	0.00	28.	1.02	19.15	173	0.04	0.01	0.03	2949.
1.01	18.30	74	0.00	0.	0.00	31.	1.02	19.30	174	0.04	0.01	0.03	2781.
1.01	18.45	75	0.00	0.	0.00	33.	1.02	19.45	175	0.04	0.01	0.03	2603.
1.01	19.00	76	0.00	0.	0.00	34.	1.02	20.00	176	0.04	0.01	0.03	2416.
1.01	19.15	77	0.00	0.	0.00	34.	1.02	20.15	177	0.04	0.01	0.03	2227.
1.01	19.30	78	0.00	0.	0.00	33.	1.02	20.30	178	0.04	0.01	0.03	2039.
1.01	19.45	79	0.00	0.	0.00	32.	1.02	20.45	179	0.04	0.01	0.03	1855.
1.01	20.00	80	0.00	0.	0.00	30.	1.02	21.00	180	0.04	0.01	0.03	1681.
1.01	20.15	81	0.00	0.	0.00	28.	1.02	21.15	181	0.04	0.01	0.03	1520.
1.01	20.30	82	0.00	0.	0.00	26.	1.02	21.30	182	0.04	0.01	0.03	1376.
1.01	20.45	83	0.00	0.	0.00	24.	1.02	21.45	183	0.04	0.01	0.03	1246.
1.01	21.00	84	0.00	0.	0.00	22.	1.02	22.00	184	0.04	0.01	0.03	1128.
1.01	21.15	85	0.00	0.	0.00	20.	1.02	22.15	185	0.04	0.01	0.03	1023.
1.01	21.30	86	0.00	0.	0.00	19.	1.02	22.30	186	0.04	0.01	0.03	928.
1.01	21.45	87	0.00	0.	0.00	17.	1.02	22.45	187	0.04	0.01	0.03	842.
1.01	22.00	88	0.00	0.	0.00	16.	1.02	23.00	188	0.04	0.01	0.03	765.
1.01	22.15	89	0.00	0.	0.00	15.	1.02	23.15	189	0.04	0.01	0.03	696.
1.01	22.30	90	0.00	0.	0.00	14.	1.02	23.30	190	0.04	0.01	0.03	634.
1.01	22.45	91	0.00	0.	0.00	13.	1.02	23.45	191	0.04	0.01	0.03	577.
1.01	23.00	92	0.00	0.	0.00	12.	1.03	0.	192	0.04	0.01	0.03	526.
1.01	23.15	93	0.00	0.	0.00	11.	1.03	0.15	193	0.	0.	0.	480.
1.01	23.30	94	0.00	0.	0.00	10.	1.03	0.30	194	0.	0.	0.	439.
1.01	23.45	95	0.00	0.	0.00	9.	1.03	0.45	195	0.	0.	0.	401.
1.02	0.	96	0.00	0.	0.00	9.	1.03	1.00	196	0.	0.	0.	366.
1.02	0.15	97	0.03	0.00	0.03	8.	1.03	1.15	197	0.	0.	0.	334.
1.02	0.30	98	0.03	0.00	0.03	8.	1.03	1.30	198	0.	0.	0.	305.
1.02	0.45	99	0.03	0.00	0.03	8.	1.03	1.45	199	0.	0.	0.	278.
1.02	1.00	100	0.03	0.00	0.03	7.	1.03	2.00	200	0.	0.	0.	252.
									SUM	22.15	18.47	3.68	83254.
										(563.)	(469.)	(94.)	(2357.49)

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	3369.	2478.	856.	415.	83095.
CMS	95.	70.	24.	12.	2353.
INCHES		12.95	17.90	18.09	18.09
MM		328.92	454.58	459.59	459.59
AC-FT		1229.	1698.	1717.	1717.
THOUS CU M		1516.	2095.	2118.	2118.

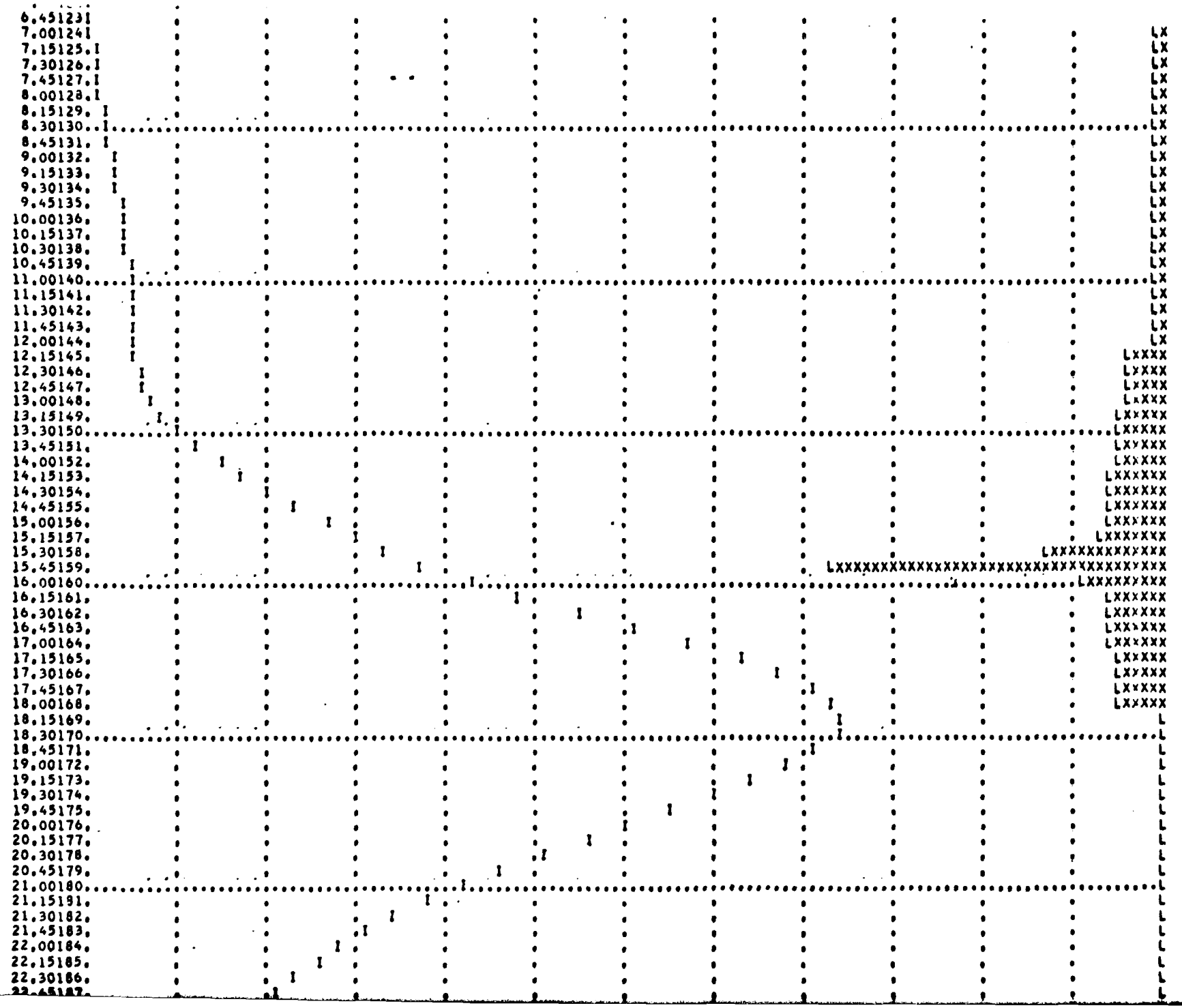
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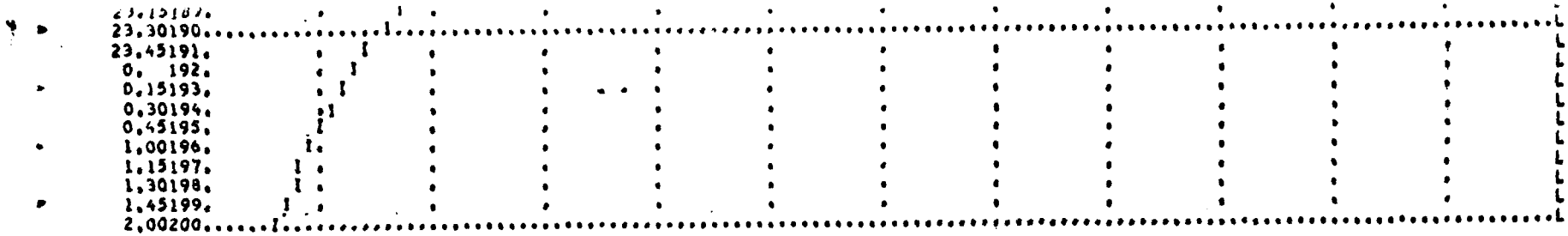
STATION 1

INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)

	0.	400.	800.	1200.	1600.	2000.	2400.	2800.	3200.	3600.	C.	C.	0.
	0.	0.	C.	0.	0.	0.	0.	C.	4.	3.	PRECIP(L) AND EXCESS(X) 2.	1.	0.
0.15	1I												
0.30	2I												
0.45	3I												
1.00	4I												
1.15	5I												
1.30	6I												
1.45	7I												
2.00	8I												
2.15	9I												
2.30	10I												
2.45	11I												
3.00	12I												
3.15	13I												
3.30	14I												
3.45	15I												
4.00	16I												
4.15	17I												
4.30	18I												
4.45	19I												
5.00	20I												
5.15	21I												
5.30	22I												
5.45	23I												
6.00	24I												
6.15	25I												
6.30	26I												
6.45	27I												
7.00	28I												
7.15	29I												
7.30	30I												
7.45	31I												
8.00	32I												
8.15	33I												
8.30	34I												
8.45	35I												
9.00	36I												
9.15	37I												
9.30	38I												
9.45	39I												
10.00	40I												
10.15	41I												
10.30	42I												
10.45	43I												
11.00	44I												
11.15	45I												
11.30	46I												
11.45	47I												
12.00	48I												
12.15	49I												
12.30	50I												
12.45	51I												
13.00	52I												
13.15	53I												
13.30	54I												
12.45	55I												

```
14.15 57|                                                                  L
14.30 58|                                                                  L
14.45 59|                                                                  L
15.00 60|..................................................................L
15.15 61|                                                                  L
15.30 62|                                                                  LX
15.45 63|                                                                  LLX
16.00 64|                                                                  LX
16.15 65|                                                                  L
16.30 66|                                                                  L
16.45 67|                                                                  L
17.00 68|                                                                  L
17.15 69|                                                                  L
17.30 70|..................................................................L
17.45 71.|                                                                 L
18.00 72.|                                                                 L
18.15 73.|                                                                 L
18.30 74.|                                                                 L
18.45 75.|                                                                 L
19.00 76.|                                                                 L
19.15 77.|                                                                 L
19.30 78.|                                                                 L
19.45 79.|                                                                 L
20.00 80.|..................................................................L
20.15 81.|                                                                 L
20.30 82.|                                                                 L
20.45 83.|                                                                 L
21.00 84.|                                                                 L
21.15 85.|                                                                 L
21.30 86|                                                                  L
21.45 87|                                                                  L
22.00 88|                                                                  L
22.15 89|                                                                  L
22.30 90|..................................................................L
22.45 91|                                                                  L
23.00 92|                                                                  L
23.15 93|                                                                  L
23.30 94|                                                                  L
23.45 95|                                                                  L
 0.   96|                                                                  L
 0.15 97|                                                                  L
 0.30 98|                                                                  L
 0.45 99|                                                                  L
 1.00100|..................................................................L
 1.15101|                                                                  L
 1.30102|                                                                  L
 1.45103|                                                                  L
 2.00104|                                                                  L
 2.15105|                                                                  L
 2.30106|                                                                  L
 2.45107|                                                                  L
 3.00108|                                                                  L
 3.15109|                                                                  L
 3.30110|..................................................................L
 3.45111|                                                                  L
 4.00112|                                                                  L
 4.15113|                                                                  L
 4.30114|                                                                  L
 4.45115|                                                                  L
 5.00116|                                                                  L
 5.15117|                                                                  L
 5.30118|                                                                  L
 5.45119|                                                                  L
 6.00120|..................................................................L
 6.15121|                                                                  LX
```




23.15189.
23.30190.
23.45191.
0. 192.
0.15193.
0.30194.
0.45195.
1.00196.
1.15197.
1.30198.
1.45199.
2.00200.

OVN

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 1

1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	2.	2.	3.	3.
4.	5.	6.	6.	7.	7.	7.	7.	6.	6.
6.	5.	5.	4.	4.	4.	3.	3.	3.	3.
3.	2.	2.	2.	2.	2.	2.	2.	2.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	3.	4.	5.	7.	9.	11.	14.	17.
20.	23.	25.	28.	30.	32.	34.	35.	37.	38.
39.	40.	41.	42.	43.	46.	51.	58.	68.	81.
97.	116.	137.	161.	186.	213.	239.	266.	298.	340.
387.	437.	487.	536.	581.	619.	647.	666.	674.	668.
649.	621.	590.	556.	521.	483.	445.	408.	371.	336.
304.	275.	249.	226.	205.	186.	168.	153.	139.	127.
115.	105.	96.	88.	80.	73.	67.	61.	56.	50.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	674.	496.	171.	83.	16619.
CMS	19.	14.	5.	2.	471.
INCHES		2.59	3.58	3.62	3.62
MM		65.78	90.92	91.92	91.92
AC-FT		246.	340.	343.	343.
THOLS CU M		303.	419.	424.	424.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 2

1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	2.	2.	2.	3.	4.	5.	7.
8.	10.	11.	12.	13.	14.	14.	13.	13.	12.
11.	11.	10.	9.	8.	7.	7.	6.	6.	5.
5.	5.	4.	4.	4.	4.	3.	3.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	3.
3.	4.	5.	7.	10.	13.	18.	23.	28.	34.
40.	45.	51.	56.	60.	64.	67.	70.	73.	76.
78.	80.	82.	84.	86.	92.	101.	116.	136.	162.
194.	232.	275.	322.	373.	425.	478.	531.	597.	680.
775.	873.	973.	1072.	1163.	1238.	1294.	1332.	1347.	1336.
1297.	1241.	1179.	1113.	1041.	966.	891.	816.	742.	672.
608.	550.	498.	451.	409.	371.	337.	306.	278.	253.
231.	210.	192.	176.	160.	146.	134.	122.	111.	101.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1347.	991.	342.	166.	33238.
CMS	38.	28.	10.	5.	941.
INCHES		5.18	7.16	7.24	7.24
MM		131.57	181.83	183.83	183.83
AC-FT		491.	679.	687.	687.
THOLS CU M		606.	838.	847.	847.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 3

2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	3.	4.	5.	7.	9.
10.	12.	14.	15.	16.	17.	17.	17.	16.	15.
14.	13.	12.	11.	10.	9.	9.	8.	7.	7.
6.	6.	5.	5.	5.	4.	4.	4.	4.	4.
4.	3.	3.	3.	3.	3.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	5.	6.	9.	12.	17.	22.	28.	35.	42.
50.	57.	63.	69.	75.	80.	84.	88.	91.	95.
98.	100.	102.	105.	108.	115.	127.	145.	169.	202.
243.	290.	344.	403.	466.	532.	597.	664.	746.	850.
968.	1092.	1217.	1340.	1454.	1548.	1618.	1664.	1684.	1671.
1621.	1552.	1474.	1391.	1301.	1208.	1113.	1019.	928.	840.
760.	688.	623.	564.	511.	464.	421.	383.	348.	317.
288.	263.	240.	219.	200.	183.	167.	152.	139.	126.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1684.	1239.	428.	208.	41547.
CMS	48.	35.	12.	6.	1176.
INCHES		6.47	8.95	9.05	9.05
MM		164.46	227.29	229.79	229.79
AC-FT		614.	849.	858.	858.
THOUS CU M		758.	1047.	1059.	1059.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 4

2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	3.	4.	5.	6.	8.	10.	12.
15.	17.	18.	20.	20.	20.	20.	19.	16.	17.
16.	15.	13.	12.	11.	10.	10.	9.	8.	8.
7.	7.	6.	6.	5.	5.	5.	5.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	5.	5.	5.	5.	5.	5.	5.	5.	5.
6.	8.	11.	15.	20.	27.	34.	42.	51.	60.
68.	76.	83.	90.	96.	101.	105.	110.	114.	117.
120.	123.	125.	129.	138.	152.	174.	203.	242.	291.
348.	412.	483.	559.	638.	717.	797.	895.	1020.	1152.
1310.	1460.	1608.	1744.	1857.	1942.	1997.	2021.	2005.	1946.
1862.	1769.	1669.	1562.	1450.	1336.	1223.	1113.	1008.	912.
825.	747.	677.	614.	557.	505.	459.	417.	380.	346.
316.	288.	263.	241.	220.	201.	183.	167.	151.	

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2021.	1487.	514.	249.	49857.
CMS	57.	42.	15.	7.	1412.
INCHES		7.77	10.74	10.86	10.06
MM		197.35	272.75	275.75	275.75
AC-FT		737.	1019.	1030.	1030.
THOUS CU M		909.	1257.	1271.	1271.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 8

3.	3.	3.	3.	3.	3.	3.	3.	3.	3.

3.	3.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	4.	5.	6.	8.	11.	14.
17.	20.	22.	25.	26.	27.	27.	27.	26.	24.
23.	21.	19.	18.	16.	15.	14.	13.	12.	11.
10.	9.	9.	8.	8.	7.	7.	6.	6.	6.
6.	6.	5.	5.	5.	6.	6.	6.	6.	6.
6.	6.	6.	6.	5.	6.	6.	6.	6.	6.
7.	8.	10.	14.	20.	27.	35.	45.	56.	68.
79.	91.	102.	111.	120.	127.	134.	141.	146.	151.
156.	160.	164.	167.	172.	183.	203.	231.	271.	323.
388.	464.	550.	644.	745.	851.	956.	1063.	1194.	1361.
1549.	1747.	1947.	2144.	2326.	2476.	2589.	2663.	2695.	2673.
2594.	2483.	2359.	2225.	2082.	1933.	1781.	1631.	1484.	1344.
1216.	1101.	996.	903.	813.	742.	674.	612.	557.	506.
461.	421.	384.	351.	321.	293.	267.	244.	222.	202.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2695.	1982.	685.	332.	66476.
CMS	76.	56.	19.	9.	1882.
INCHES		10.36	14.32	14.48	14.48
MM		263.14	363.66	367.67	367.67
AC-FT		983.	1359.	1373.	1373.
THOUS CU M		1212.	1676.	1694.	1694.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 6

4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	5.	6.	8.	10.	13.	17.
21.	24.	28.	31.	33.	34.	34.	33.	32.	30.
28.	26.	24.	22.	20.	19.	17.	16.	15.	14.
13.	12.	11.	10.	9.	9.	8.	8.	8.	7.
7.	7.	7.	7.	7.	7.	7.	7.	7.	7.
7.	7.	8.	8.	8.	8.	8.	8.	8.	8.
8.	10.	13.	18.	25.	33.	44.	57.	70.	85.
99.	114.	127.	139.	150.	159.	168.	176.	183.	189.
195.	200.	205.	209.	216.	229.	253.	289.	339.	404.
485.	580.	687.	805.	932.	1063.	1195.	1328.	1492.	1701.
1936.	2183.	2433.	2680.	2907.	3095.	3236.	3329.	3369.	3341.
3243.	3103.	2949.	2781.	2603.	2416.	2227.	2039.	1855.	1681.
1520.	1376.	1246.	1128.	1023.	928.	842.	765.	696.	633.
577.	526.	480.	439.	401.	366.	334.	305.	278.	252.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	3369.	2478.	856.	415.	83095.
CMS	95.	70.	24.	12.	2353.
INCHES		12.95	17.90	18.09	18.09
MM		328.92	454.58	459.59	459.59
AC-FT		1229.	1698.	1717.	1717.
THOUS CU M		1516.	2095.	2118.	2118.

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

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

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.	0.	0.	1	1	0	0	0

NSTPS	NSTOL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.	0.	0.	-1170.	-1

STAGE	1170.00	1170.25	1170.50	1170.75	1171.00	1172.00	1173.00	1174.00
FLOW	0.	10.00	29.00	37.00	59.00	219.00	454.00	745.00
CAPACITY=	0.	34.	91.	150.	241.	272.		
ELEVATION=	1152.	1162.	1164.	1166.	1169.	1170.		

CREL	SPWID	COOW	EXPW	ELEVL	CCOL	CAREA	EXPL
1170.0	0.	0.	0.	0.	0.	0.	0.

DAM DATA

TOPEL	COQD	EXPD	DAMWID
1173.0	3.0	1.5	600.

WARNING *** TOP OF DAM, BOTTOM OF BREACH, OR LOW-LEVEL OUTLET IS NOT WITHIN RANGE OF GIVEN ELEVATIONS IN STORAGE-ELEVATION DATA
BOTTOM OF RESERVOIR ASSUMED TO BE AT 1152.00
STORAGE-ELEVATION DATA WILL BE EXTRAPOLATED ABOVE ELEVATION 1170.00

STATION 1, PLAN 1, RATIO 1

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	3.	3.	3.
4.	4.	5.	5.	6.	6.	7.	8.	9.	9.
10.	12.	13.	14.	16.	17.	19.	20.	23.	25.
28.	30.	32.	35.	39.	46.	58.	77.	98.	121.
145.	172.	201.	239.	285.	331.	375.	416.	453.	549.
614.	627.	614.	590.	561.	529.	496.	466.	448.	435.
418.	399.	379.	359.	338.	317.	297.	277.	258.	240.
223.	210.	199.	188.	178.	167.	158.	148.	139.	130.

STORAGE

272.	272.	272.	272.	272.	272.	272.	272.	272.	272.
272.	272.	272.	272.	272.	272.	272.	272.	272.	272.
272.	272.	272.	272.	272.	272.	272.	272.	272.	272.
272.	272.	272.	272.	272.	272.	272.	272.	272.	272.
272.	272.	272.	272.	272.	272.	272.	272.	272.	272.
272.	272.	272.	272.	272.	272.	272.	272.	272.	272.
272.	272.	272.	272.	272.	272.	272.	273.	273.	273.
273.	273.	273.	273.	273.	273.	273.	273.	273.	274.
274.	274.	274.	274.	274.	274.	274.	274.	274.	274.
274.	274.	274.	274.	274.	274.	274.	274.	274.	274.

274.	274.	274.	274.	274.	274.	274.	274.	274.	274.
274.	274.	274.	274.	274.	274.	274.	274.	274.	274.
275.	275.	275.	276.	276.	277.	277.	278.	279.	279.
280.	280.	281.	282.	282.	283.	283.	284.	285.	286.
287.	289.	291.	293.	296.	299.	303.	307.	311.	315.
320.	325.	331.	337.	343.	349.	355.	360.	365.	368.
370.	370.	370.	369.	369.	368.	367.	366.	364.	362.
360.	358.	355.	352.	350.	347.	344.	342.	339.	337.
334.	332.	330.	328.	326.	324.	322.	320.	319.	317.

STAGE

1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0
1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0
1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0
1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0
1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0
1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0
1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0
1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0
1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1
1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1
1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1
1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.0	1170.0
1170.0	1170.0	1170.0	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1
1170.1	1170.1	1170.1	1170.1	1170.1	1170.2	1170.2	1170.2	1170.2	1170.2
1170.3	1170.3	1170.3	1170.3	1170.3	1170.3	1170.4	1170.4	1170.4	1170.4
1170.5	1170.5	1170.6	1170.7	1170.8	1170.9	1171.0	1171.1	1171.2	1171.4
1171.5	1171.7	1171.9	1172.1	1172.3	1172.5	1172.7	1172.8	1173.0	1173.1
1173.2	1173.2	1173.2	1173.1	1173.1	1173.1	1173.1	1173.0	1173.0	1172.9
1172.8	1172.8	1172.7	1172.6	1172.5	1172.4	1172.3	1172.2	1172.2	1172.1
1172.0	1171.9	1171.9	1171.8	1171.7	1171.7	1171.6	1171.6	1171.5	1171.4

PEAK OUTFLOW IS 627, AT TIME 43.00 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	627.	440.	150.	72.	14457.
CMS	18.	12.	4.	2.	409.
INCHES		2.30	3.13	3.15	3.15
MM		58.41	79.42	79.96	79.96
AC-FT		218.	297.	299.	269.
THOUS CU M		269.	366.	368.	368.

WARNING *** TOP OF DAM, BOTTOM OF BREACH, OR LOW-LEVEL OUTLET IS NOT WITHIN RANGE OF GIVEN ELEVATIONS IN STORAGE-ELEVATION DATA
BOTTOM OF RESERVOIR ASSUMED TO BE AT 1152.00
STORAGE-ELEVATION DATA WILL BE EXTRAPOLATED ABOVE ELEVATION 1170.00

STATION 1, PLAN 1, RATIO 2

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	2.
2.	2.	2.	2.	3.	3.	3.	3.	4.	4.
4.	4.	4.	5.	5.	5.	5.	5.	5.	5.
5.	5.	5.	5.	5.	5.	5.	5.	5.	5.
5.	5.	5.	4.	4.	4.	4.	4.	4.	4.
				4.	4.	4.	4.	4.	4.

28.	30.	31.	32.	33.	34.	35.	37.	42.	48.
55.	68.	87.	109.	133.	160.	189.	222.	272.	325.
383.	447.	687.	931.	1079.	1179.	1251.	1303.	1334.	1341.
1320.	1277.	1221.	1159.	1093.	1022.	950.	876.	804.	735.
670.	612.	559.	513.	474.	450.	436.	420.	401.	382.
361.	341.	321.	301.	281.	263.	245.	228.	214.	203.

STORAGE

272.	272.	272.	272.	272.	272.	272.	272.	272.	272.
272.	272.	272.	272.	272.	272.	272.	272.	272.	272.
272.	272.	273.	273.	273.	273.	273.	273.	273.	273.
273.	273.	273.	273.	273.	273.	273.	273.	273.	273.
273.	273.	273.	273.	273.	273.	273.	273.	273.	273.
273.	273.	273.	273.	273.	273.	273.	273.	273.	273.
273.	273.	273.	273.	273.	273.	273.	273.	273.	273.
273.	273.	274.	274.	274.	274.	274.	275.	275.	275.
275.	275.	275.	276.	276.	276.	276.	276.	276.	276.
276.	276.	276.	276.	276.	276.	276.	276.	276.	276.
276.	276.	276.	275.	275.	275.	275.	275.	275.	275.
275.	275.	275.	275.	275.	275.	275.	275.	275.	275.
275.	275.	275.	275.	275.	275.	276.	276.	276.	277.
277.	278.	279.	280.	281.	282.	283.	284.	285.	286.
287.	288.	289.	290.	291.	292.	294.	295.	297.	299.
302.	305.	308.	313.	317.	323.	328.	334.	341.	348.
356.	364.	371.	376.	378.	380.	381.	381.	382.	382.
382.	381.	380.	379.	378.	377.	376.	375.	374.	372.
371.	370.	369.	367.	366.	365.	363.	360.	358.	355.
353.	350.	347.	345.	342.	340.	337.	335.	333.	331.

STAGE

1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0
1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0
1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0
1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0
1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0
1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0
1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0
1170.0	1170.0	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1
1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1
1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1
1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1
1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1
1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.2
1170.2	1170.2	1170.2	1170.3	1170.3	1170.3	1170.4	1170.4	1170.4	1170.5
1170.5	1170.5	1170.6	1170.6	1170.6	1170.7	1170.7	1170.7	1170.8	1170.9
1171.0	1171.1	1171.2	1171.3	1171.5	1171.6	1171.8	1172.0	1172.2	1172.5
1172.7	1173.0	1173.2	1173.4	1173.4	1173.5	1173.5	1173.5	1173.5	1173.5
1173.5	1173.5	1173.5	1173.5	1173.4	1173.4	1173.4	1173.3	1173.3	1173.2
1173.2	1173.2	1173.1	1173.1	1173.0	1173.0	1172.9	1172.9	1172.8	1172.7
1172.6	1172.5	1172.4	1172.3	1172.3	1172.2	1172.1	1172.0	1172.0	1171.9

PEAK OUTFLOW IS 1341. AT TIME 42.50 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1341.	952.	315.	152.	
CMS	38.	27.	9.	4.	861.
INCHES		4.97	6.58	6.62	6.62
MM		126.33	167.03	168.11	168.11
AC-FT		472.	624.	628.	628.
THOUS CU M		582.	770.	775.	775.

[illegible] BOTTOM OF BREACH, OR LOW-LEVEL OUTLET IS NOT WITHIN RANGE OF GIVEN ELEVATIONS IN STORAGE-ELEVATION DATA

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	2.	2.	2.	2.	2.
2.	2.	3.	3.	3.	4.	4.	4.	5.	5.
5.	5.	6.	6.	6.	6.	6.	6.	6.	6.
6.	6.	6.	6.	6.	6.	6.	6.	6.	6.
6.	6.	6.	6.	6.	6.	5.	5.	5.	5.
5.	5.	5.	5.	5.	5.	5.	5.	5.	5.
5.	5.	5.	5.	5.	5.	6.	6.	7.	8.
9.	10.	12.	15.	18.	21.	24.	27.	29.	31.
32.	34.	35.	36.	39.	44.	48.	53.	59.	72.
87.	105.	126.	151.	180.	212.	261.	314.	371.	433.
623.	911.	1104.	1249.	1376.	1484.	1571.	1624.	1670.	1677.
1649.	1593.	1522.	1444.	1360.	1271.	1180.	1086.	996.	905.
827.	752.	685.	625.	572.	525.	484.	454.	441.	425.
407.	388.	368.	348.	328.	308.	289.	270.	252.	235.

STORAGE

272.	272.	272.	272.	272.	272.	272.	272.	272.	272.
272.	272.	272.	272.	272.	272.	273.	273.	273.	273.
273.	273.	273.	273.	273.	273.	273.	273.	273.	273.
273.	273.	273.	273.	273.	273.	273.	273.	273.	273.
273.	273.	273.	273.	273.	273.	273.	273.	273.	273.
273.	273.	273.	273.	273.	273.	273.	273.	273.	273.
273.	273.	273.	273.	273.	273.	273.	273.	273.	273.
274.	274.	274.	274.	275.	275.	275.	275.	276.	276.
276.	276.	276.	276.	277.	277.	277.	277.	277.	277.
277.	277.	277.	277.	277.	277.	277.	277.	277.	277.
276.	276.	276.	276.	276.	276.	276.	276.	276.	276.
276.	276.	276.	276.	276.	276.	276.	276.	276.	276.
276.	276.	276.	276.	276.	276.	276.	277.	277.	278.
279.	280.	281.	282.	283.	284.	285.	287.	288.	289.
291.	292.	293.	295.	296.	298.	299.	301.	303.	305.
308.	312.	316.	321.	326.	333.	339.	347.	354.	362.
370.	376.	379.	381.	382.	384.	385.	386.	386.	386.
386.	385.	384.	383.	382.	381.	380.	378.	377.	376.
374.	373.	371.	370.	369.	368.	366.	364.	363.	361.
359.	356.	354.	351.	348.	346.	343.	341.	338.	336.

STAGE

1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0
1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0
1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0
1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0
1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0
1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0
1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1
1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.2	1170.2	1170.2	1170.2
1170.2	1170.2	1170.2	1170.2	1170.2	1170.2	1170.2	1170.1	1170.1	1170.1
1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1
1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1
1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.2	1170.2	1170.2
1170.2	1170.2	1170.3	1170.3	1170.4	1170.4	1170.4	1170.5	1170.5	1170.6
1170.6	1170.6	1170.7	1170.7	1170.8	1170.8	1170.9	1170.9	1171.0	1171.1
1171.2	1171.3	1171.4	1171.6	1171.8	1172.0	1172.2	1172.4	1172.6	1172.9
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

1173.3	1173.3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1172.8	1172.7	1172.6	1172.6	1172.5	1172.4	1172.3	1172.2	1172.1	1172.1

PEAK OUTFLOW IS 1677. AT TIME 42.50 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1677.	1216.	398.	192.	38452.
CMS	47.	34.	11.	5.	1089.
INCHES		6.35	8.32	8.37	8.37
MM		161.35	211.33	212.67	212.67
AC-FT		603.	789.	794.	794.
THOUS CU M		743.	974.	980.	980.

WARNING *** TOP OF DAM, BOTTOM OF BREACH, OR LOW-LEVEL OUTLET IS NOT WITHIN RANGE OF GIVEN ELEVATIONS IN STORAGE-ELEVATION DATA
BOTTOM OF RESERVOIR ASSUMED TO BE AT 1152.00
STORAGE-ELEVATION DATA WILL BE EXTRAPOLATED ABOVE ELEVATION 1170.00

STATION 1, PLAN 1, RATIO 4

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
3.	3.	3.	4.	4.	4.	5.	5.	6.	6.
6.	6.	7.	7.	7.	7.	7.	7.	7.	7.
7.	7.	7.	7.	7.	7.	7.	7.	7.	7.
7.	7.	7.	7.	7.	7.	7.	6.	6.	6.
6.	6.	6.	6.	6.	6.	6.	6.	6.	6.
6.	6.	6.	6.	6.	6.	7.	8.	8.	9.
11.	14.	17.	20.	23.	26.	29.	31.	33.	34.
36.	39.	44.	48.	53.	57.	65.	75.	86.	100.
117.	137.	162.	191.	227.	281.	338.	399.	478.	769.
1013.	1195.	1357.	1513.	1660.	1788.	1891.	1964.	2007.	2013.
1977.	1909.	1822.	1728.	1626.	1519.	1407.	1297.	1188.	1083.
985.	895.	814.	741.	675.	617.	565.	519.	480.	453.
440.	424.	406.	387.	368.	348.	328.	308.	289.	270.

STORAGE

272.	272.	272.	272.	272.	272.	272.	272.	272.	272.
272.	272.	272.	273.	273.	273.	273.	273.	273.	273.
273.	273.	273.	273.	273.	273.	273.	273.	273.	273.
273.	273.	273.	273.	273.	273.	273.	273.	273.	273.
273.	273.	273.	273.	273.	273.	273.	273.	273.	273.
273.	273.	273.	273.	273.	273.	273.	273.	273.	273.
273.	273.	273.	273.	273.	273.	273.	274.	274.	274.
274.	274.	274.	275.	275.	275.	276.	276.	276.	277.
277.	277.	277.	277.	277.	278.	278.	278.	278.	278.
278.	278.	278.	278.	278.	278.	278.	278.	278.	277.
277.	277.	277.	277.	277.	277.	277.	277.	277.	277.
277.	277.	277.	277.	277.	277.	277.	277.	277.	277.
277.	277.	277.	277.	277.	277.	277.	278.	278.	279.
280.	281.	282.	284.	285.	286.	288.	289.	291.	293.
294.	296.	298.	299.	301.	302.	304.	306.	308.	311.
314.	318.	323.	329.	335.	342.	350.	358.	366.	373.
377.	380.	382.	384.	386.	388.	389.	390.	390.	390.
390.	389.	388.	387.	386.	384.	383.	381.	380.	378.
377.	375.	374.	373.	371.	370.	369.	368.	366.	365.
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

STAGE

1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0
1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0
1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0
1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0
1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0
1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0
1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.1	1170.1
1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1
1170.2	1170.2	1170.2	1170.2	1170.2	1170.2	1170.2	1170.2	1170.2	1170.2
1170.2	1170.2	1170.2	1170.2	1170.2	1170.2	1170.2	1170.2	1170.2	1170.2
1170.2	1170.2	1170.2	1170.2	1170.2	1170.2	1170.2	1170.2	1170.2	1170.2
1170.2	1170.2	1170.2	1170.2	1170.2	1170.2	1170.2	1170.2	1170.1	1170.1
1170.1	1170.1	1170.1	1170.2	1170.2	1170.2	1170.2	1170.2	1170.2	1170.2
1170.3	1170.3	1170.3	1170.4	1170.4	1170.5	1170.5	1170.6	1170.6	1170.7
1170.7	1170.8	1170.8	1170.9	1170.9	1171.0	1171.0	1171.1	1171.2	1171.3
1171.4	1171.5	1171.6	1171.8	1172.0	1172.3	1172.5	1172.8	1173.0	1173.3
1173.4	1173.5	1173.6	1173.6	1173.7	1173.7	1173.8	1173.8	1173.8	1173.8
1173.8	1173.8	1173.7	1173.7	1173.7	1173.6	1173.6	1173.5	1173.5	1173.4
1173.4	1173.3	1173.3	1173.2	1173.2	1173.2	1173.1	1173.1	1173.0	1173.0
1172.9	1172.9	1172.8	1172.7	1172.6	1172.5	1172.5	1172.4	1172.3	1172.2

PEAK OUTFLOW IS 2013. AT TIME 42.50 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2013.	1475.	482.	233.	46536.
CMS	57.	42.	14.	7.	1318.
INCHES		7.71	10.07	10.13	10.13
MM		195.82	255.77	257.39	257.39
AC-FT		732.	955.	961.	961.
THOUS CU M		902.	1179.	1186.	1186.

WARNING *** TOP OF DAM, BOTTOM OF BREACH, OR LOW-LEVEL OUTLET IS NOT WITHIN RANGE OF GIVEN ELEVATIONS IN STORAGE-ELEVATION DATA
BOTTOM OF RESERVOIR ASSUMED TO BE AT 1152.00
STORAGE-ELEVATION DATA WILL BE EXTRAPOLATED ABOVE ELEVATION 1170.00

STATION 1, PLAN 1, RATIO 8

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	3.	3.	3.
3.	4.	4.	5.	5.	6.	6.	7.	7.	8.
8.	9.	9.	9.	9.	10.	10.	10.	10.	10.
10.	10.	10.	10.	10.	10.	10.	10.	9.	9.
9.	9.	9.	9.	9.	9.	9.	9.	9.	8.
8.	8.	8.	8.	8.	8.	8.	8.	8.	8.
8.	8.	8.	8.	8.	9.	9.	10.	12.	15.
17.	21.	25.	29.	31.	33.	35.	37.	43.	49.
55.	62.	72.	81.	90.	99.	109.	120.	133.	150.
171.	196.	232.	285.	344.	410.	539.	852.	1067.	1241.
1426.	1624.	1829.	2033.	2227.	2396.	2530.	2625.	2679.	2684.
2634.	2539.	2423.	2295.	2159.	2015.	1866.	1718.	1572.	1432.
1300.	1180.	1072.	974.	886.	807.	736.	672.	615.	565.
520.	482.	454.	441.	426.	409.	390.	370.	351.	330.

STORAGE

273.	273.	273.	273.	273.	273.	273.	273.	273.	273.
273.	273.	273.	273.	273.	273.	273.	273.	273.	273.
273.	273.	273.	273.	273.	273.	273.	273.	273.	273.
273.	273.	274.	274.	274.	274.	274.	274.	274.	274.
274.	274.	274.	274.	274.	274.	274.	274.	274.	274.
274.	274.	274.	274.	274.	274.	274.	274.	274.	274.
275.	275.	275.	276.	276.	277.	277.	277.	278.	278.
278.	279.	279.	279.	279.	279.	280.	280.	280.	280.
280.	280.	280.	280.	280.	280.	279.	279.	279.	279.
279.	279.	279.	279.	279.	279.	279.	279.	279.	279.
279.	278.	278.	278.	278.	278.	278.	278.	278.	278.
278.	278.	278.	278.	278.	279.	279.	280.	281.	282.
283.	284.	286.	287.	289.	291.	293.	295.	297.	299.
301.	304.	306.	307.	309.	311.	313.	315.	317.	321.
325.	330.	336.	343.	351.	359.	368.	375.	378.	381.
383.	386.	388.	390.	393.	394.	396.	397.	397.	397.
397.	396.	395.	393.	392.	390.	389.	387.	385.	383.
381.	380.	378.	377.	375.	374.	372.	371.	370.	369.
368.	366.	365.	363.	361.	359.	357.	354.	351.	349.

STAGE

1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0
1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0
1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0
1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0
1170.0	1170.0	1170.0	1170.0	1170.0	1170.1	1170.1	1170.1	1170.1	1170.1
1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1
1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1
1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.2	1170.2	1170.2	1170.2
1170.2	1170.2	1170.2	1170.2	1170.2	1170.2	1170.2	1170.2	1170.2	1170.2
1170.2	1170.2	1170.2	1170.2	1170.2	1170.2	1170.2	1170.2	1170.2	1170.2
1170.2	1170.2	1170.2	1170.2	1170.2	1170.2	1170.2	1170.2	1170.2	1170.2
1170.2	1170.2	1170.2	1170.2	1170.2	1170.2	1170.2	1170.2	1170.2	1170.2
1170.2	1170.2	1170.2	1170.2	1170.2	1170.2	1170.2	1170.3	1170.3	1170.3
1170.3	1170.4	1170.4	1170.5	1170.6	1170.6	1170.7	1170.7	1170.8	1170.9
1171.0	1171.0	1171.1	1171.1	1171.2	1171.3	1171.3	1171.4	1171.5	1171.6
1171.7	1171.9	1172.1	1172.3	1172.5	1172.8	1173.1	1173.3	1173.4	1173.5
1173.6	1173.7	1173.7	1173.8	1173.9	1173.9	1174.0	1174.0	1174.0	1174.0
1174.0	1174.0	1174.0	1173.9	1173.9	1173.8	1173.8	1173.7	1173.6	1173.6
1173.5	1173.5	1173.4	1173.4	1173.3	1173.3	1173.2	1173.2	1173.2	1173.1
1173.1	1173.0	1173.0	1172.9	1172.9	1172.8	1172.7	1172.6	1172.6	1172.5

PEAK OUTFLOW IS 2684. AT TIME 42.50 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2684.	1979.	650.	314.	62769.
CMS	76.	56.	18.	9.	1777.
INCHES		10.34	13.58	13.67	13.67
MM		262.70	345.01	347.17	347.17
AC-FT		981.	1289.	1297.	1297.
THOUS CU M		1210.	1590.	1600.	1600.

WARNING *** TOP OF DAM, BOTTOM OF BREACH, OR LOW-LEVEL OUTLET IS NOT WITHIN RANGE OF GIVEN ELEVATIONS IN STORAGE-ELEVATION DATA
BOTTOM OF RESERVOIR ASSUMED TO BE AT 1152.00
STORAGE-ELEVATION DATA WILL BE EXTRAPOLATED ABOVE ELEVATION 1170.00

STATION 1, PLAN 1, RATIO 6

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

0.	0.	0.	0.	0.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.

2.	2.	2.	2.	2.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	4.
4.	5.	5.	6.	7.	7.	8.	9.	9.	10.
11.	11.	12.	13.	13.	13.	14.	14.	14.	14.
14.	14.	14.	13.	13.	13.	13.	13.	12.	12.
12.	12.	11.	11.	11.	11.	11.	10.	10.	10.
10.	10.	10.	10.	10.	10.	10.	10.	10.	9.
9.	9.	9.	10.	10.	11.	12.	14.	17.	20.
23.	27.	30.	32.	35.	38.	45.	52.	60.	72.
85.	96.	107.	117.	127.	136.	147.	159.	175.	195.
221.	266.	319.	381.	452.	758.	1040.	1222.	1384.	1572.
1798.	2045.	2300.	2554.	2795.	3005.	3170.	3286.	3351.	3355.
3289.	3169.	3022.	2862.	2691.	2509.	2324.	2138.	1956.	1780.
1615.	1465.	1330.	1208.	1098.	999.	910.	830.	758.	693.
635.	583.	537.	497.	464.	447.	433.	417.	398.	379.

STORAGE

272.	272.	272.	272.	272.	272.	272.	273.	273.	273.
273.	273.	273.	273.	273.	273.	273.	273.	273.	273.
273.	273.	273.	273.	273.	273.	273.	273.	273.	274.
274.	274.	274.	274.	274.	274.	274.	274.	274.	274.
274.	274.	274.	274.	274.	274.	274.	274.	274.	274.
274.	274.	274.	274.	274.	274.	274.	274.	274.	274.
274.	274.	274.	274.	274.	274.	274.	275.	275.	275.
275.	276.	276.	277.	277.	278.	278.	279.	279.	280.
280.	280.	281.	281.	281.	281.	281.	281.	281.	281.
281.	281.	281.	281.	281.	281.	281.	281.	281.	281.
281.	280.	280.	280.	280.	280.	280.	280.	280.	280.
280.	280.	280.	280.	280.	280.	280.	279.	279.	279.
279.	279.	279.	279.	280.	280.	281.	281.	282.	284.
285.	287.	289.	291.	293.	295.	298.	301.	303.	306.
308.	310.	312.	314.	316.	318.	320.	322.	326.	329.
334.	340.	347.	355.	365.	373.	378.	380.	383.	385.
388.	391.	393.	396.	399.	401.	402.	403.	404.	404.
403.	402.	401.	399.	397.	396.	394.	392.	390.	388.
386.	384.	382.	380.	379.	377.	376.	374.	373.	372.
370.	369.	368.	367.	366.	364.	362.	360.	358.	355.

STAGE

1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0
1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0
1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0	1170.0
1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1
1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1
1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1
1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1	1170.1
1170.1	1170.1	1170.1	1170.1	1170.2	1170.2	1170.2	1170.2	1170.2	1170.2
1170.3	1170.3	1170.3	1170.3	1170.3	1170.3	1170.3	1170.3	1170.3	1170.3
1170.3	1170.3	1170.3	1170.3	1170.3	1170.3	1170.3	1170.3	1170.3	1170.3
1170.3	1170.3	1170.3	1170.3	1170.3	1170.3	1170.3	1170.3	1170.3	1170.3
1170.2	1170.2	1170.2	1170.2	1170.2	1170.2	1170.2	1170.2	1170.2	1170.2
1170.2	1170.2	1170.2	1170.2	1170.2	1170.3	1170.3	1170.3	1170.3	1170.4
1170.4	1170.5	1170.5	1170.6	1170.7	1170.8	1170.8	1170.9	1171.0	1171.1
1171.2	1171.2	1171.3	1171.4	1171.4	1171.5	1171.5	1171.6	1171.7	1171.9
1172.0	1172.2	1172.4	1172.7	1173.0	1173.3	1173.4	1173.5	1173.6	1173.6
1173.7	1173.8	1173.9	1174.0	1174.1	1174.1	1174.2	1174.2	1174.3	1174.3
1174.2	1174.2	1174.2	1174.1	1174.0	1174.0	1173.9	1173.9	1173.8	1173.7
1173.7	1173.6	1173.5	1173.5	1173.4	1173.4	1173.3	1173.3	1173.3	1173.2
1173.2	1173.1	1173.1	1173.1	1173.0	1173.0	1172.9	1172.8	1172.8	1172.7

PEAK OUTFLOW IS 3355. AT TIME 42.50 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	3355.	2475.	818.	395.	79077.

INCHES	12.94	17.11	17.22	17.22
MM	328.58	434.54	437.36	437.36
AC-FT	1227.	1623.	1634.	1634.
TOOLS CU M	1514.	2002.	2015.	2015.

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

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FORMULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS RATIO 1 0.20	RATIO 2 0.40	RATIO 3 0.50	RATIO 4 0.60	RATIO 5 0.80	RATIO 6 1.00
HYDROGRAPH AT	1	1.78	1	674.	1347.	1684.	2021.	2695.	3369.
		(8689.19)		(19.08)(	38.15)(	47.69)(	57.23)(	76.31)(	95.39)(
ROUTED TO	1	1.78	1	627.	1341.	1677.	2013.	2684.	3355.
		(8689.19)		(17.74)(	37.97)(	47.48)(	56.99)(	76.00)(	95.00)(

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1170.00	1170.00	1173.00
STORAGE	272.	272.	365.
OUTFLOW	0.	0.	454.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
0.20	1173.17	0.17	370.	627.	2.25	43.00	0.
0.40	1173.55	0.55	382.	1341.	5.75	42.50	0.
0.50	1173.69	0.69	386.	1677.	7.00	42.50	0.
0.60	1173.81	0.81	390.	2013.	7.75	42.50	0.
0.80	1174.05	1.05	397.	2684.	9.00	42.50	0.
1.00	1174.26	1.26	404.	3355.	10.00	42.50	0.

TEST BORING REPORT

HALL & COMPANY, INC., ALBANY, N. Y.

To James Van Deusen Date February 19 63

Cobleskill, NY Job Cobleskill Dam Site

No. 1

		A	B	C
1'		57		
2'		42		
3		20		
4	CLAY, trace fine	26	12	20
5	sand & pebbles,	45	25	29
6	brown, dense, dry	108		
7		82		
8		79		
9	SAME - gray	88	23	27
10		171	32	56
11		300		
12	Refusal -			
13	Drilled thru			
14	boulder em-			
15	bedded in			
16	SILT, gray, dense,			
17	damp, trace fine			
18	sand			
19	SAME		52	50
20			63	71
21	Refusal -			
22	drilled dense			
23	hard pan to			
24	25' - Sample at			
25	23 to 25 is MED SAND			
26	& GRAVEL, silt binder,			
27	dense, wet			
28				
29	SILT, med SAND		53	56
30	& GRAVEL, gray,		64	78
31	dense, damp			
32				
33				
34	Bottom - 36'			
35				
36				
37				
38				
39				
40				

No. 2

		A	B	C
1'		37		
2'		19		
3		17		
4	CLAY, lge stone,	37	15	15
5	brown, dense, damp	34	19	29
6		31		
7		29		
8		31		
9	CLAY, some med	39	29	30
10	sand & gravel,	48	35	39
11	dense, moist	60		
12		79		
13		80		
14	med SAND & GRA-	229	37	40
15	VEL, silt binder,	184	51	163
16	dense, moist	119		
17		75		
18		58		
19	SAME	45	60	49
20		45	50	75
21		37		
22		37		
23		36		
24	SILT, some med	30	39	25
25	sand & fine gravel,	37	29	30
26	dense, damp	42		
27		48		
28		39		
29	SAME, moist		38	42
30			63	75
31				
32				
33				
34				
35				
36				
37				
38				
39				
40				

No. ____

		A	B	C
1'				
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39				
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Depths indicated are from grade level.

Column "A" indicates blows per foot on Casing.

Column "B" indicates blows from 0" to 6" on Sampling Spoon.

Column "C" indicates blows from 6" to 12" on Sampling Spoon.

Weight of Hammer: 300 lbs. on casing; 140# 30" on spoon

Distance of fall: 18 in.

Size of Casing: 2½ in. extra heavy.

Outside dia. of Spoon: 2 in.

Diameter of Sample: 1 3/8 in.

Overall Length of Spoon 36 in.

TEST BORING REPORT

HALL & COMPANY, INC., ALBANY, N. Y.

To James Van Deusen Date February 19 63

Cobleskill, NY Job Cobleskill Dam Site

No. 1

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12	Refusal -			
13	Drilled thru			
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21	Refusal -			
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25	23 to 25 is Med SAND			
26	& GRAVEL, silt binder,			
27	brown, wet			
28				
29	SILT, med SAND		53	56
30	& GRAVEL, some		64	78
31	dense, damp			
32				
33				
34	1 x Hum - 36			
35				
36				
37				
38				
39				
40				

No. 2

		A	B	C
1'		37		
2'		19		
3		17		
4	CLAY, lge stone,	37	15	15
5	brown, dense, damp	34	19	29
6		31		
7		29		
8		31		
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10	sand gravel,	48	35	39
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20		45	50	75
21		37		
22		37		
23		36		
24	SILT, some med	30	39	25
25	sand fine gravel,	37	29	30
26	dense, damp	42		
27		48		
28		39		
29	SAME, moist		38	42
30			63	75
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No. ____

		A	B	C
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Overall length of Spoon 36 in.

lbs

APPENDIX D

REFERENCES

APPENDIX D

REFERENCES

1) U.S. Department of Commerce, Technical Paper No. 40, Rainfall Frequency Atlas of the United States, May 1961.

2) U.S. Department of Commerce, Hydrometeorological Report No. 33, Seasonal Variation of the Probable Maximum Precipitation East of the 105th Meridian for Areas from 10 to 1,000 Square Miles and Durations of 6, 12, 24, and 48 Hours; April 1956.

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4) H.W. King and E.F. Brater, Handbook of Hydraulics, 5th edition, McGraw-Hill, 1963.

5) T.W. Lambe and R.V. Whitman, Soil Mechanics, John Wiley and Sons, 1965.

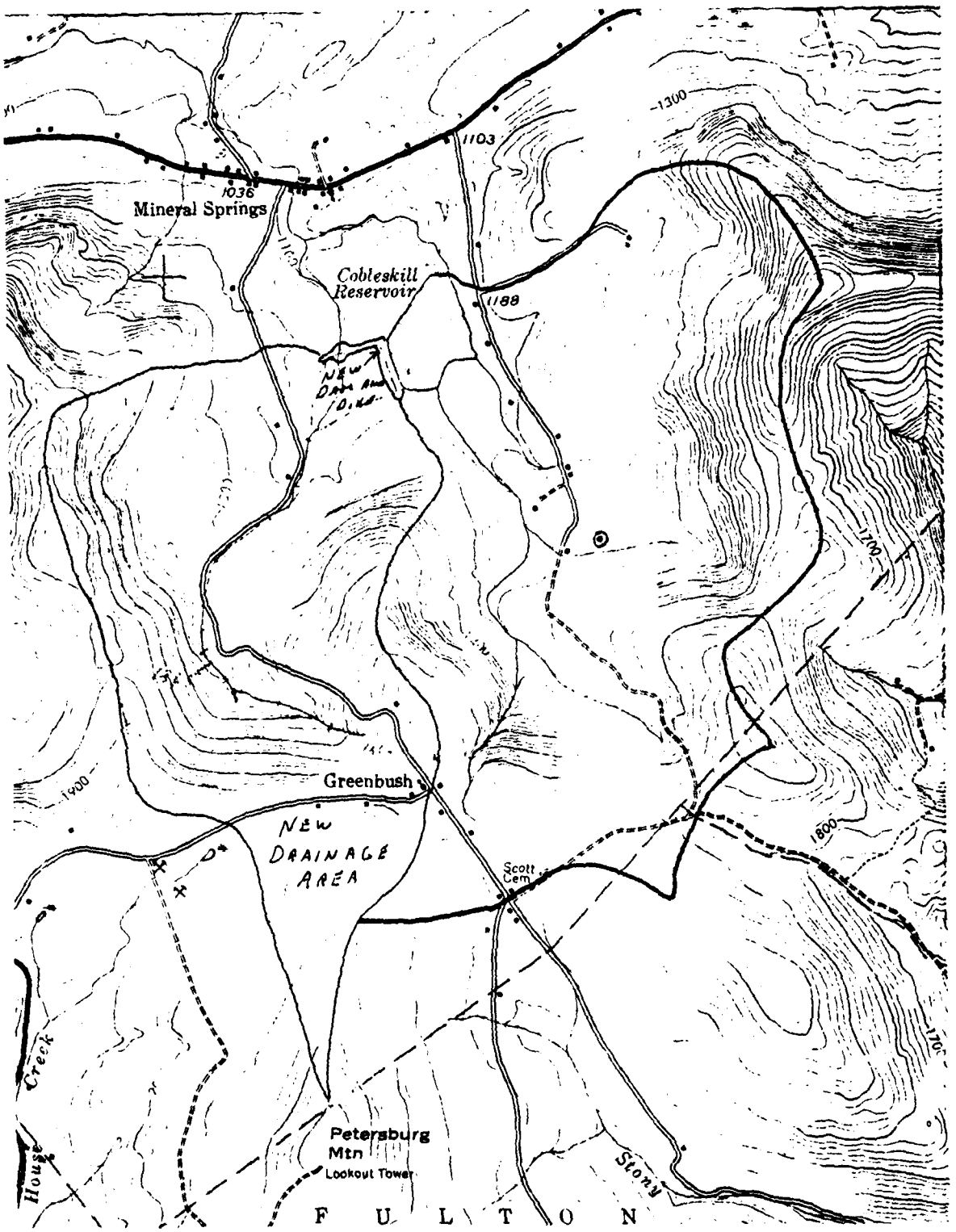
6) W.D. Thornbury, Principles of Geomorphology, John Wiley and Sons, 1969.

7) University of the State of New York, Geology of New York, Education Leaflet 20, Reprinted 1973.

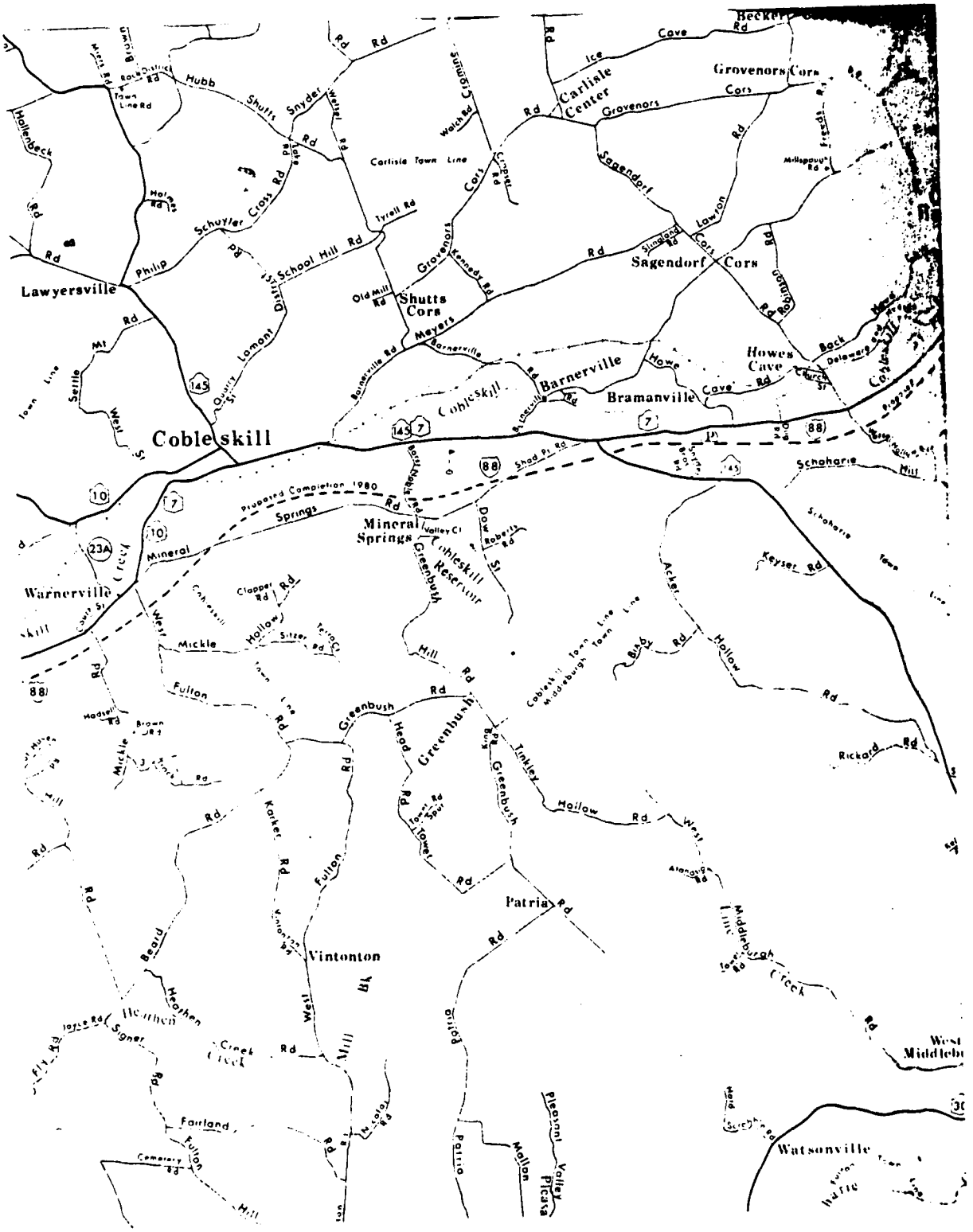
8) Cornell University Agriculture Experiment Station (compiled by M.G. Cline and R.L. Marshall), General Soil Map of New York State and Soils of New York Landscapes, Information Bulletin 119, 1977.

APPENDIX E

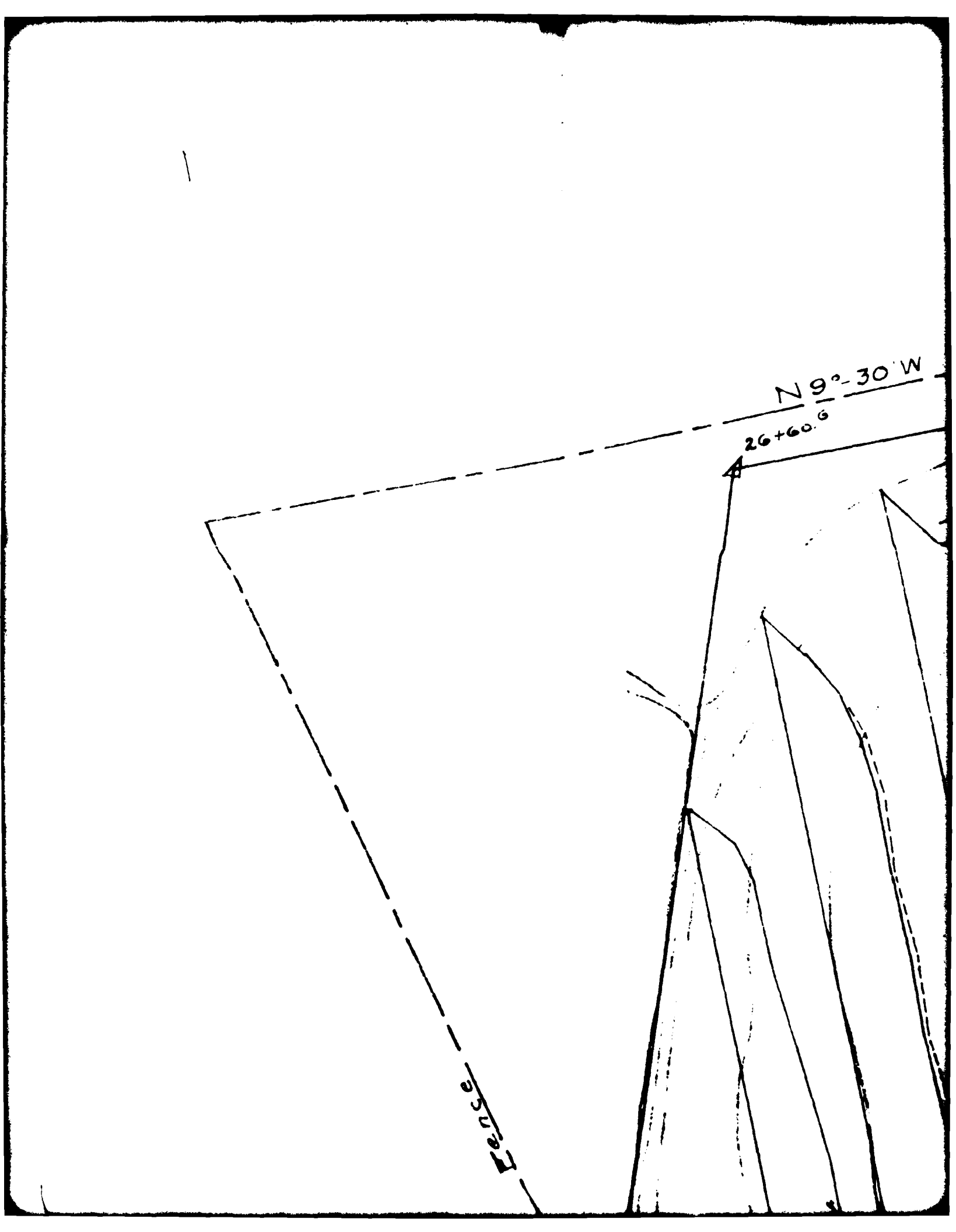
DRAWINGS

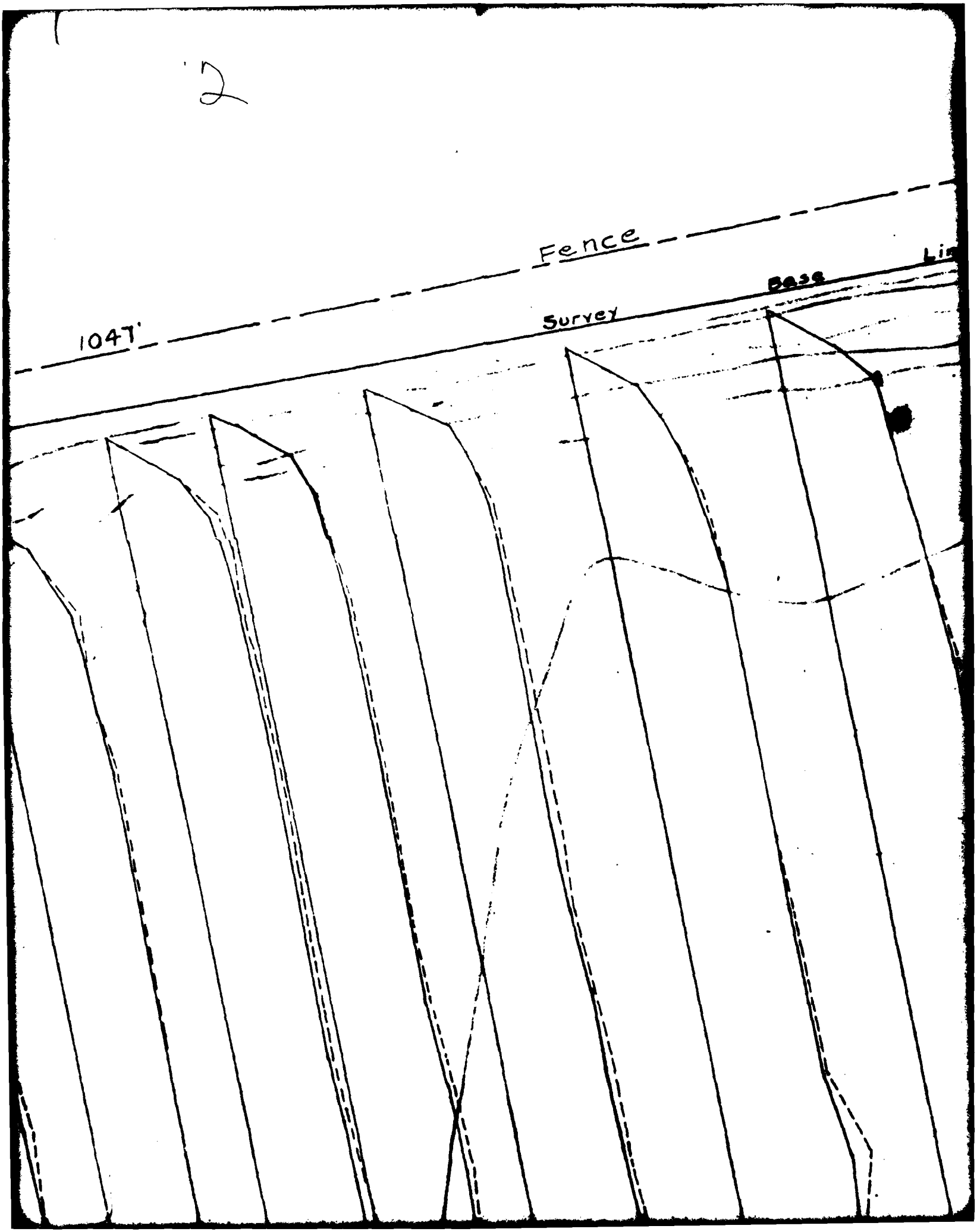


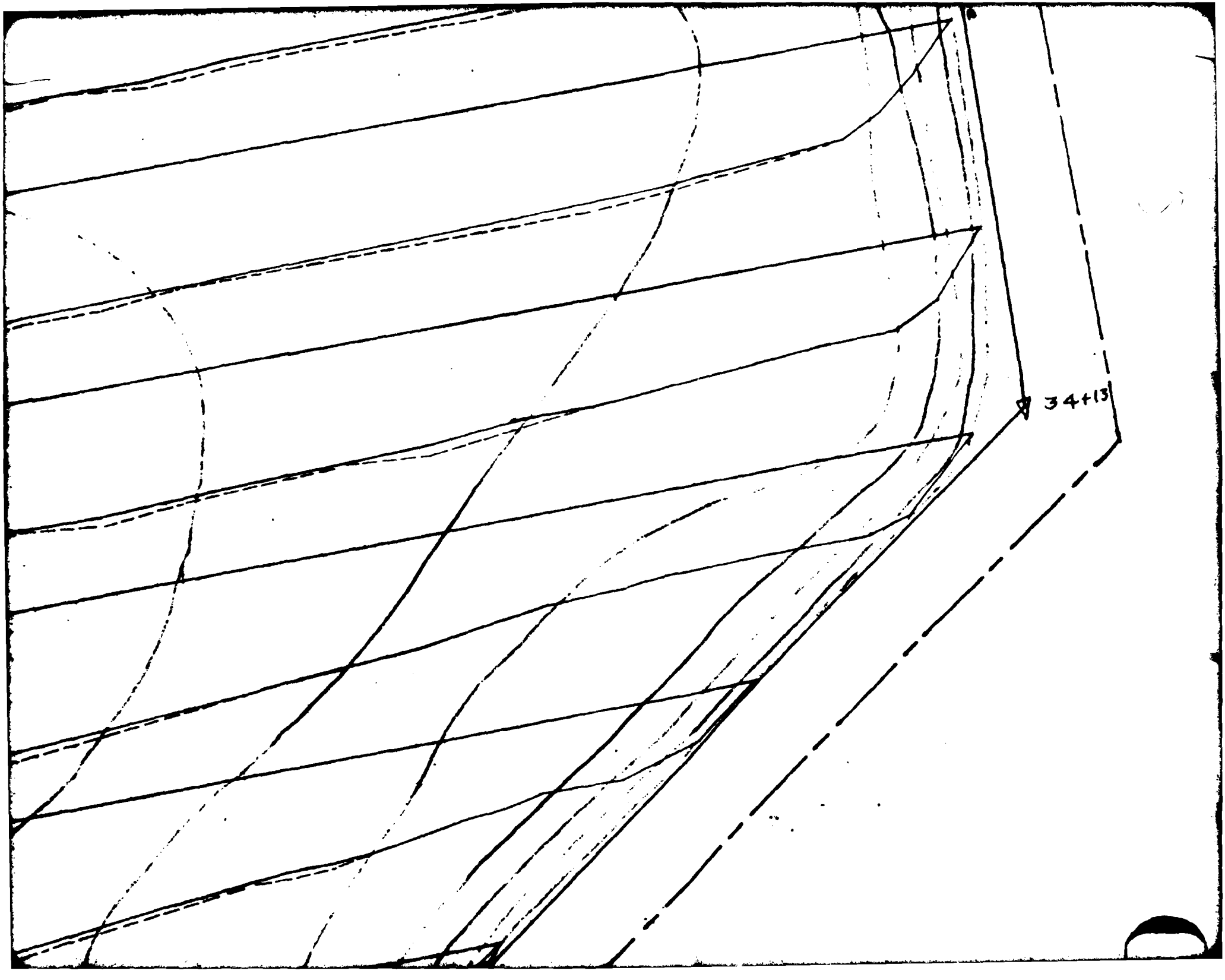
TOPOGRAPHIC MAP



VICINITY MAP


N 9°-30' W
26+60.6
Fence


2
Fence
1047'
Survey
Base
Lin


34+13

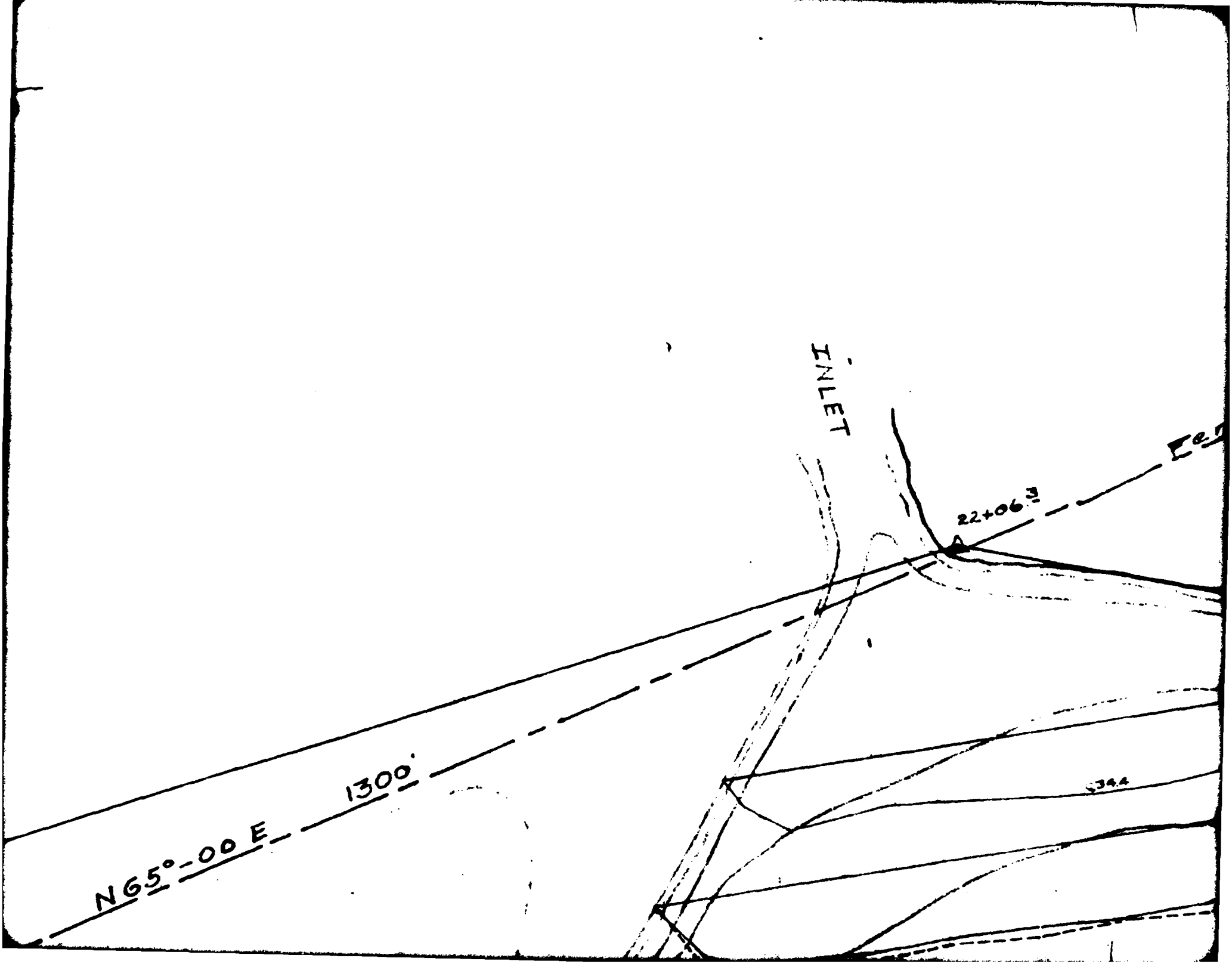
COBLESKILL WA

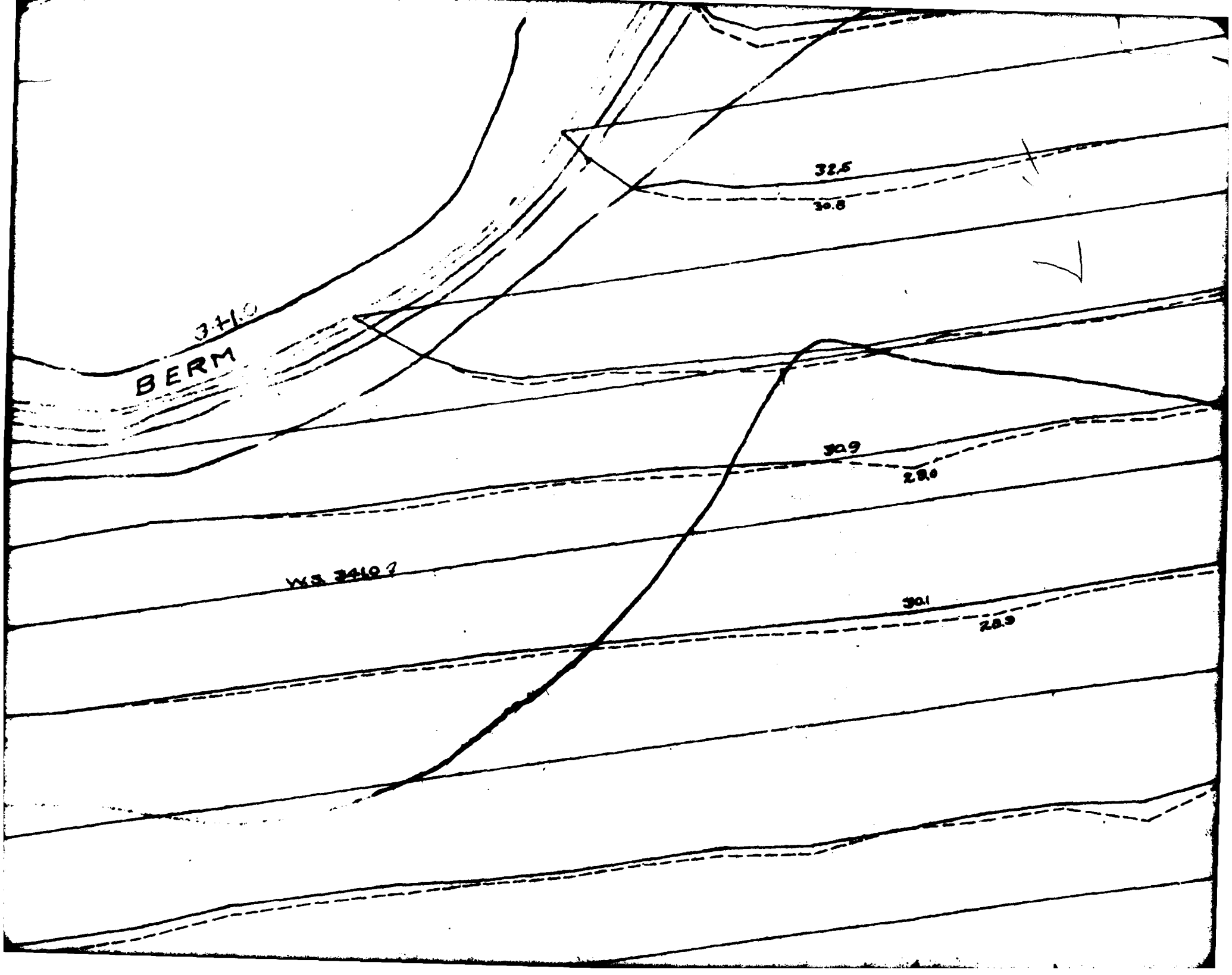
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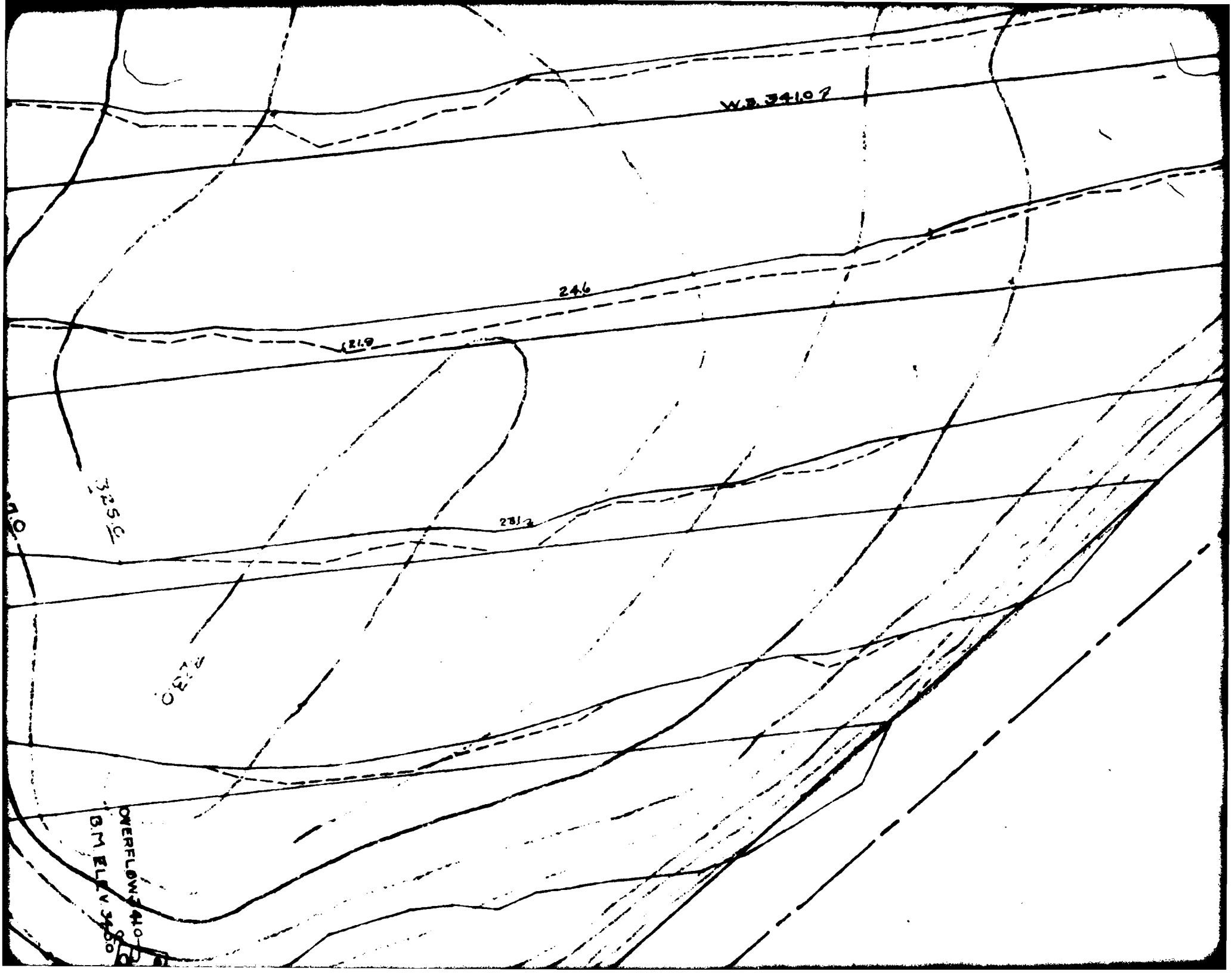
ER WORKS

RESERVOIR	CAPACITY	
CONTOUR ELEVATION	ACRES	GALLONS
341	310	

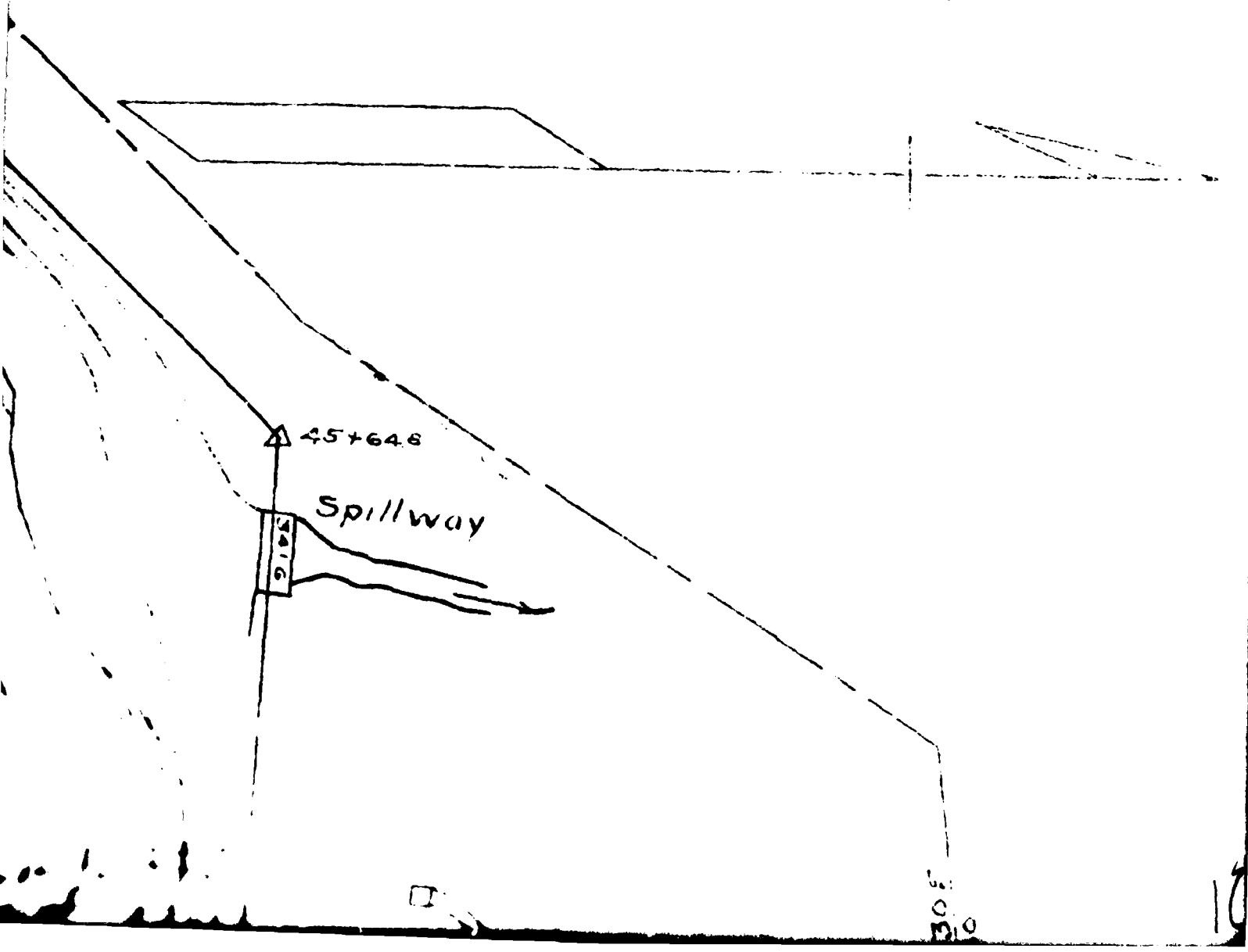

INLET
22+06.3
Eq.
N65°-00 E
1300'
344

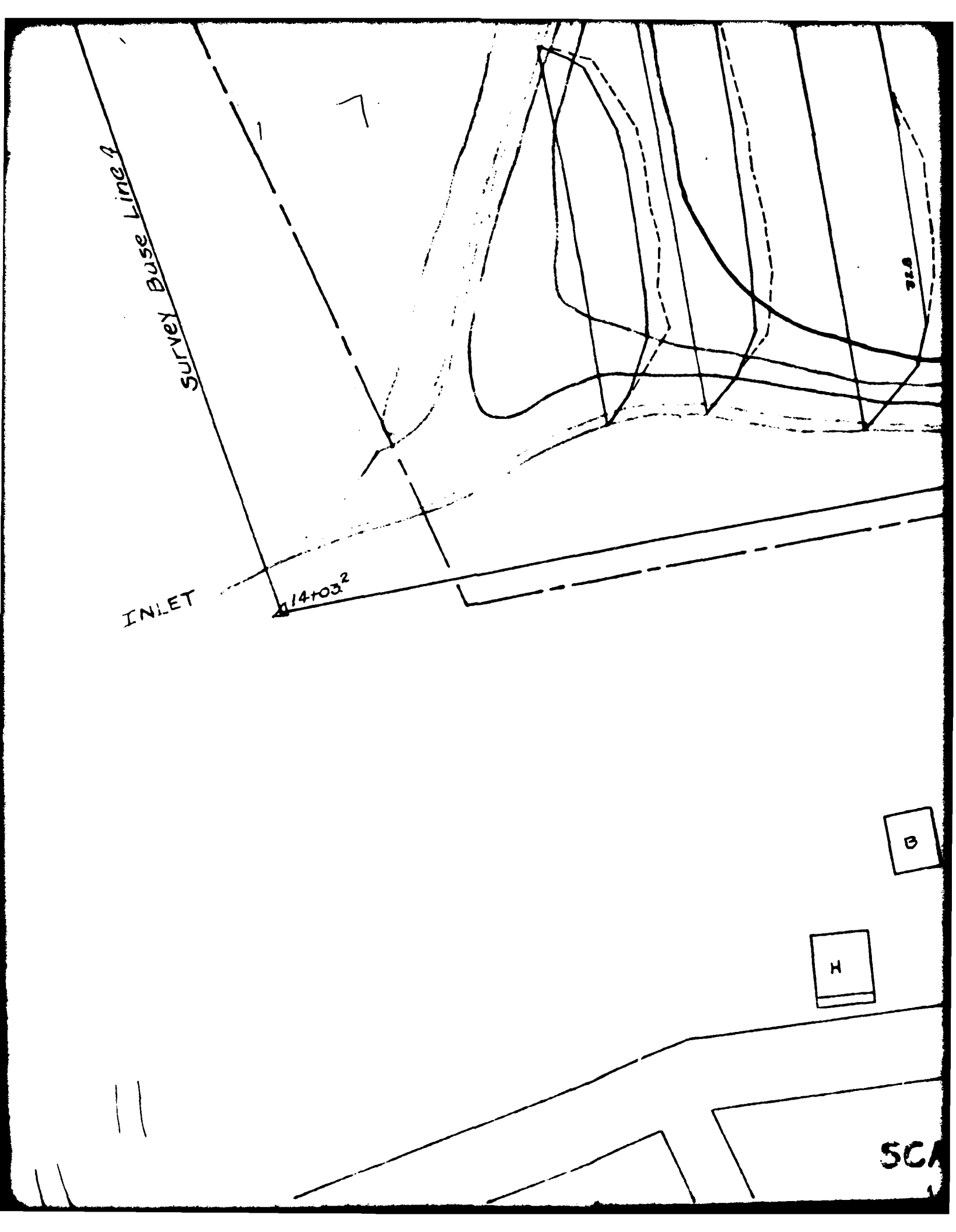

32.5
30.8
34.0
BERM
30.9
29.0
WS 24.0?
30.1
29.9

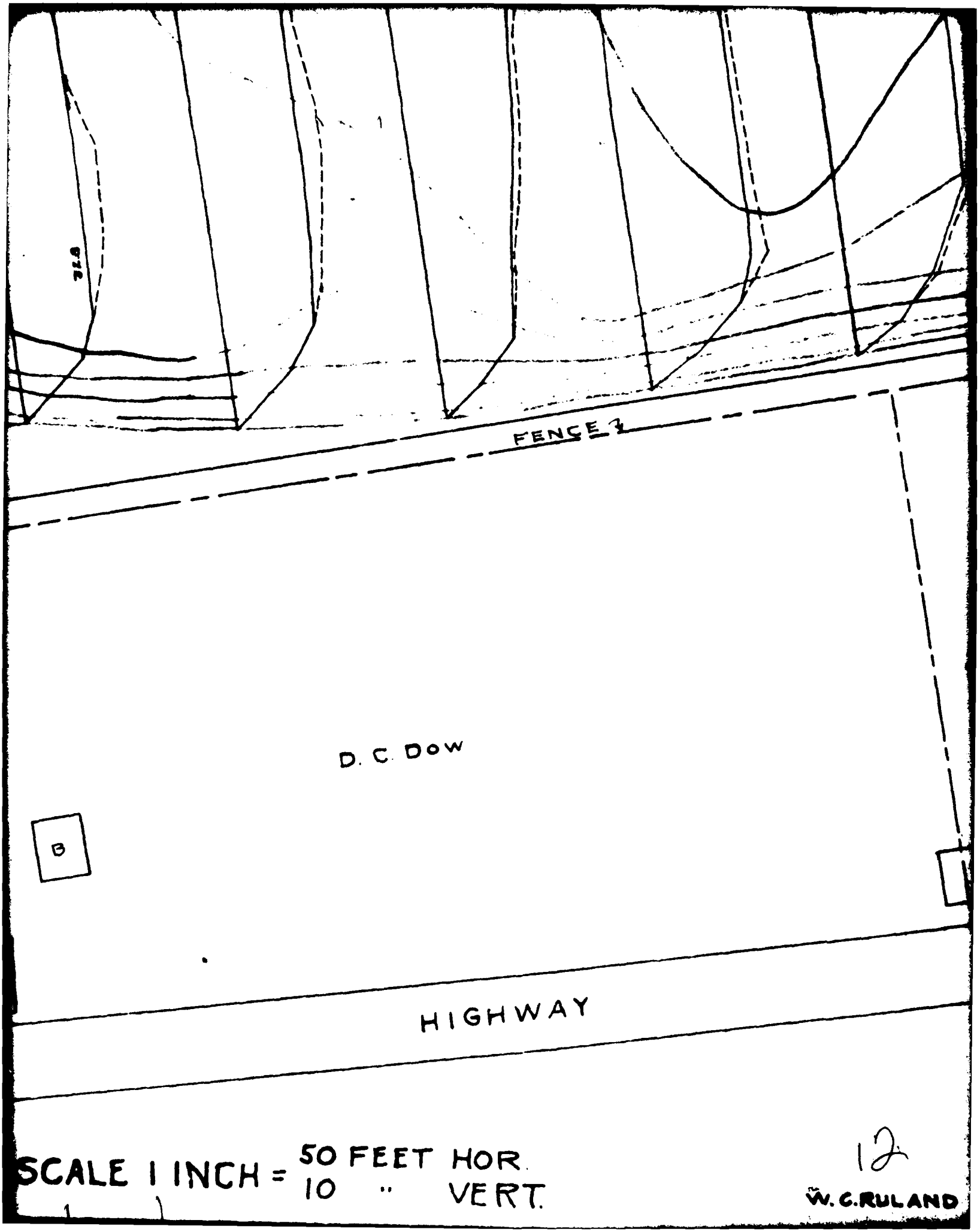

WS 34107


W.B. 3410 ?
24.6
21.9
23 1/2
OVERFLOW 4.0
B.M. ELEV 34.50

RESERVOIR	CAPACITY	
CONTOUR ELEVATION	ACRES	GALLONS
341	31.2	
340	30.7	10,[illegible]00,000
337	30.1	2,000,0000
335	29.2	960,0000
333	21.1	1,000,000
332		604,000
		8,554,0000
USEABLE CAPACITY 54'		83,000,000
TOTAL "		106,350,000
SILT		7,550,000



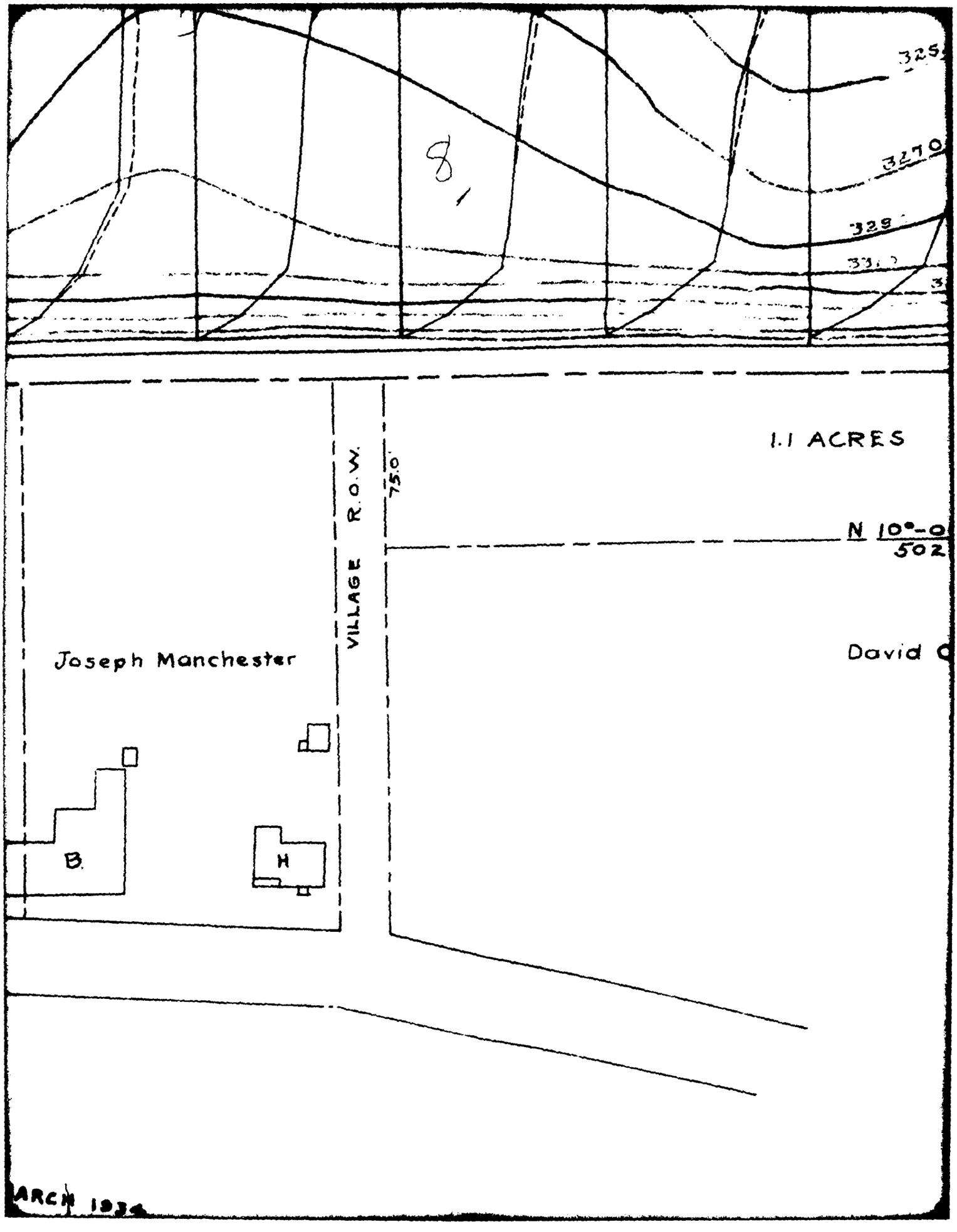

Survey Base Line 1
INLET
14+03²
B
H

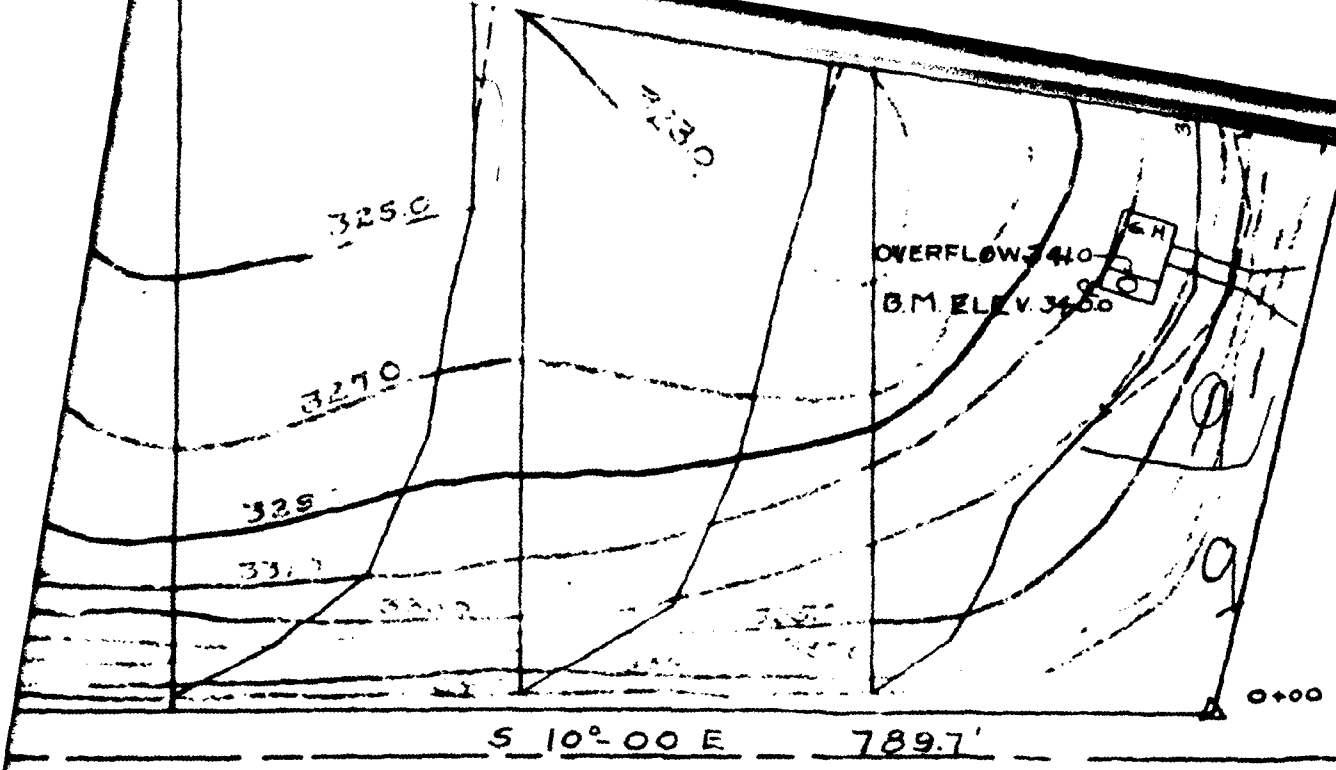


SCALE 1 INCH = 50 FEET HOR.
10 " VERT.

12

W. C. RULAND


325
3270
329
8
1.1 ACRES
75.0'
VILLAGE R.O.W.
N 10°-0
502
Joseph Manchester
David
B.
H
ARCH 1034



S 10°-00 E 789.7'

1.1 ACRES PURCHASED 1935

N 24°-25' W
292.5'

N 10°-00' W
502'±

David C. Lawyer

9
9
0+00
N85°-30 E
130'
10
10
N24°-25' W
292'