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National Dam Safety Program
Visual Inspection
Hydrology, Structural Stability
Conewang Creek
Chautauqua
Allegheny

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 available engineering documents and visual inspection of the Conewango Creek Watershed Project - Site 33 dam did not disclose conditions which constitute a hazard to downstream

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human life or property.

The total discharge capacity of the combined principal and auxiliary spillways is adequate to impound and safely discharge the floodwater resulting from the Probable Maximum Flood (PMF).

A number of minor deficiencies were noted on this structure. These deficiencies include: debris around the trash racks of the orifice in the riser intake structure, debris (logs) on the lower half of the upstream slope as measured from the crest to the normal pool elevation, slight erosion along abutment-embankment contacts on lower third of downstream slope, damaged internal drainage pipes above plunge pool, small animal burrow on downstream slope just above riprap around the principal spillway outlet pipe, wet areas beyond downstream toe in waste area along east side of outlet channel and natural flood plain on the west side of the outlet channel. These deficiencies should be corrected within 6 months of the date of notification of the owner. A warning system and evacuation plan for notification of downstream residents and proper authorities in the case of impending downstream flooding within 6 months should also be developed and implemented.

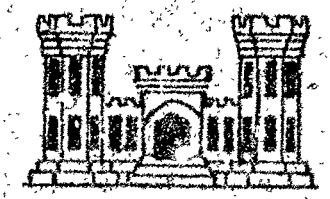
ALLEGHENY RIVER BASIN

CONEWANGO CREEK WATERSHED PROJECT
SITE 33

CHAUTAUQUA COUNTY, NEW YORK

INVENTORY NO. N.Y. 581

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM



Prepared by

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Prepared for

DEPARTMENT OF THE ARMY

NEW YORK DISTRICT, CORPS OF ENGINEERS

NEW YORK, NEW YORK

JULY 1980

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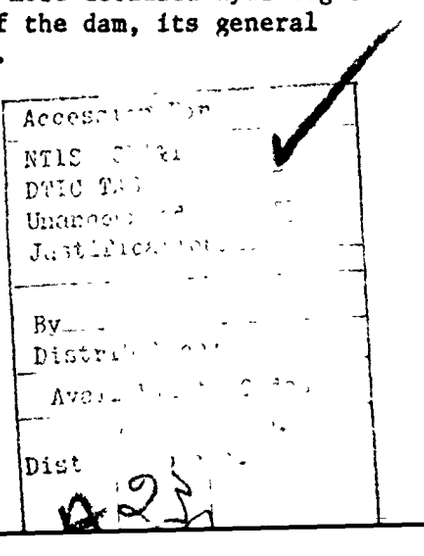
PREFACE

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.



(10) Bent L. Thomsen / Gary L. Wood (11) 19 Sep 80 (12) 190

(6) PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
CONEWANGO CREEK WATERSHED PROJECT
SITE 33 (Inventory Number NY581)
~~I.D. NO. N.Y. 581~~
ALLEGHENY RIVER BASIN
CHAUTAUQUA COUNTY, NEW YORK
Phase I Inspection Report.

TABLE OF CONTENTS

(15) DACW51-79-C-0001

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PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

NAME OF DAM:	Conewango Creek Watershed Project Site 33, Inventory No. N.Y. 581
STATE LOCATED:	New York
COUNTY:	Chautauqua
RIVER BASIN:	Allegheny
WATERSHED:	Conewango Creek
STREAM:	Unnamed
DATE OF INSPECTION(s):	May 6 and 21, 1980 See Vicinity Map & Topographic Map, Appendix F

ASSESSMENT

The examination of available engineering documents and visual inspection of the Conewango Creek Watershed Project - Site 33 dam did not disclose conditions which constitute a hazard to downstream human life or property.

The total discharge capacity of the combined principal and auxiliary spillways is adequate to impound and safely discharge the floodwater resulting from the Probable Maximum Flood (PMF).

A number of minor deficiencies were noted on this structure. These deficiencies include: debris around the trash racks of the orifice in the riser intake structure, debris (logs) on the lower half of the upstream slope as measured from the crest to the normal pool elevation, slight erosion along abutment-embankment contacts on lower third of downstream slope, damaged internal drainage pipes above plunge pool, small animal burrow on downstream

slope just above riprap around the principal spillway outlet pipe, wet areas beyond downstream toe in waste area along east side of outlet channel and natural flood plain on the west side of the outlet channel. These deficiencies should be corrected within 6 months of the date of notification of the owner. A warning system and evacuation plan for notification of downstream residents and proper authorities in the case of impending downstream flooding within 6 months should also be developed and implemented.

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APPROVED BY 17 SEP 1980

New York District Engineer
Colonel W. M. Smith, Jr.

View of reservoir and
surrounding slopes

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
CONEWANGO CREEK WATERSHED PROJECT
SITE 33
I. D. No. N.Y. 581
ALLEGHENY RIVER BASIN
CHAUTAUQUA COUNTY, NEW YORK

SECTION 1: PROJECT INFORMATION

1.1 GENERAL

a. Authority

This Phase I Inspection Report was authorized by the New York State Department of Environmental Conservation by Contract No. D 201458. This study was performed in accordance with the terms of the above contract and the Recommended Guideline for Safety Inspection of Dams prepared by Department of the Army; Office of the Chief of Engineers to fulfill the requirements of the National Dam Inspection Act, Public Law 92-327.

b. Purpose of Inspection

This inspection was conducted to obtain available data concerning design and construction of the dam, to evaluate that data, to visually inspect existing conditions at the dam, to identify and evaluate deficiencies and/or hazardous conditions, if any, which may threaten life and property of the residents downstream of the dam and to recommend remedial measure to mitigate such deficiencies and hazardous conditions.

1.2 DESCRIPTION OF PROJECT

a. Description of Dam

The Conewango Creek Watershed Project Site 33 consists of an earth dam, with a principal spillway outlet pipe passing through the embankment and an auxiliary spillway passing around the western abutment of the dam.

The dam consists of a zoned compacted earth embankment which is 57 feet high, having a crest width of 18 feet and crest length of 325 feet. The upstream slope is 1 vertical on 3 horizontal and the downstream slope is 1 vertical on 2.5 horizontal. The crest, downstream slope and upper two-thirds of the upstream slope between the normal pool elevation and the crest are grass covered. The lower third of the upstream slope is not vegetated. There is a cutoff trench under the centerline of the dam which presumably was excavated to bedrock in accordance with the recommendations of the Design Report. Typical sections of this cutoff are shown on Sheet 4 of the As-Built Drawings, Appendix F.

The principal spillway includes the following components: a rectangular reinforced concrete riser structure with an orifice at elevation 1483.7 and riser crest at elevation 1509.1, a 36 inch I.D. reinforced concrete pressure pipe outlet and a riprap lined plunge pool cut into bedrock at the outlet end of the pipe. The reservoir drain is a 10 inch diameter cast iron pipe extending 40 feet into the reservoir from the base of the riser structure. A manually operated vertical slide gate mechanism mounted on the top of the riser structure controls the flow through the reservoir drain. The auxiliary spillway is in a cut section and has a bottom width of 50 feet.

The internal drainage system consists of drain trenches cut into the foundation material. The drain trenches are filled with a two-zone filter material and roughly parallel the abutment-embankment contact. Seepage from the drain trenches is collected in two 8 inch diameter perforated asbestos cement pipes which are surrounded by the filter materials and are parallel to the dam axis some 114 feet downstream from the dam centerline. The perforated sections terminate near the principal spillway outlet pipe where solid 8 inch diameter asbestos cement pipe bends 90 degrees and outlets to the plunge pool parallel to and either side of the principal spillway outlet pipe.

b. Location

The Conewango Creek Watershed Project Site 33 is located east of Pickup Hill Road approximately 1.2 miles (via public roads) southwest of the Village of Cherry Creek, New York.

c. Size Classification

The dam is 57 feet high and has a maximum storage capacity (normal pool to top of dam) of 128.3 acre-feet. Therefore, the dam is in the intermediate size category by virtue of its height as defined in the Recommended Guidelines for Safety Inspection of Dams.

d. Hazard Classification

The dam is classified as a "high" hazard due to the presence of a number of homes along the downstream channel and the crossing of a State Route 83 in the Village of Cherry Creek.

e. Ownership

The dam is owned, operated and maintained by the Conewango Creek Watershed District. The contracting officer is Mr. Richard Shield of R.D. #1, Box 334, Kennedy, New York 14747. His telephone number is 716-267-4801.

f. Purpose of Dam

The dam is an uncontrolled floodwater retarding structure.

g. Design and Construction History

Design of the dam was performed by the U.S. Department of Agriculture, Soil Conservation Service (SCS), Syracuse, New York. Construction was under the inspection of the SCS and the General Contractor was W. W. Kimmons Company of Buffalo, New York. The dam was completed in 1974 and the as-built drawings (portions of which are attached in Appendix F) are dated December 9, 1974. The Syracuse office of SCS has a design folder containing hydrologic, hydraulic, geologic information, as well as soil laboratory test data and slope stability analyses; in addition, as-built drawings and contract documents are maintained by the Syracuse SCS office.

h. Normal Operation Procedures

Normal flows are discharged through an orifice in the intake riser structure then through the principal spillway. The orifice is the primary control when the reservoir is between elevation 1483.7 and 1509.1. Reservoir levels between elevation 1509.1 and 1511.6 are discharged through the orifices and over the intake riser crest. The reservoir has sufficient capacity to store and discharge 8 percent of the Probable Maximum Flood without discharge occurring in the auxiliary spillway.

1.3 PERTINENT DATA

a. Drainage Area (Areas)	350
b. Discharge at Damsite (cfs)	
Reservoir Drain at Orifice Crest	6
Orifice at Riser Crest	30±
Principal Spillway at Auxiliary Spillway Crest	155
Principal Spillway at Design High Water	156
Auxiliary Spillway at Design High Water	500
Total Spillway Capacity at Design High Water	656

c. Elevation (ft above MSL, taken from Design Report)

Top of Dam	1519.9
Design Maximum High Water	1513.8
Auxiliary Spillway Crest	1511.6
Normal Pool and Orifice Crest	1483.7
Intake Riser Crest (Principal Spillway)	1509.1
Reservoir Drain Invert	1472.1
Streambed at Dam Centerline	1462.0

d. Reservoir (ft)

Length of Drainage Basin	1.21 miles
Length of Normal Pool	300 feet ±

e. Storage (acre-feet)

Normal Pool (Taken from Design Report)	3.3
Crest of Riser (Flood Storage Above Normal Pool)	64.8
Design High Water (Flood Storage Above Normal Pool)	87.7
Top of Dam (Flood Storage Above Normal Pool)	128.3

f. Reservoir Surface (acres)

Normal Pool	0.7
Crest of Riser	4.4
Design High Water	5.4
Top of Dam	7.9

g. Dam (Taken from Design Report)

Type: 2 zone earth embankment with keyed earth cutoff trench and toe drains parallel to dam centerline

Length: (ft)	325
Height: (ft)	57
Top Width: (ft)	18
Side Slopes: Upstream (V:H)	1:3
Downstream (V:H)	1:2.5

Zone 1: Interior Section of Dam, material contains more than 20%, by weight, finer than #200 sieve size

Zone 2: Exterior sections, material contains less than 20%, by weight, finer than #200 sieve

Cutoff: Earth Cutoff Trench with Zone 1 material

Grout Curtain: None

h. Principle Spillway (Taken from Design Report, see Sheet 10 of Drawings, Appendix F)

Type: 30 inch I.D. Outlet Pipe a 2.5' x 7.5' I.D. reinforced concrete riser structure rising 41.92' above the base (outlet invert) elevation 1469.1

Length of Weir:	15.0 ft
Crest Elevation:	1509.1
Gates:	Uncontrolled

i. Auxiliary Spillway (Taken from Design Report)

Type: Channel cut into soil, trapezoidal cross-section with "bench" at mid-height, grass lined (see revised cross section, Sheet 4 of Drawings, Appendix F)

Bottom Width: (ft)	50
Side Slopes: (V:H)	1:3
Length of Level or Control Section	50
Entrance Slope (%)	2
Exit Slope (%)	3

j. Reservoir Drain (Taken from Design Report)

Type: 10 inch diameter cast iron pipe

Length: (ft)	40

Control: Manually operated vertical slide gate mounted on the top of the intake riser structure

SECTION 2: ENGINEERING DATA

2.1 GEOTECHNICAL DATA

a. General Geology

The Conewango damsite 33 is located southwest of the Village of Cherry Creek, in Chautauqua County, New York on the northern rim of the Appalachian Uplands physiographic province. This province is characterized by the sharp topographic relief associated with dissection of a broad plateau; namely, steep hills rising to elevations of over 2000 feet which are isolated by deep, narrow valleys.

Local bedrock consists of interbedded shales and siltstones of Upper Devonian age which are essentially horizontally bedded. The area is considered geologically stable seismically, and no major or active faults have been revealed by geologic field work. However, the area is within Zone 3 on the seismic map included with the Recommended Guidelines.

This particular area illustrates the diverse range of effects of Wisconsin continental glaciation. Uplands are comprised of ground moraine, largely basal till associated with glacial advances; major valleys such as the Conewango Creek valley contain deposits of silt and clay formed in proglacial lake basins when they were dammed by the ice, with resulting impondment of meltwater and temporary existence of proglacial lakes. Present and former meltwater drainage channels are marked by the presence of sand and gravel outwash material deposited both during final glacial retreat and as more recent alluvium.

b. Subsurface Investigation

The subsurface investigation conducted by the SCS consisted of a total of 10 test borings and 24 test pit excavations. Overburden sampling in the test borings was accomplished by

driving a standard 2 inch O.D. split spoon sampler into the undisturbed material, beneath the casing, with a 140 pound weight falling 30 inches. Bedrock was cored with a double tube core barrel and NX size cores were recovered.

A total of 3 of the test borings and 4 of the test pit excavations were made along the dam centerline. The investigation for the principal spillway and outlet channel included advancing 3 test borings and 4 test pits. Three test pit excavations were made along the reservoir drain line. In the auxiliary spillway channel 4 test borings and 8 test pit excavations were advanced. An additional 5 test pit excavations were advanced between the dam and Pickup Hill Road because of the need for supplemental borrow material.

c. Subsurface Conditions

The subsurface investigation revealed the overburden soils at the dam site are quite variable in terms of composition and geologic origin. In general, alluvial gravels overlay glacial till soils in the flood plain.

Along the west abutment ice-contact stratified drift, glacial outwash sands and glacio-lacustrine silts and clays were encountered. At the steep east abutment shale and siltstone outcrop or was overlain by a thin veneer of topsoil. The bedrock exposed in the lower part of east abutment and along the drain line was highly weathered.

Seeps were present along the steep right abutment slopes at numerous locations and were encountered in the test pit excavations. Although seeps were not encountered in the test pit excavations for the auxiliary spillway investigation several were encountered during construction. Groundwater levels in the test pit-excavations and boreholes appear to be controlled by the creek level.

2.2 DESIGN RECORDS

The dam was designed by the Soil Conservation Service, who prepared a design report, contract specifications and engineering drawings. Portions of the design folder have been included with this report as Appendix E. In addition a number of as-built drawings prepared by SCS have been included in Appendix F of this report.

2.3 CONSTRUCTION RECORDS

Construction inspection was performed by SCS and the construction documents are also available at the SCS office in Syracuse, New York. Changes from original design are noted on the as-built plans in Appendix F. The most notable change was the relocation of the principal spillway outlet pipe a distance of 20 feet east.

2.4 OPERATION RECORDS

Since the dam was designed as an uncontrolled, floodwater retarding structure no operating records are maintained regarding reservoir level or spillway discharge. During periods of heavy runoff it is reported the structure is monitored periodically by SCS personnel and representatives of the Conewango Watershed Commission.

2.5 EVALUATION OF DATA

The data presented in this report has been compiled from information obtained from the Soil Conservation Service, Conewango Creek Watershed Commission and the files of the New York State Department of Environmental Conservation.

The information reviewed in connection with the Phase I inspection was considered adequate and reliable.

SECTION 3: VISUAL INSPECTION

3.1 FINDINGS

a. General

The visual inspection of the dam was conducted on May 6, 1980. The weather at the time of the inspection was cloudy with temperatures in the seventies. The reservoir level was at the crest of the orifice elevation 1483.7. On May 21, 1980 the site was revisited for the purpose of inspecting the principal spillway outlet pipe. On this date, the reservoir level had been drawn down, by opening the reservoir drain to approximately elevation 1478.

b. Embankment

In general the embankment was in good condition. No evidence of misalignment, sloughing, seepage, or cracking were observed. However, seepage was emerging from the natural valley wall at the abutment-embankment contacts on the upstream side of the dam. Also, the upstream slope of the embankment was not vegetated between elevation 1483.7 and about elevation 1496. Debris in the form of logs was laying on the upstream slope between elevations 1483.7 and 1500.0. Along the downstream abutment-embankment contact a slight amount of erosion has occurred in the lower third of the slope. Surface water runoff is concentrated along these contacts and has eroded a channel approximately 12 inches wide and deep. In general, these contacts are unlined except for some small stones (2" $\pm$ maximum size) which were removed during the seeding operation and placed in this area. An animal burrow was observed in the embankment near the toe of the dam just upslope of the riprap and to the right or east of the principal spillway outlet pipe.

The internal drainage system consists of drain trenches near the toe of the dam along the abutment. The drain trenches are cut into the foundation materials and filled with filter material. Seepage is collected and diverted from the drainage trenches into 8 inch diameter perforated asbestos cement pipe surrounded by filter material. The perforated sections are parallel to the axis of the dam and located 114 feet downstream from the dam centerline. The toe drains bend 90 degrees and outlet along either side of the principal spillway outlet pipe into the plunge pool as solid 8 inch diameter asbestos cement pipe. Between May 6 and May 21, 1980 the asbestos pipes had been broken off by vandals where they daylight above the plunge pool. No discharge was observed from the drains on the inspection dates noted above.

c. Principal Spillway

The principal spillway consists of a reinforced concrete riser structure with a 6 inch high by 9 inch wide orifice at elevation 1483.7 and the riser crest at elevation 1509.1. One 30 inch I.D. reinforced concrete pressure pipe bedded on a non-reinforced concrete craddle transports reservoir water from the riser structure to the plunge pool and outlet channel. This outlet pipe is provided with 9 reinforced concrete anti-seep collars at approximately 25 foot spacings starting 90 feet from the outlet to the riser structure. The components observed were in satisfactory condition.

d. Auxiliary Spillway

The auxiliary spillway for this structure is located at the west end of the dam. The spillway is cut into glacial derived soils consisting of: ice contact stratified drift and glacial outwash sands and gravels, glacio-lacustrine sands, silts and clays, and glacial till. Although the majority of the auxiliary spillway is in a cut area it

was necessary to construct a levee or dike along the east side of the spillway extending from just south of the dam axis north a distance of 135 feet. The levee section has a maximum height above existing ground surface of about 2.5 feet. Seeps encountered in the west side of the auxiliary spillway during construction are drained using 4 inch heavy duty perforated plastic pipe bedded in a trench 2 foot wide by 2 foot deep and surrounded by No. 2 stone. Areas in the cut slope which experienced sloughing were overexcavated and filled with No. 2 stone. Following earthwork the auxiliary spillway was lined with topsoil and seeded and now supports a healthy grass cover.

e. Reservoir Drain

The reservoir is drained by a 10 inch cast iron pipe and manually operated slide gate with the gate handle situated on the top of the riser structure. The slide gate is in operable condition.

f. Downstream of Toe

The waste area downstream of the dam along the east side of the outlet channel and the natural floodplain along west side of channel both exhibited ponded water and wet surficial soils.

g. Downstream Channel

The plunge pool is cut through a sequence of 5 feet of alluvial silt, sand and gravel underlain by 3 feet of silt and clay and terminates at the base 4 feet below the bedrock surface. A 2 foot layer of riprap lines the entire plunge pool and extended to elevation 1462.0 at the toe of the dam. Beyond the plunge pool the outlet channel area has been cleared and graded downstream a distance of about 135 feet from the outlet pipe. Beyond

the cleared and graded outlet channel the discharge is into the natural stream creek which is tree lined.

h. Reservoir Area

The area surrounding the reservoir is wooded with slopes ranging from 1 vertical to 4 horizontal to 1 vertical to 2 horizontal. No signs of slope instability were observed, however, seepage was emerging from the east reservoir slope.

3.2 EVALUATION

The visual inspection of this dam revealed the following deficiencies:

1) Debris buildup around orifice trash racks
2) Debris buildup along lower half of upstream embankment slope
3) Slight erosion along lower third of downstream slope at embankment-abutment contacts
4) Broken toe drain pipes and missing animal guards above plunge pool
5) An animal burrow on downslope above riprap lined plunge pool
6) Wet areas downstream of dam located east of outlet channel in waste area and west of outlet channel in flood plain
7) Unvegetated lower third of upstream slope
8) Evidence was observed that riprap around plunge pool has been thrown into plunge pool

SECTION 4: OPERATION AND MAINTENANCE

4.1 PROCEDURES

The normal reservoir level is controlled by the crest elevation of the orifice in the riser structure.

Downstream flow is controlled by the three outlet devices; first the orifice, then the riser crest and, finally the auxiliary spillway. The riser can discharge up to 155 cfs without discharges occurring in the auxiliary spillway.

4.2 MAINTENANCE OF DAM

The dam is maintained by the owner, Conewango Creek Watershed Commission. Normal maintenance should include mowing the grass from the embankment and auxiliary spillway; removal of debris from upstream embankment slope, reservoir slopes and around orifice trash rack; as well as repair or replacement of damaged or inoperative structures. The structure is inspected annually by a representative of SCS and the Owner's Contracting Officer. The resulting Inspection Report Forms from July 1975 through September 1979 are attached as Appendix D.

4.3 WARNING SYSTEM IN EFFECT

There is no warning system in effect, however, the dam is reportedly monitored during periods of heavy runoff by representatives of the SCS and Owner.

4.4 EVALUATION

The operation procedure for this structure is satisfactory. Increased maintenance is required to correct what appears to be reoccurring deficiencies noted during the visual inspection and review of Operation and Maintenance Inspection Records.

SECTION 5: HYDROLOGIC/HYDRAULIC

5.1 DRAINAGE AREA CHARACTERISTICS

Delineation of the watershed draining into the reservoir pool area was accomplished using the USGS 7.5 minute quadrangles for Hamlet and Cherry Creek, New York. The drainage area measures 350 acres and consists primarily of woodlands and open fields. The relief in the area consists of a continuous, moderately steep hill that forms into a gorge near the reservoir. The average slope of the drainage basin is approximately 10 percent.

5.2 ANALYSIS CRITERIA

The analysis of the floodwater retarding capability of this dam was performed using the Corps of Engineers HEC-1 computer program, Dam Safety Version. This program develops an inflow hydrograph based upon the "Snyder Synthetic Unit Hydrograph" and then uses the "Modified Puls" flood routing procedure. The spillway design flood selected for analysis was the PMF in accordance with the recommended guidelines of the U.S. Army Corps of Engineers.

5.3 SPILLWAY CAPACITY

The principal spillway of the dam is a drop inlet structure consisting of a two-stage reinforced concrete riser and a 30 inch diameter concrete pipe. The auxiliary spillway is an excavated outlet channel. Principal spillway discharge is controlled by the orifice and the riser up to the stage of 1511.7. Above this stage, the principal spillway discharge is controlled by the 30 inch diameter outlet pipe. The emergency spillway channel is of trapezoidal section with a bottom width of 50 feet and side slope of 3 horizontal to 1 vertical. Discharge through the emergency spillway was calculated assuming a depth of flow at the control section as critical depth.

The spillway appears to have adequate capacity for discharging the peak outflow for the Probable Maximum Flood (PMF). For the PMF, the peak inflow is 2035 cfs and the peak outflow is 2029 cfs. The calculated spillway capacity for a water surface elevation at the top of dam is 5113 cfs.

5.4 RESERVOIR CAPACITY

Storage capacity of the reservoir between the auxiliary spillway crest and the top of dam is 51.9 acre-feet, which is equivalent to a runoff depth of 1.95 inches over the drainage area. The total flood storage capacity of the dam is 128.3 acre-feet.

5.5 FLOODS OF RECORD

Due to the lack of reliable information no attempt was made to estimate the discharge for the flood of record.

5.6 OVERTOPPING POTENTIAL

Analysis using the PMF indicates that the dam would not be overtopped. For a PMF peak outflow of 2029 cfs the computed water surface elevation would still be 3.8 feet below the crest of the dam.

5.7 EVALUATION

At the PMF, flow discharge through the auxiliary spillway is 4.5 above the control section. The maximum discharge velocity and duration of flow through the auxiliary spillway are within normally accepted limits for grass-lined spillways.

SECTION 6: STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations

No signs of instability were observed in connection with this structure.

b. Design and Construction Data

A total of 7 slope stability analyses were performed by the SCS for the embankment during the design phase. The soil strength parameters utilized in these analyses were based on consolidated-undrained triaxial shear tests wihtout pore pressure measurements. The tests were conducted on remolded specimens of the proposed embankment materials compacted to at least 94.2 percent of the maximum dry density attainable through the Standard Proctor Compaction Method (ASTM D-698). The shear strength parameters used in the analyses are as follows:

Material Description	ø degrees	c psf
Silty Gravel (GM)	28.5	375
Low Plasticity Silt (ML)	26.5	800

We note the tests were conducted on remolded materials having a gradation less than the No. 4 sieve size.

The stability analyses were based on a modified Swedish circle method for both the upstream and downstream slopes under varying conditions. Of the 7 failure arcs investigated, the minimum factor of safety computed was 1.72 for the upstream slope under the following conditions: rapid drawdown from a reservoir level at elevation 1511.6, no berm, the failure arc confined within the embankment material, with ϕ = 28.5 degrees and c = 375 psf.

The results of the stability analyses are contained with the Design Folder included in Appendix E. We note that all trial arcs are confined within the embankment.

A review of the stability analyses indicates the study was cursory in nature based on the minimal number of trail failure arcs investigated, as well as the seepage and loading conditions considered. However, the embankment slopes are flatter than is normally required for adequate safety factors in a zoned earth embankment.

We note that medium stiff silts and clay form a portion of the embankment foundation, yet no stability analyses failure arc penetrated the foundation. However, this does not appear to be a problem since any excess pore pressures generated within this material during and after embankment construction would have dissipated and the material would be stronger than at the end of construction.

Design of the crest width and longitudinal camber for settlement considerations as well as the cutoff trench width and depth are in accordance with standard engineering practice. The construction of the internal drainage system is of conventional design for zoned earth embankment dams.

c. Seismic Stability

No seismic stability analyses were performed as part of the dam design.

SECTION 7: ASSESSMENT/RECOMMENDATIONS

7.1 ASSESSMENT

a. Safety

The Phase I inspection of the Conwango Creek Watershed Project Site 33 dam did not reveal conditions which constitute a hazard to human life or property. The earth embankment is considered stable based on the available engineering data and visual observations. The dam and spillways are capable of retarding and safely discharging floodwaters resulting from the Probable Maximum Flood (PMF).

b. Adequacy of Information

The information reviewed was adequate for Phase I Inspection Reports.

c. Need for Additional Investigation

No additional investigations are required for this structure.

d. Urgency

All remedial measures should be completed within 6 months from the time of approval of this report. An emergency preparedness plan for notification and evacuation of downstream residents in the event of large auxiliary spillway discharge should be implemented within 6 months.

7.2 RECOMMENDED REMEDIAL MEASURES

a. Remove debris from around orifice trash racks, embankment upstream slope.
b. Remove dead brush and trees from reservoir slopes.
c. Provide increased maintenance.
d. Provide a procedure for periodic inspections including operations and lubrication of slide gate mechanisms.
e. Re-establsih riprap in and around plunge pool to as-built condition.

f. Repair and re-establish asbestos cement drain pipe to as-built condition (including animal screens).

g. Revegetate or otherwise protect the lower third of upstream embankment slope.

h. Line abutment-embankment contact in eroded areas with non-erodable material such as stone, corrugated metal pipe, asphaltic pavement.

i. Treat animal burrow by digging out and replacing with compacted embankment material.

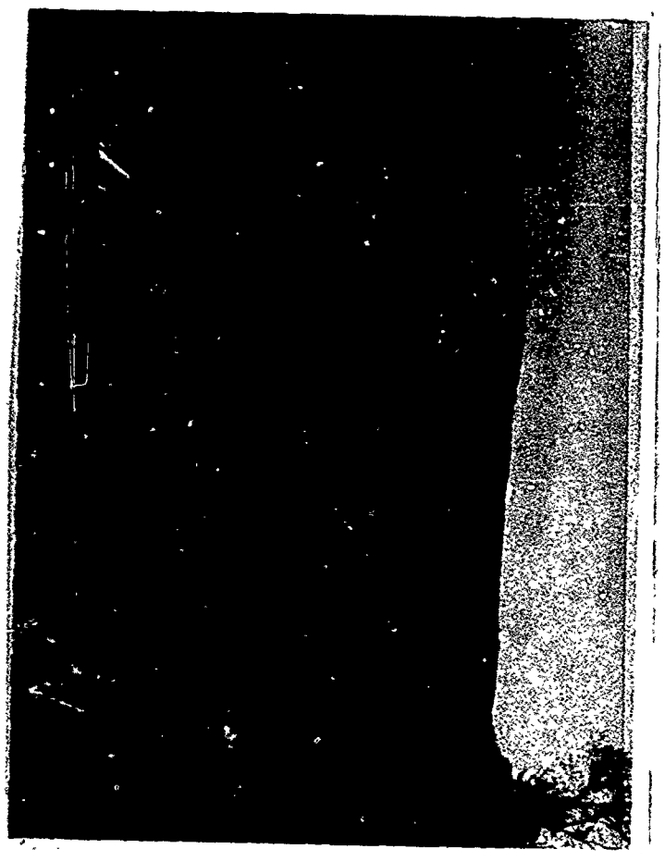
j. Consideration should be given to installing a fence along Pickup Hill Road to discourage vandals from entering property and cause further damage.

k. Develop and implement a warning system and evacuation plan for downstream residents in the event of large auxiliary spillway discharge.

APPENDIX A

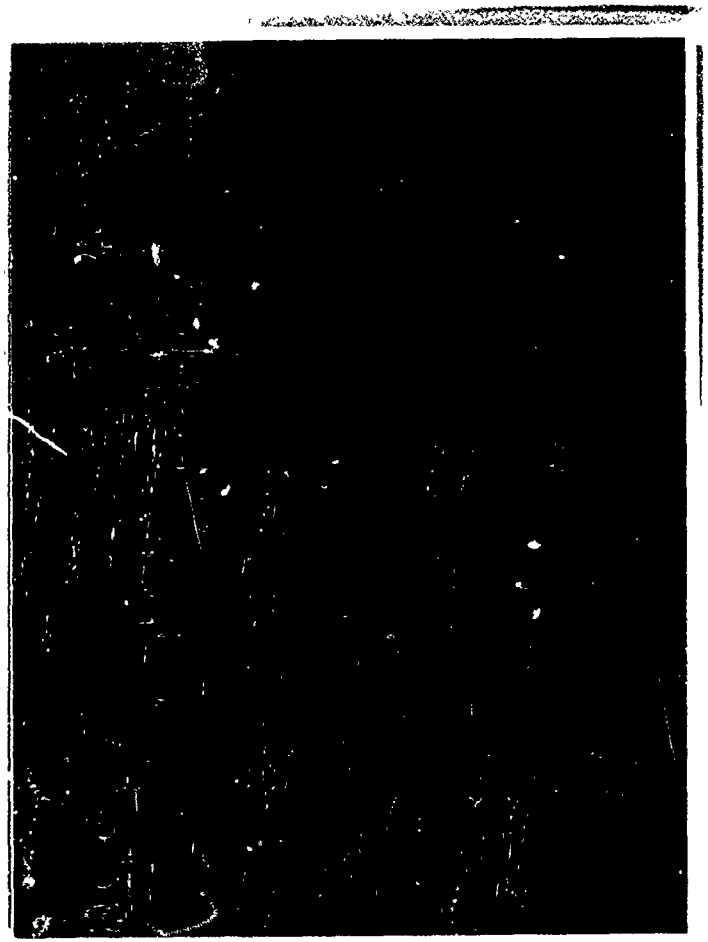
PHOTOGRAPHS

View of upstream slope from the embankment--note erosion along toe of embankment and resulting "delta" formation in the reservoir near picture center.



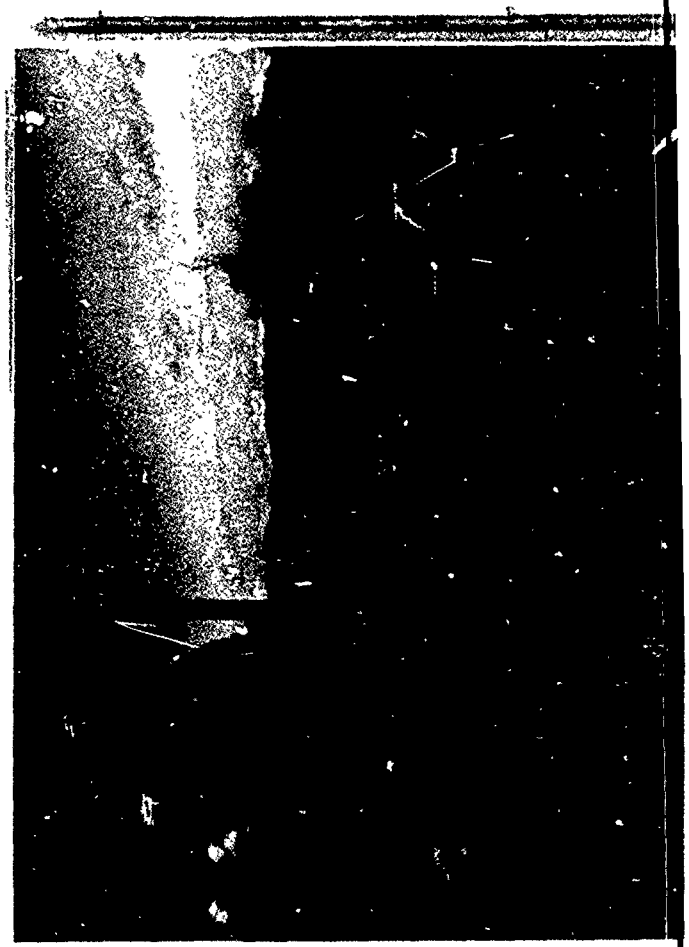
View of upstream embankment slope and intake structure from west abutment.

View of dam crest and top of intake structure.



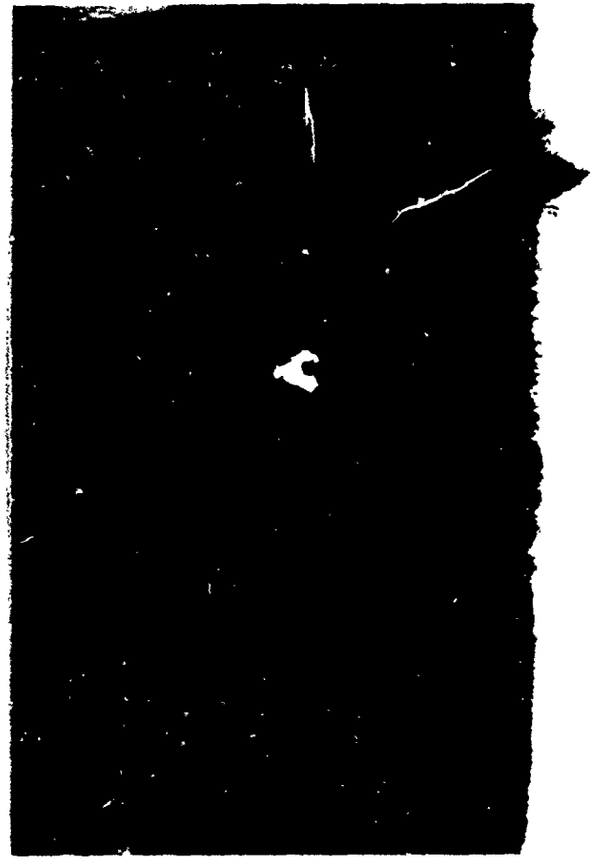
View of the upstream slope taken from the embankment above the intake structure.

View of reservoir and intake structure from atop the reservoir--note trees within the reservoir.



View of downstream embankment slope and outlet pipe from west side of downstream channel-note erosion along the abutment-embankment contact at left side of photo.

View of auxiliary spillway looking downstream.



View of auxiliary spillway looking upstream--note the gravel underdrain.

View of the outlet pipe, plunge pool and downstream channel from the crest of the embankment.

View of reservoir and surrounding slopes.

APPENDIX B

VISUAL INSPECTION CHECKLIST

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CONSULTING GEOTECHNICAL ENGINEERS & GEOLOGISTS

VISUAL INSPECTION CHECKLIST

1) Basic Data

a. General

Name of Dam Conewango Creek - Site 33
Fed. I.D. # 72-3917 DEC. Dam No. NY 581
River Basin Allegheny
Location: Town Cherry Creek County Chautauqua
U.S.G.S. Quadrangle Cherry Creek
Stream Name Unnamed tributary
Tributary of Cherry Creek
Latitude (N) 42° 17' 10" Longitude (W) 79° 06' 51"
Type of Dam Zoned Earth Fill
Hazard Category High
Date(s) of Inspection 5/6/80, 5/21/80
Weather Conditions Cloudy
Reservoir Level at Time of Inspection 1483.70 Controlled at Outlet Structure
Tailwater Level at Time of Inspection 1454.1

b. Inspection Personnel Charles T. Gaynor II - Thomsen Associates
Paul Ehrenberg - MJT, Don Lake & Harry Hersh - SCS
Richard Shields - Conewango Creek Watershed Commission

c. Persons Contacted (Including Address & Phone No.)
Don Lake & Harry Hersh - SCS - Syracuse Office - 315-423-5503
Richard Shields - Conewango Office - Kennedy, N.Y. - 716-267-4801
Robbin Weisnicker - DEC - Albany, NY - 518-457-5557

d. History: As Built 12/9/74
Date Constructed 1974 Date(s) Reconstructed NONE
Designed Soil Conservation Service
Constructed by W W Kimmons Co. Buffalo, NY
Owner Conewango Creek Watershed Commission

e. Seismic Zone Zone 3

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2) Embankment

a. Characteristics

1) Embankment Material 2-Zone Dam, Central Core composed of Material w/ >20% Passing #200 sieve, Upstream & Downstream Slopes composed of material w/ <20% Passing #20 sieve

2) Cutoff Type Cutoff Trench

3) Impervious Core Glacial Till, Glaciofluvial, Glaciolacustrine >20% Passing #200 sieve

4) Internal Drainage System Dr. Trench [illegible] w/ Drain, Dr. Pipe 9" within Dr. Trench [illegible] to Dr. Pipe Outlet

5) Miscellaneous

b. Crest

1) Vertical Alignment OK

2) Horizontal Alignment OK

3) Surface Cracks NONE

4) Miscellaneous

c. Upstream Slope

1) Slope (Estimate) (V:H) 1:3

2) Undesirable Growth or Debris, Animal Burrows

Debris (Drill debris) lower 1/2 of slope

3) Sloughing, Subsidence or Depressions NONE

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4) Slope Protection NONE (Lower 1/3 Bare, Middle 1/3 Reed Canary, Top 1/3 Grass)

5) Surface Cracks or Movement at Toe NONE, Note: Natural Seepage from Abutments toward Reservoir, Left Abutment - Embankment contact is lined with 1" MAX. Washed GRAVEL

d. Downstream Slope

1) Slope (Estimate - V:H) 1:2.5

2) Undesirable Growth or Debris, Animal Burrows See Animal Burrow Noted below around outlet pipe.

3) Sloughing, Subsidence or Depressions NONE

4) Surface Cracks or Movement at Toe NONE

5) Seepage NONE

6) External Drainage System (Ditches, Trenches; Blanket)

SWALE BETWEEN TOE & ABUTMENT [illegible] GRASS COVERED. EROSION NOTED Lower 1/3 of slope 1' WIDE 1' Deep

7) Condition Around Outlet Structure SMALL ANIMAL BURROW IN UPSLOPE SIDE OF RIPRAP AROUND OUTLET PIPE

8) Seepage Beyond Toe NONE, SEE AS BUILT MAPS

GENERAL WASTE AREA RIGHT SIDE OF OUTLET CHANNEL - IN NATURAL FLOOD PLAIN LEFT OF OUTLET CHANNEL

e. Abutments-Embankment Contact

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1) **Erosion at Contact** Both Right and Left Sides - EROSION ALONG DRAINAGE SWALE 1' WIDE 1' Deep at Lower END of Slope

2) **Seepage Along Contract** NONE

3) **Drainage System**

a. **Description of System** Drain Trench with Filter Material for toe along ABUTMENT TO PARALLEL DRAIN TRENCH with 8"ϕ Asbestos Cement Drain Pipe located 114' from Dam ℄, Animal Guards at Drain Pipe Outlet

b. **Condition of System** Only Outlet Drain Pipe Exposed 5-21-80 Vandals have Broken off ≈2' of outlet drain pipe when they daylight from embankment

c. **Discharge from Drainage System** NONE

4) **Instrumentation** (Momumentation/Surveys, Observation Wells, Weirs, Piezometers, Etc.) Horizontal & Vertical Control, 2 Monuments along ℄ outside of Dam West Side in Picture Hill Road Horizontal Control @ STA. 0+05.13 RR spike in Road ℄ for Dam ℄. East Side ℄ Dam Monument STA. 7+18.85, Elev. 1527.76

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VISUAL INSPECTION CHECKLIST

5) Reservoir

a. Slopes Right Side 1:1.5 Left Side between 10% + 1:2

b. Sedimentation slight exposed on lower 1/2 of upstream face less than 1" 5-21-80 Est. Sedimentation with reservoir nearly drained is 4"-5"

c. Unusual Conditions Which Affect Dam Fallen Trees along Reservoir Slopes

6) Area Downstream of Dam

a. Downstream Hazard (No. of Homes, Highways, etc.) High Many Homes in Cherry Creek, NY, downstream channel crosses secondary roads at several locations.

b. Seepage, Unusual Growth See [illegible]

c. Evidence of Movement Beyond Toe of Dam None

d. Condition of Downstream Channel cleared ≈ 135' from outlet works then into natural tree lined channel

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

Concrete Riser Intake Structure with 36" Ø Reinforced Concrete Pressure Pipe to Plunge Pool on Downstream Side

a. General Orifice control on pool @ Elev 1483.7
Riser Crest Elev. 1509.1

b. Condition of Service Spillway Debris needs to be cleaned around orifice trash racks

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VISUAL INSPECTION CHECKLIST

c. Condition of Auxiliary Spillway Good Nbk: Seeps disclosed (during construction) in Cut Slope along West side of Spillway, Area is treated w/ Gravel & Drained by 4" ϕ perforated plastic pipe; no flow has ever been observed from Pipe outlet. GRASS LINED, Max. Elevation 1511.6

d. Condition of Discharge Conveyance Cnannel _____

8) Reservoir Drain/Outlet

Type: Pipe ✓ Conduit _____ Other _____

Material: Concrete _____ Metal Cast Iron Other _____

Size: 10" ϕ Nominal Length 40.0'

Invert Elevations: Entrance 1472.1 Exit 1470.1 in Riser Structure

Physical Condition (Describe): Unobservable ✓

Material: _____

Joints: _____ Alignment _____

Structural Integrity: _____

Hydraulic Capability: _____

Means of Control: Gate ✓ Valve _____ Uncontrolled _____

Operation: Operable ✓ Inoperable _____ Other _____

Present Condition (Describe): _____

Riser Crest Elev. 1509.1

No Warning System or Evacuation Plan

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9) Structural

a. Concrete Surfaces Good - Concrete Riser Intake Structure

b. Structural Cracking NONE

c. Movement - Horizontal & Vertical Alignment (Settlement)
NONE

d. Junctions with Abutments or Embankments
N/A

e. Drains - Foundation, ~~Joint~~, ~~Face~~ Outlet of Drain Pipes (8" ϕ Asbestos Cement) had been broken off between 5/6/80 & 5/21/80 by Vandals

f. Water Passages, Conduits, Sluices

g. Seepage or Leakage N/A

h. Joints - Construction, etc. Tight

i. Foundation

j. Abutments

k. Control Gates Riser Stm Gate on Reservoir Drain

l. Approach & Outlet Channels Outlet pipe was to be inspected on 5/21/80, Reservoir level had been drawn down below orifice but local contracting officer was not present to close drain at pre-arranged time to facilitate inspection of outlet pipe

m. Energy Dissipators (Plunge Pool, etc.)

n. Intake Structures Concrete Riser Structure - Good Condition Some debris around trash racks @ orifice

o. Stability

p. Miscellaneous

APPENDIX C

HYDROLOGIC/HYDRAULIC ENGINEERING DATA AND COMPUTATIONS

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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	1519.9	7.9	137.9
2) Design High Water (Max. Design Pool)	1513.8	5.4	97.3
3) Auxiliary Spillway Crest	1511.6	4.9	86.0
4) Pool Level with Flashboards	N.A.	N.A.	N.A.
5) Service Spillway Crest	1509.1	4.4	74.4
6) Orifice Crest	1493.7	0.7	9.6

DISCHARGES

	Volume (cfs)
1) Average Daily	Unknown
2) Spillway @ Maximum High Water (Top of Dam)	163
3) Spillway @ Design High Water	156
4) Spillway @ Auxiliary Spillway Crest Elevation	148
5) Low Level Outlet at Normal Pool	5
6) Total (of all facilities) @ Maximum High Water	5113
7) Maximum Known Flood	Unknown

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CREST: ELEVATION: 1519 ?

Type: Zoned Earth Embankment

Width: 18 Length: 317 feet

Spillover Concrete Riser Structure & Auxiliary Spillway

Location Riser Structure on Upstream Embankment Slope near Maximum section of Dam, Auxiliary Spillway at West End of Dam

SPILLWAY:

PRINCIPAL		EMERGENCY
Orifice Crest - 1483.7 Riser Crest - 1509.1	Elevation	1511.6
Concrete Riser Structure w/ orifice	Type	Grass lined Earthen Channel
	Width	50 feet
	Type of Control	
Yes	Uncontrolled	Yes
	Controlled:	
	Type (Flashboards; gate)	
	Number	
	Size/Length	
	Invert Material	Topsoil over generally fine grained silt, sands and clay
	Anticipated Length of operating service	17 hours at PMF event
295.2 (Pipe Length)	Chute Length	50' @ Level Control Section
Not Applicable	Height Between Spillway Crest & Approach Channel Invert (Weir Flow)	2% Entrance Slope

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~~OUTLET STRUCTURES~~/EMERGENCY DRAWDOWN FACILITIES:

Type: Gate ✓ Sluice ____ Conduit ____ Penstock ____

Shape: Circular (Cast Iron Pipe)

Size: 10"

Elevations: Entrance Invert 1472.1

Exit Invert 1470.1

Tailrace Channel: Elevation Not Applicable

HYDROMETEROLOGICAL GAGES:

Type: NONE KNOWN TO BE IN THE AREA

Location: ____

Records:

Date - ____

Max. Reading - ____

FLOOD WATER CONTROL SYSTEM:

Warning System: None

Method of Controlled Releases (mechanisms):

Reservoir Drain with Manually operated slide gate

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DRAINAGE AREA: 350 Acres (0.53 sq miles)

DRAINAGE BASIN RUNOFF CHARACTERISTICS:

Land Use - Type: Wooded

Terrain - Relief: Moderate to Steep

Surface - Soil: Varies between glacio-lacustrine silt & clay & dense glacial till

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

None Planned

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

Normal Pool is designed as a 50 year Sediment Pool

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

None

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

Location: None

Elevation:

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Drainage Area = 0.53 sq. mile

Estimation of Lag Time (tp)

$tp = C_t(.955)(L \cdot L_c)^{.3} + .25\, t_R = 1.1(.955)(1.21 \times .6)^{.3} + .25(.20)$

$= 1.00$ hr.

Slope of the basin $= \frac{1950 - 1500}{4200} \times 100 = 10.7\%$

Check of Lag time

Using Linsley, Kohler & Paulhus Equation,

$$\text{Lag } (tp) = 0.72\left(\frac{L \cdot L_c}{\sqrt{S}}\right)^{.38} = 0.72\left(\frac{1.21 \times .6}{\sqrt{.107}}\right)^{.38}$$

$= 0.97$ hr.

In HEC-1 input $tp = 1$ hr. & $C_p = 0.63$ were used to develop synthetic unit hydrographs.

Probable Maximum Precipitation

From Hydrometeorological Report #33, Probable Maximum Precipitation = 22.6 inches (For 200 sq. mile - 24 hr. duration)

Depth - Area - Duration Relationship (Zone 2)

6 hr. - 116%
12 hr. - 127%
24 hr. - 141%

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JOB HYDROLOGIC STUDY DAM # NY 581
SHEET NO _____ OF _____
CALCULATED BY F.C. DATE 6/5/89
CHECKED BY _____ DATE _____
SCALE _____

STAGE - STORAGE DATA

ELEVATION (ft.)	Surface Area (Acres)	Avg. Area (Acres)	Incremental Storage (Acre-ft)	Total Storage (Acre-ft)	Remarks
1483.7	0.7			0	Surface Areas are directly taken from S.C.S. design report since they are computed with later contour maps.
1509.1	4.4	2.55	64.8	64.8	
1511.6	4.9	4.65	11.6	76.4	
1513.8	5.4	5.15	11.3	87.7	
1519.9	7.9	6.65	40.6	128.3	

NOTE: Storage for other stages for HEC-1 input were interpolated from Stage-Storage Curve.

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JOB HYDROLOGIC STUDY DAM # NY 521
SHEET NO _____ OF _____
CALCULATED BY T.K DATE 6/5/90
CHECKED BY P.S. DATE 6/8/90
SCALE _____

STAGE - DISCHARGE COMPUTATION

Normal Pool Elevation - 1493.7
Elev. of Crest of riser - 1509.1
Emergency spillway Elvn. - 1511.6
Elevn. of top of dam - 1519.9
Elevn. of Tail water - 1454.1

Size of Orifice - 0.75' x 0.5'
Size of outlet pipe - 30" ϕ. S_o = .032
Length of pipe - 295.2'. n = .012
El. @ crest of pipe - 1469.1
Riser opening - 7.5' x 1.25' (2)

Assumptions :

(1) A constant coefficient of discharge of 0.7 was assumed to compute discharge through orifice.

(2) To compute the discharge through the riser, weir flow equation was used for reservoir stage below the top of riser. For all reservoir stage above the top of the riser orifice flow equation was used.

(3) Coefficient of Weir - 3.1

(4) Bureau of Public Roads Hydraulic Engineering Circular # 5 was used to compute headwater from the pipe assuming inlet and outlet control. Long hand calculations were made to compute headwater beyond the limit of the chart.

(5) In computing discharge through emergency spillway, approach velocity and friction loss were ignored.

(6) Tailwater Elevation was ignored since the outlet pipe is discharging into a plunge pool.

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JOB HYDROLOGIC STUDY DAM # 1 - SAI
SHEET NO _____ OF _____
CALCULATED BY T.K DATE 6/3/8[illegible]
CHECKED BY K.S. DATE [illegible]
SCALE _____

STAGE-DISCHARGE COMPUTATIONS (CONTD.)

ELEV.	STAGE	ORIFICE	INLET CONTROL		OUTLET CONTROL			CONTROL	RISER & PIPE		EMER. SPILLWAY	TOTAL
		DISCHARGE	HW/D	HW	$\frac{d_c+d}{2}$	H	HW	HW	H	DISCHARGE	DISCHARGE	DISCHARGE
ft	ft	C.f.s.		ft.	ft.	ft.	ft.	ft.	ft.	C.f.s.	C.f.s.	C.f.s.
1483.7	0											0
1485.7	2	2.8	—	—			—					2.8
1487.7	4	4.0	—	—			—					4.0
1489.7	6	5.0	—	—			—					5.0
1491.7	8	5.9	—	—			—					5.9
1493.7	10	6.6	—	—			—					6.6
1495.7	12	7.2	—	—			—					7.2
1497.7	14	7.8	0.52	1.30			—					7.8
1499.7	16	8.4	0.53	1.32			—					8.4
1501.7	18	8.9	0.57	1.42			—					8.9
1503.7	20	9.4	0.58	1.45			—					9.4
1505.7	22	9.8	0.59	1.47			—					9.8
1507.7	24	10.3	0.6	1.5	1.8	—	—	1.5				10.3
1509.7	26	10.7	1.4	3.5	2.15	2.4	—	3.5	0.6	21.6		32.3
1511.7	28	3.1		31.2	2.5	49.95	41.05	41.05	1.97 Pipe	147.8 Control	4.9	155.7

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JOB HYDR[illegible] STUDY DAM # NY [illegible]
SHEET NO ____ OF ____
CALCULATED BY T.K. DATE 6/81
CHECKED BY P.S. DATE 6/[illegible]/81
SCALE ____

STAGE-DISCHARGE COMPUTATIONS (CONTD.)

ELEV.	STAGE	ORIFICE DISCHARGE	INLET CONTROL		OUTLET CONTROL			CONTROL	RISER & PIPE		EMER. SPILLWAY DISCHARGE	TOTAL DISCHARGE
			HW/D	H.W	dc+d	H	HW	H.W	#	DISCHARGE		
ft.	ft.	C.f.s.		ft.	ft.	ft.	ft.	ft.	ft.	C.f.s.	C.f.s.	C.f.s.
1513.7	30			–	2.5	53.5	44.6	44.6	44.6	156	500	656
1515.7	32			–	2.5	55.5	46.6	46.6	46.6	157	1500	1657
1517.7	34			–	2.5	57.5	48.6	48.6	48.6	160	2900	3060
1519.7	36			–	2.5	59.5	50.6	50.6	50.6	162	4800	4962
1519.9	36.2			–	2.5	59.7	50.8	50.8	50.8	163	4950	5113

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JOB _____

SHEET NO _____ OF _____

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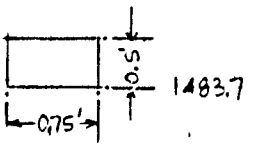
CHECKED BY P.S. DATE 6/20/89

SCALE _____

SAMPLE CALCULATIONS

ORIFICE DISCHARGE



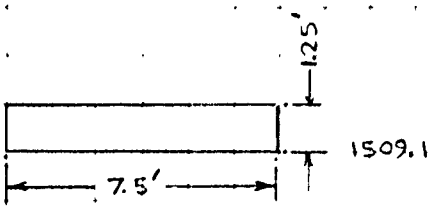
Stage @ 1501.7

$Q = CA\sqrt{2gH} = .7 \times .75 \times .5 \sqrt{64.4 \times 17.75}$

$= 8.9$ c.f.s.

RISER DISCHARGE

Stage @ 1511.7



$Q = CA\sqrt{2gH}$

$= 0.7 \times 2 \times 7.5 \times 1.25 \sqrt{64.4 \times 1.98}$

$= 148.2$ c.f.s.

Computed head with Q = 148 c.f.s. indicates that the orifice will be submerged. Therefore, the orifice discharge will be greatly reduced. By trial & error the total combined discharge through orifice & riser was computed. Total discharge of 151 c.f.s. was assumed and head water head (outlet & outlet control) were computed.

Controlling Head (Outlet Control) = 40.4 ft.

Water Surface El. in the riser box = 1469.1 + 41.05 = 1510.15

Discharge thru orifice,

$Q = CA\sqrt{2g\Delta H}$ $\quad \Delta H = 1511.7 - 1510.15 = 1.55$

$= 0.7 \times .375 \sqrt{64.4 \times 1.55}$

$= 2.6$ c.f.s.

Total discharge thru riser & orifice = 148.2 + 2.6 = 150.8 c.f.s.

Discharge through Emergency Spillway

$Q = CLH^{3/2} = 3.1(50)(.1)^{3/2} = 4.9$ c.f.s.

Total Discharge @ El. 1511.7 = 150.8 + 4.9 = 155.7 c.f.s.

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SHEET NO _____ OF _____
CALCULATED BY T.K. DATE 6/4/80
CHECKED BY P.S. DATE 6/4/80
SCALE _____

PIPE CONTROL

At stage of 1513.7 the computed headwater with combined discharge (orifice and spillway) was more than the stage. Therefore, it was assumed pipe controls and it is outlet control.

$HW = 1513.7 - 1469.1 = 44.6$

$HW = H + ho - LSo \quad \therefore H = 44.6 - 2.5 + 11.4 = 53.5$

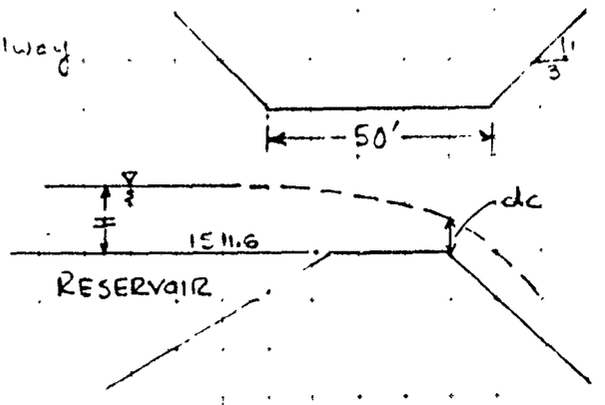
$$H = \left(1 + Ke + \frac{29n^2L}{R^{4/3}}\right) V^2/2g$$

$$53.5 = \left(1 + 1.1 + \frac{29(.012)^2 \times 295}{(1.62)^{4/3}}\right) V^2/2g, \quad 53.5 = 3.4\, V^2/2g$$

$V = 31.8'/sec \quad Q = A \times V = 4.908 \times 31.8 = 156$ c.f.s.

EMERGENCY SPILLWAY

Discharge thru Emergency spillway.



$H = 1513.7 - 1511.6 = 2.10$

Neglecting approach velocity and friction loss

$H = dc + \frac{Vc^2}{2g}$

Computations involve assuming a discharge through the spillway and calculate dc & $Vc^2/2g$ to balance two sides of the equation.

Table 8-5 of King & Brater "Handbook of Hydraulics was used to Compute dc.

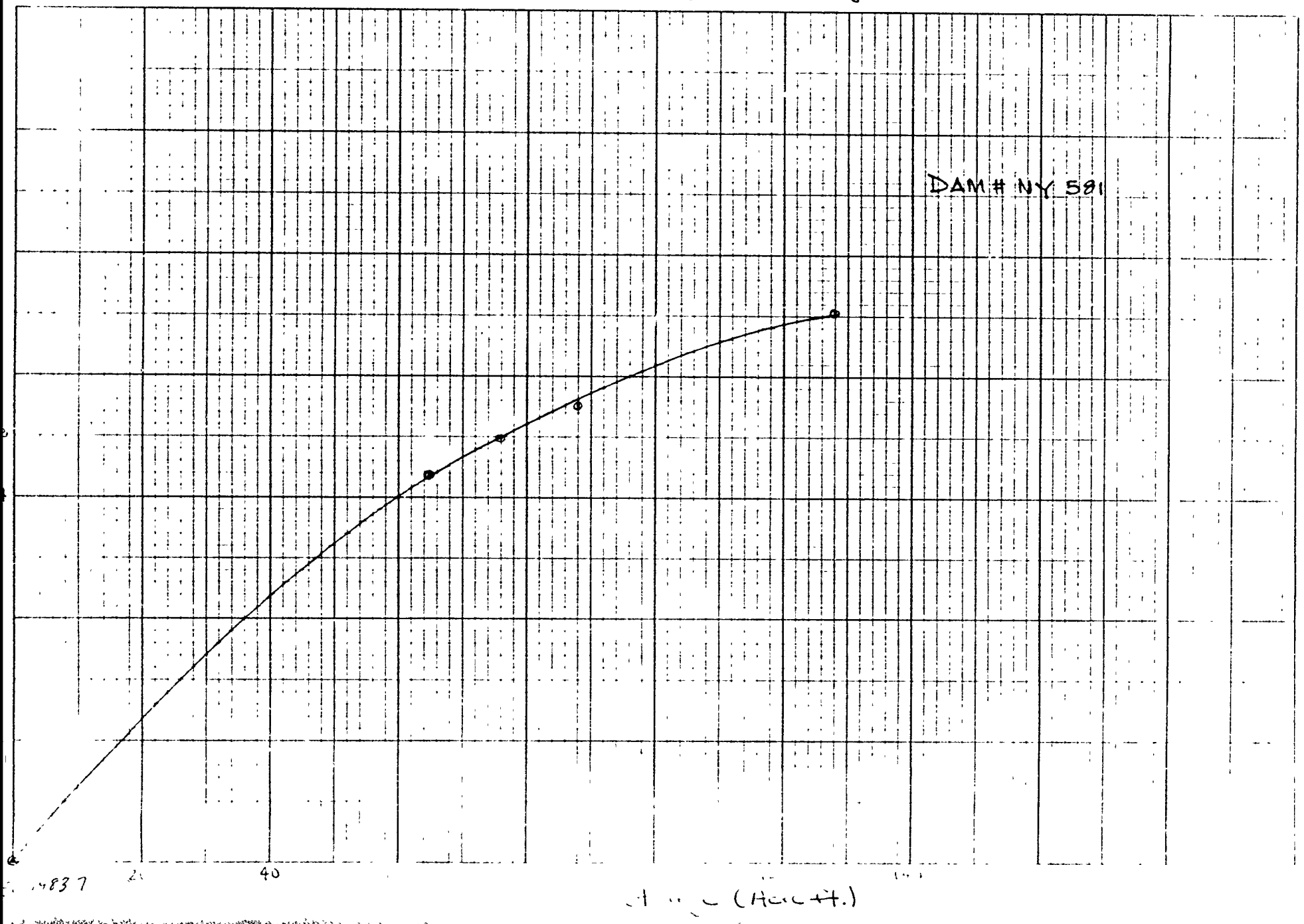
assume $Q = 500$ c.f.s. $\quad k'c = .028 \quad dc/b = .029$

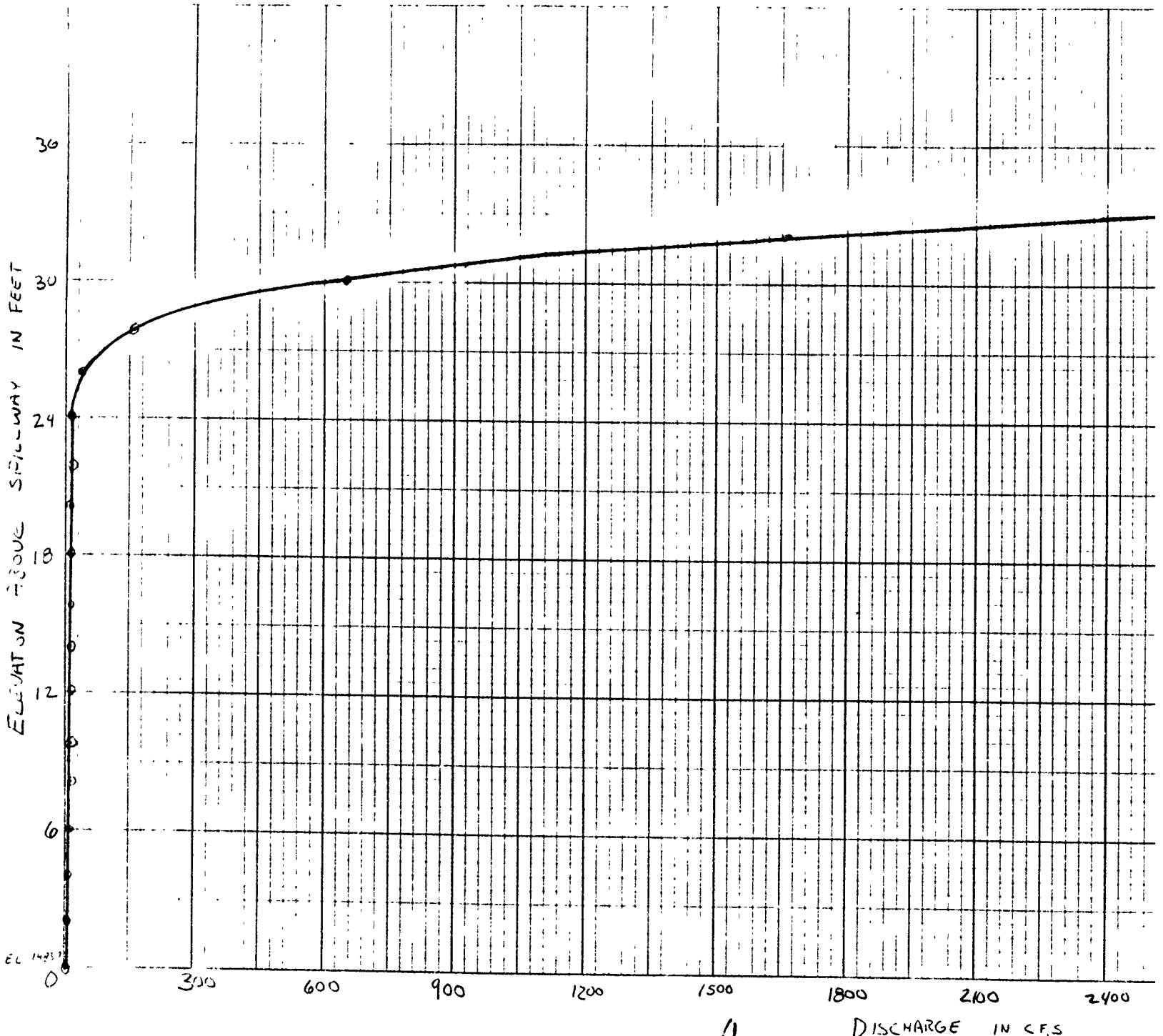
$\therefore dc = .029(50) = 1.45', \quad Vc = 500/78.8 = 6.34'/sec \quad Vc^2/2g = 0.62$

$\therefore dc + Vc^2/2g = 1.45 + 0.62 = 2.07 = 2.1$

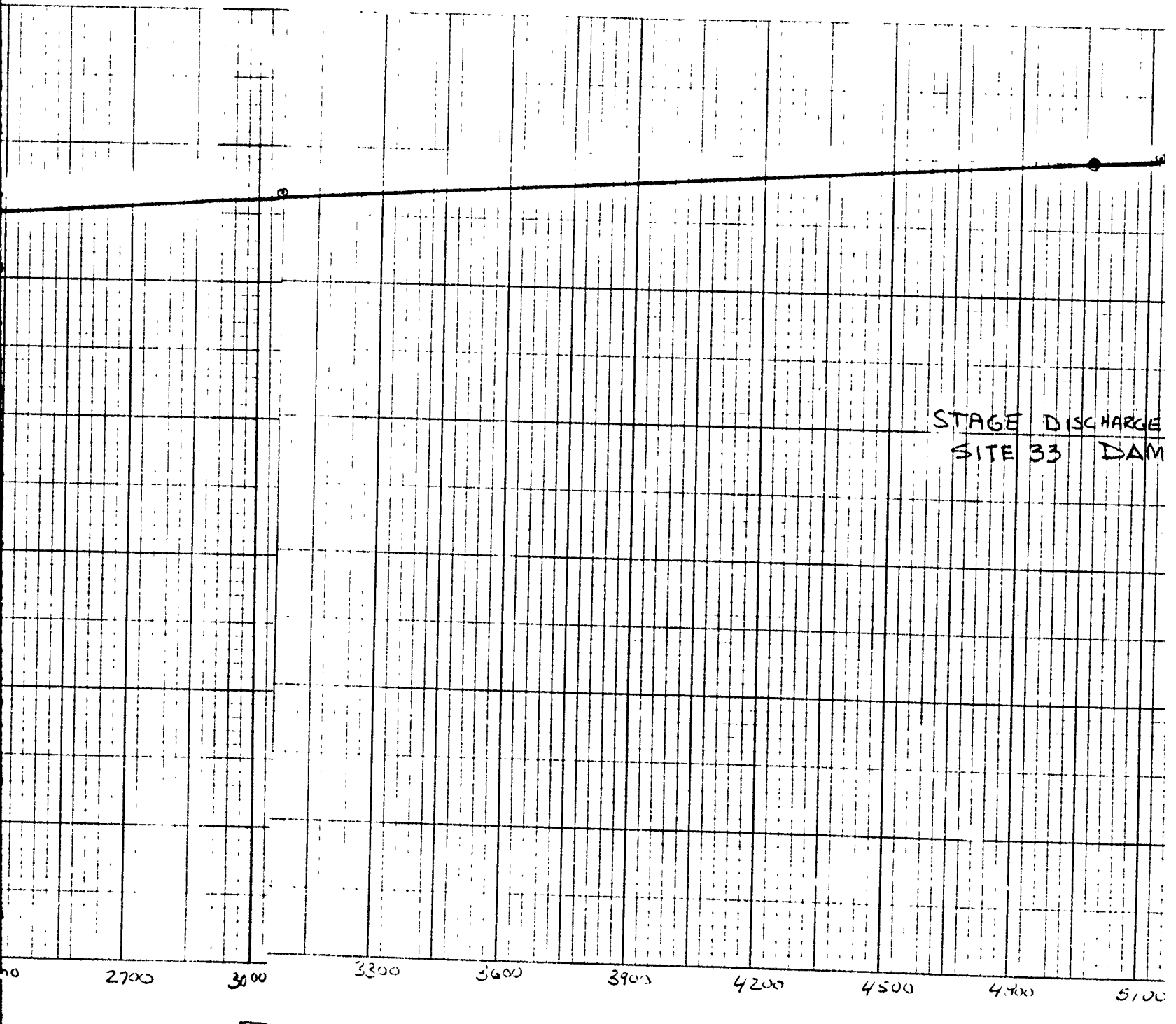
$\therefore$ Total Discharge @ 1513.7 = 156 + 500 = 656 c.f.s.

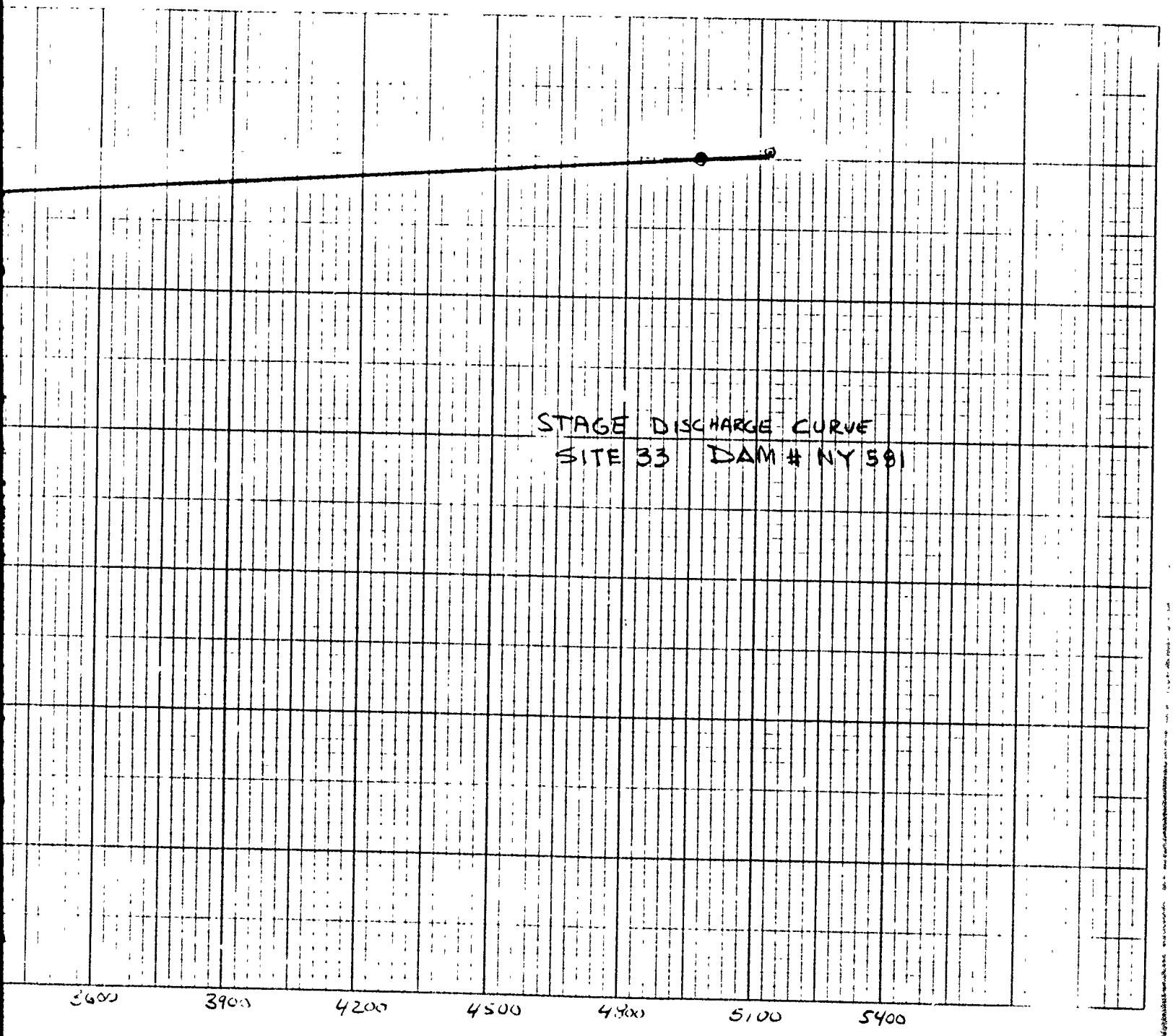
Site 33 Stage vs. Storage





1


STAGE DISCHARGE
SITE 33 DAM
2700
3000
3300
3600
3900
4200
4500
4800
5100



3

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**********
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION     JULY 1978
  LAST MODIFICATION  26 FEB 79
**********
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1	A1	ANALYSIS OF DAM OVERTOPPING USING RATIOS OF PMF									
2	A2	HYDROLOGIC-HYDRAULIC ANALYSIS OF SAFETY OF NY 501									
3	A3	RATIOS OF PMF ROUTED THROUGH THE RESERVOIR									
4	B	150	0	12	0	0	0	0	0	0	0
5	B1	5									
6	J	1	6	1							
7	J1	.2	.35	.50	.65	.80	1				
8	K	0	1	0	0	0	0	1			
9	K1	CALCULATION OF INFLOW HYDROGRAPH									
10	M	1	1	.53	0	.53	0	0	0	0	0
11	P		22.6	116	127	141	0	0	0	0	
12	T	0	0	0	0	0	0	1	.1	0	0
13	W	1.00	.63								
14	X	-2	-.1	2							
15	K	1	2	0	0	0	0	1	0	0	0
16	K1	ROUTING OF INFLOW HYDROGRAPH									
17	Y	0	0	0	1	1					
18	Y1	1	0	0	0	0	0	-1			
19	Y2	0	12.5	31	47.5	60	67.8	76	85.5	96	108
20	Y2	126	128								
21	Y3	0	5	7.8	9.4	10.3	32.3	155	654	1657	3060
22	Y3	4962	5113								
23	K	99									

PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

RUNOFF HYDROGRAPH AT	1
ROUTE HYDROGRAPH TO	2
END OF NETWORK	

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

TIME OF EXECUTION 30-JUL-80 11:33:50

ANALYSIS OF DAM OVERTOPPING USING RATIOS OF PMF
HYDROLOGIC-HYDRAULIC ANALYSIS OF SAFETY OF NY 581
RATIOS OF PMF ROUTED THROUGH THE RESERVOIR

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
150	0	12	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 0.35 0.50 0.65 0.80 1.00

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

SUB-AREA RUNOFF COMPUTATION

CALCULATION OF INFLOW HYDROGRAPH

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

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	0.53	0.00	0.53	0.00	0.000	0	0	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	22.60	116.00	127.00	141.00	0.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS 0.800

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRIL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.10	0.00	0.00

UNIT HYDROGRAPH DATA
TP= 1.00 CP=0.63 NTA= 0

RECESSION DATA
STRTQ= -2.00 QRCSN= -0.10 RTIOR= 2.00
APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TC= 5.82 AND R= 4.39 INTERVALS

UNIT HYDROGRAPH 27 END-OF-PERIOD ORDINATES, LAG= 0.99 HOURS, CP= 0.63 VOL= 1.00

18.	64.	125.	181.	214.	214.	183.	146.	116.	92.
73.	58.	46.	37.	29.	23.	19.	15.	12.	9.
7.	6.	5.	4.	3.	2.	2.			

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	0.12	1	0.03	0.00	0.03	1.	1.01	15.12	76	0.80	0.78	0.02	875.
1.01	0.24	2	0.03	0.00	0.03	1.	1.01	15.24	77	1.43	1.41	0.02	932.
1.01	0.36	3	0.03	0.00	0.03	1.	1.01	15.36	78	3.98	3.96	0.02	1066.
1.01	0.48	4	0.03	0.00	0.03	1.	1.01	15.48	79	1.28	1.26	0.02	1313.
1.01	1.00	5	0.03	0.00	0.03	1.	1.01	16.00	80	0.64	0.62	0.02	1615.
1.01	1.12	6	0.03	0.00	0.03	1.	1.01	16.12	81	0.59	0.57	0.02	1883.
1.01	1.24	7	0.03	0.00	0.03	1.	1.01	16.24	82	0.59	0.57	0.02	2035.
1.01	1.36	8	0.03	0.00	0.03	1.	1.01	16.36	83	0.59	0.57	0.02	2027.
1.01	1.48	9	0.03	0.00	0.03	1.	1.01	16.48	84	0.59	0.57	0.02	1888.
1.01	2.00	10	0.03	0.00	0.03	1.	1.01	17.00	85	0.59	0.57	0.02	1711.
1.01	2.12	11	0.03	0.00	0.03	0.	1.01	17.12	86	0.46	0.44	0.02	1558.
1.01	2.24	12	0.03	0.00	0.03	0.	1.01	17.24	87	0.46	0.44	0.02	1429.
1.01	2.36	13	0.03	0.00	0.03	0.	1.01	17.36	88	0.46	0.44	0.02	1317.
1.01	2.48	14	0.03	0.00	0.03	0.	1.01	17.48	89	0.46	0.44	0.02	1217.
1.01	3.00	15	0.03	0.00	0.03	0.	1.01	18.00	90	0.46	0.44	0.02	1129.
1.01	3.12	16	0.03	0.00	0.03	0.	1.01	18.12	91	0.05	0.03	0.02	1046.
1.01	3.24	17	0.03	0.00	0.03	0.	1.01	18.24	92	0.05	0.03	0.02	958.
1.01	3.36	18	0.03	0.00	0.03	0.	1.01	18.36	93	0.05	0.03	0.02	858.
1.01	3.48	19	0.03	0.00	0.03	0.	1.01	18.48	94	0.05	0.03	0.02	744.
1.01	4.00	20	0.03	0.00	0.03	0.	1.01	19.00	95	0.05	0.03	0.02	625.
1.01	4.12	21	0.03	0.00	0.03	0.	1.01	19.12	96	0.05	0.03	0.02	512.
1.01	4.24	22	0.03	0.00	0.03	0.	1.01	19.24	97	0.05	0.03	0.02	418.
1.01	4.36	23	0.03	0.00	0.03	0.	1.01	19.36	98	0.05	0.03	0.02	342.
1.01	4.48	24	0.03	0.00	0.03	0.	1.01	19.48	99	0.05	0.03	0.02	282.
1.01	5.00	25	0.03	0.00	0.03	0.	1.01	20.00	100	0.05	0.03	0.02	234.
1.01	5.12	26	0.03	0.00	0.03	0.	1.01	20.12	101	0.05	0.03	0.02	201.
1.01	5.24	27	0.03	0.00	0.03	0.	1.01	20.24	102	0.05	0.03	0.02	187.
1.01	5.36	28	0.03	0.00	0.03	0.	1.01	20.36	103	0.05	0.03	0.02	175.
1.01	5.48	29	0.03	0.00	0.03	0.	1.01	20.48	104	0.05	0.03	0.02	163.
1.01	6.00	30	0.03	0.01	0.03	0.	1.01	21.00	105	0.05	0.03	0.02	152.
1.01	6.12	31	0.07	0.05	0.02	1.	1.01	21.12	106	0.05	0.03	0.02	142.
1.01	6.24	32	0.07	0.05	0.02	5.	1.01	21.24	107	0.05	0.03	0.02	132.
1.01	6.36	33	0.07	0.05	0.02	11.	1.01	21.36	108	0.05	0.03	0.02	124.
1.01	6.48	34	0.07	0.05	0.02	19.	1.01	21.48	109	0.05	0.03	0.02	115.
1.01	7.00	35	0.07	0.05	0.02	29.	1.01	22.00	110	0.05	0.03	0.02	108.
1.01	7.12	36	0.07	0.05	0.02	39.	1.01	22.12	111	0.05	0.03	0.02	100.
1.01	7.24	37	0.07	0.05	0.02	47.	1.01	22.24	112	0.05	0.03	0.02	94.
1.01	7.36	38	0.07	0.05	0.02	54.	1.01	22.36	113	0.05	0.03	0.02	87.
1.01	7.48	39	0.07	0.05	0.02	59.	1.01	22.48	114	0.05	0.03	0.02	82.
1.01	8.00	40	0.07	0.05	0.02	63.	1.01	23.00	115	0.05	0.03	0.02	76.
1.01	8.12	41	0.07	0.05	0.02	66.	1.01	23.12	116	0.05	0.03	0.02	71.
1.01	8.24	42	0.07	0.05	0.02	69.	1.01	23.24	117	0.05	0.03	0.02	66.
1.01	8.36	43	0.07	0.05	0.02	71.	1.01	23.36	118	0.05	0.03	0.02	62.
1.01	8.48	44	0.07	0.05	0.02	73.	1.01	23.48	119	0.05	0.03	0.02	58.
1.01	9.00	45	0.07	0.05	0.02	74.	1.02	0.00	120	0.05	0.03	0.02	54.
1.01	9.12	46	0.07	0.05	0.02	75.	1.02	0.12	121	0.00	0.00	0.00	52.
1.01	9.24	47	0.07	0.05	0.02	76.	1.02	0.24	122	0.00	0.00	0.00	50.
1.01	9.36	48	0.07	0.05	0.02	77.	1.02	0.36	123	0.00	0.00	0.00	46.
1.01	9.48	49	0.07	0.05	0.02	77.	1.02	0.48	124	0.00	0.00	0.00	43.
1.01	10.00	50	0.07	0.05	0.02	78.	1.02	1.00	125	0.00	0.00	0.00	40.
1.01	10.12	51	0.07	0.05	0.02	78.	1.02	1.12	126	0.00	0.00	0.00	38.
1.01	10.24	52	0.07	0.05	0.02	78.	1.02	1.24	127	0.00	0.00	0.00	35.
1.01	10.36	53	0.07	0.05	0.02	78.	1.02	1.36	128	0.00	0.00	0.00	33.
1.01	10.48	54	0.07	0.05	0.02	78.	1.02	1.48	129	0.00	0.00	0.00	31.
1.01	11.00	55	0.07	0.05	0.02	79.	1.02	2.00	130	0.00	0.00	0.00	29.
1.01	11.12	56	0.07	0.05	0.02	79.	1.02	2.12	131	0.00	0.00	0.00	27.
1.01	11.24	57	0.07	0.05	0.02	79.	1.02	2.24	132	0.00	0.00	0.00	25.
1.01	11.36	58	0.07	0.05	0.02	79.	1.02	2.36	133	0.00	0.00	0.00	23.
1.01	11.48	59	0.07	0.05	0.02	79.	1.02	2.48	134	0.00	0.00	0.00	22.

1.01	12.00	60	0.07	0.05	0.02	79.	1.02	3.00	135	0.00	0.00	0.00	20.
1.01	12.12	61	0.42	0.40	0.02	85.	1.02	3.12	136	0.00	0.00	0.00	19.
1.01	12.24	62	0.42	0.40	0.02	108.	1.02	3.24	137	0.00	0.00	0.00	18.
1.01	12.36	63	0.42	0.40	0.02	152.	1.02	3.36	138	0.00	0.00	0.00	16.
1.01	12.48	64	0.42	0.40	0.02	216.	1.02	3.48	139	0.00	0.00	0.00	15.
1.01	13.00	65	0.42	0.40	0.02	291.	1.02	4.00	140	0.00	0.00	0.00	14.
1.01	13.12	66	0.50	0.48	0.02	368.	1.02	4.12	141	0.00	0.00	0.00	13.
1.01	13.24	67	0.50	0.48	0.02	438.	1.02	4.24	142	0.00	0.00	0.00	12.
1.01	13.36	68	0.50	0.48	0.02	500.	1.02	4.36	143	0.00	0.00	0.00	12.
1.01	13.48	69	0.50	0.48	0.02	556.	1.02	4.48	144	0.00	0.00	0.00	11.
1.01	14.00	70	0.50	0.48	0.02	606.	1.02	5.00	145	0.00	0.00	0.00	10.
1.01	14.12	71	0.63	0.61	0.02	652.	1.02	5.12	146	0.00	0.00	0.00	9.
1.01	14.24	72	0.63	0.61	0.02	696.	1.02	5.24	147	0.00	0.00	0.00	9.
1.01	14.36	73	0.63	0.61	0.02	741.	1.02	5.36	148	0.00	0.00	0.00	8.
1.01	14.48	74	0.63	0.61	0.02	786.	1.02	5.48	149	0.00	0.00	0.00	8.
1.01	15.00	75	0.63	0.61	0.02	831.	1.02	6.00	150	0.00	0.00	0.00	7.
									SUM	25.65	22.84	2.81	39843.
										(652.)	(580.)	(71.)	(1128.23)

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2035.	1084.	332.	266.	39835.
CMS	58.	31.	9.	8.	1128.
INCHES		19.03	23.30	23.31	23.31
MM		483.46	591.78	591.96	591.96
AC-FT		538.	658.	658.	658.
THOUS CU M		663.	812.	812.	812.

HYDROGRAPH AT STA 1 FOR PLAN 1, RT10 1

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.	2.	4.	6.	8.	9.	11.	12.	13.
13.	14.	14.	15.	15.	15.	15.	15.	15.	16.
16.	16.	16.	16.	16.	16.	16.	16.	16.	16.
17.	22.	30.	43.	58.	74.	88.	100.	111.	121.
130.	139.	148.	157.	166.	175.	186.	213.	263.	323.
377.	407.	405.	378.	342.	312.	286.	263.	243.	226.
209.	192.	172.	149.	125.	102.	84.	68.	56.	47.
40.	37.	35.	33.	30.	28.	26.	25.	23.	22.
20.	19.	17.	16.	15.	14.	13.	12.	12.	11.
10.	10.	9.	9.	8.	8.	7.	7.	6.	6.
5.	5.	5.	4.	4.	4.	4.	3.	3.	3.
3.	2.	2.	2.	2.	2.	2.	2.	2.	1.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	407.	217.	66.	53.	7967.
CMS	12.	6.	2.	2.	226.
INCHES		3.81	4.66	4.66	4.66
MM		96.69	118.36	118.39	118.39
AC-FT		108.	132.	132.	132.
THOUS CU M		133.	162.	162.	162.

HYDROGRAPH AT STA 1 FOR PLAN 1, RT10 2

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.				0.	0.	0.	0.

0.	2.	4.	7.	10.	14.	16.	19.	21.	22.
23.	24.	25.	25.	26.	26.	27.	27.	27.	27.
27.	27.	27.	27.	28.	28.	28.	28.	28.	28.
30.	38.	53.	75.	102.	129.	153.	175.	195.	212.
228.	244.	259.	275.	291.	306.	326.	373.	459.	565.
659.	712.	709.	661.	599.	545.	500.	461.	426.	395.
366.	335.	300.	260.	219.	179.	146.	120.	99.	82.
70.	66.	61.	57.	53.	50.	46.	43.	40.	38.
35.	33.	31.	29.	27.	25.	23.	22.	20.	19.
18.	17.	16.	15.	14.	13.	12.	11.	11.	10.
9.	9.	8.	8.	7.	7.	6.	6.	5.	5.
5.	4.	4.	4.	4.	3.	3.	3.	3.	2.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	712.	380.	116.	93.	13942.
CMS	20.	11.	3.	3.	395.
INCHES		6.66	8.15	8.16	8.16
MM		169.21	207.12	207.19	207.19
AC-FT		188.	230.	230.	230.
THOUS CU M		232.	284.	284.	284.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 3

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.	2.	5.	10.	15.	19.	24.	27.	29.	31.
33.	34.	36.	36.	37.	38.	38.	38.	39.	39.
39.	39.	39.	39.	39.	39.	39.	39.	39.	39.
43.	54.	76.	108.	146.	184.	219.	250.	278.	303.
326.	348.	370.	393.	416.	438.	466.	533.	656.	808.
942.	1017.	1013.	944.	856.	779.	714.	658.	608.	564.
523.	479.	429.	372.	312.	256.	209.	171.	141.	117.
100.	94.	87.	82.	76.	71.	66.	62.	58.	54.
50.	47.	44.	41.	38.	35.	33.	31.	29.	27.
26.	25.	23.	22.	20.	19.	18.	16.	15.	14.
13.	12.	12.	11.	10.	9.	9.	8.	8.	7.
7.	6.	6.	5.	5.	5.	4.	4.	4.	4.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1017.	542.	166.	133.	19918.
CMS	29.	15.	5.	4.	564.
INCHES		9.52	11.65	11.65	11.65
MM		241.73	295.89	295.98	295.98
AC-FT		269.	329.	329.	329.
THOUS CU M		332.	406.	406.	406.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 4

1.	1.	1.	1.	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.	3.	7.	12.	19.	25.	31.	35.	38.	41.
43.	45.	46.	47.	48.	49.	49.	50.	50.	50.
51.	51.	51.	51.	51.	51.	51.	51.	51.	51.
55.	70.	99.	140.	189.	239.	285.	325.	361.	394.
424.	453.	481.	511.	540.	569.	606.	693.	853.	1050.
1224.	1323.	1317.	1[illegible].	[illegible].	[illegible].	529.	856.	791.	734.
680.	623.	557.	484.	406.	333.	271.	222.	183.	152.

130.	122.	114.	106.	99.	92.	86.	80.	75.	70.
65.	61.	57.	53.	49.	46.	43.	40.	37.	35.
34.	32.	30.	28.	26.	24.	23.	21.	20.	19.
17.	16.	15.	14.	13.	12.	11.	11.	10.	9.
9.	8.	8.	7.	7.	6.	6.	5.	5.	5.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1323.	705.	216.	173.	25893.
CMS	37.	20.	6.	5.	733.
INCHES		12.37	15.14	15.15	15.15
MM		314.25	384.66	384.78	384.78
AC-FT		350.	428.	428.	428.
THOUS CU M		431.	528.	528.	528.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 5

1.	1.	1.	1.	1.	1.	1.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1.	4.	8.	15.	23.	31.	38.	43.	47.	50.
53.	55.	57.	58.	59.	60.	61.	61.	62.	62.
62.	62.	63.	63.	63.	63.	63.	63.	63.	63.
68.	86.	121.	172.	233.	295.	350.	400.	445.	485.
522.	557.	593.	629.	665.	700.	745.	853.	1050.	1292.
1507.	1628.	1621.	1510.	1369.	1246.	1143.	1053.	973.	903.
837.	766.	686.	595.	500.	410.	334.	274.	225.	187.
161.	150.	140.	130.	122.	114.	106.	99.	92.	86.
80.	75.	70.	65.	61.	57.	53.	49.	46.	43.
41.	40.	37.	35.	32.	30.	28.	26.	24.	23.
21.	20.	19.	17.	16.	15.	14.	13.	12.	11.
11.	10.	9.	9.	8.	8.	7.	7.	6.	6.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1628.	868.	265.	212.	31868.
CMS	46.	25.	8.	6.	902.
INCHES		15.23	18.64	18.64	18.64
MM		386.77	473.42	473.57	473.57
AC-FT		430.	527.	527.	527.
THOUS CU M		531.	650.	650.	650.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 6

1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1.	5.	11.	19.	29.	39.	47.	54.	59.	63.
66.	69.	71.	73.	74.	75.	76.	77.	77.	78.
78.	78.	78.	78.	79.	79.	79.	79.	79.	79.
85.	108.	152.	216.	291.	368.	438.	500.	556.	606.
652.	696.	741.	786.	831.	875.	932.	1066.	1313.	1615.
1883.	2035.	2027.	1888.	1711.	1558.	1429.	1317.	1217.	1129.
1046.	958.	858.	744.	625.	512.	418.	342.	282.	234.
201.	187.	175.	163.	152.	142.	132.	124.	115.	108.
100.	94.	87.	82.	76.	71.	66.	62.	58.	54.
52.	50.	46.	43.	40.	38.	35.	33.	31.	29.
27.	25.	23.	22.	20.	19.	18.	16.	15.	14.
13.	12.	12.	11.	10.	9.	9.	8.	8.	7.

CFS	2035.	1084.	332.	266.	39835.
CMS	58.	31.	9.	8.	1128.
INCHES		19.03	23.30	23.31	23.31
MM		483.46	591.78	591.96	591.96
AC-FT		538.	658.	658.	658.
THOUS CU M		663.	812.	812.	812.

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HYDROGRAPH ROUTING

ROUTING OF INFLOW HYDROGRAPH

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

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAI
1	0	0	0.000	0.000	0.000	-1.	0

STORAGE	0.00	12.50	31.00	47.50	60.00	67.80	76.00	85.50	96.00
	126.00	128.00							
OUTFLOW	0.00	5.00	7.80	9.40	10.30	32.30	155.00	654.00	1657.00
	4962.00	5113.00							

STATION 2, PLAN 1, RTIO 1

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.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	3.	3.	3.	3.	4.	4.	5.	5.	5.
6.	6.	6.	7.	7.	8.	8.	8.	9.	9.
10.	10.	17.	41.	111.	166.	246.	263.	257.	244.
228.	211.	193.	173.	154.	145.	133.	121.	108.	96.
84.	74.	66.	59.	53.	48.	43.	39.	36.	33.
32.	31.	31.	30.	29.	29.	28.	27.	27.	26.
25.	25.	24.	23.	23.	22.	21.	21.	20.	19.
19.	18.	17.	17.	16.	16.	15.	15.	14.	14.
13.	13.	12.	12.	11.	11.	10.	10.	10.	10.

STOR

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.
2.	2.	2.	2.	2.	3.	3.	3.	3.	4.
4.	4.	4.	5.	5.	5.	5.	5.	6.	6.
6.	6.	7.	7.	8.	9.	10.	12.	14.	15.
17.	20.	22.	25.	28.	30.	32.	35.	39.	44.
50.	56.	62.	68.	73.	76.	78.	78.	78.	78.

77.	77.	77.	76.	76.	75.	75.	74.	73.	72.
71.	71.	70.	70.	69.	69.	69.	68.	68.	68.
68.	67.	67.	67.	67.	67.	66.	66.	66.	66.
65.	65.	65.	65.	64.	64.	64.	64.	63.	63.
63.	63.	63.	62.	62.	62.	62.	62.	61.	61.
61.	61.	61.	60.	60.	60.	60.	60.	60.	60.

STAGE

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	0.0	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	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	0.0	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
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	0.0	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	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

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	263.	117.	37.	29.	4391.
CMS	7.	3.	1.	1.	124.
INCHES		2.06	2.57	2.57	2.57
MM		52.20	65.17	65.25	65.25
AC-FT		58.	72.	73.	73.
THOUS CU M		72.	89.	90.	90.

MAXIMUM STORAGE = 78.

STATION 2, PLAN 1, RTIO 2

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.	1.	1.	1.	1.
1.	1.	1.	2.	2.	2.	2.	2.	2.	3.
3.	3.	3.	3.	3.	3.	4.	4.	4.	4.
4.	4.	5.	5.	5.	6.	6.	6.	7.	7.
8.	8.	9.	9.	9.	10.	10.	18.	49.	151.
424.	582.	663.	682.	642.	600.	553.	509.	469.	434.
402.	371.	339.	303.	265.	225.	187.	155.	145.	133.
120.	109.	99.	90.	82.	76.	69.	64.	59.	55.
51.	47.	44.	41.	38.	35.	33.	32.	31.	31.
30.	30.	29.	29.	28.	27.	27.	26.	25.	25.
24.	23.	23.	22.	21.	21.	20.	19.	19.	18.
17.	17.	16.	16.	15.	15.	14.	14.	13.	13.

STOR

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.

3.	3.	4.	4.	4.	5.	5.	6.	6.	6.
7.	7.	9.	8.	8.	9.	9.	10.	10.	10.
11.	11.	12.	13.	14.	16.	18.	21.	24.	27.
31.	34.	38.	43.	47.	52.	57.	63.	69.	76.
81.	84.	86.	86.	85.	84.	84.	83.	82.	81.
81.	80.	79.	79.	78.	77.	77.	76.	75.	75.
74.	73.	72.	72.	71.	71.	70.	70.	70.	69.
69.	69.	69.	68.	68.	68.	68.	68.	67.	67.
67.	67.	67.	66.	66.	66.	66.	66.	65.	65.
65.	65.	64.	64.	64.	64.	63.	63.	63.	63.
63.	62.	62.	62.	62.	62.	61.	61.	61.	61.

STAGE

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	0.0	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	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	0.0	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
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	0.0	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	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

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	682.	300.	86.	69.	10315.
CMS	19.	8.	2.	2.	292.
INCHES		5.26	6.03	6.03	6.03
MM		133.67	153.14	153.29	153.29
AC-FT		149.	170.	170.	170.
THOUS CU M		183.	210.	210.	210.

MAXIMUM STORAGE = 86.

STATION 2, PLAN 1, RIIO 3

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.	1.	1.	1.	1.	1.	1.	1.
2.	2.	2.	2.	2.	3.	3.	3.	3.	4.
4.	4.	4.	5.	5.	5.	5.	5.	5.	5.
5.	6.	6.	6.	6.	7.	7.	8.	8.	9.
9.	10.	10.	14.	32.	117.	252.	402.	519.	648.
[illegible]	964.	1009.	982.	909.	828.	756.	695.	645.	609.
570.	528.	483.	433.	378.	321.	268.	221.	181.	153.
143.	133.	124.	115.	107.	100.	93.	87.	81.	75.
70.	65.	61.	57.	53.	49.	46.	43.	40.	37.
35.	33.	32.	32.	31.	31.	30.	29.	29.	28.
27.	27.	26.	25.	25.	24.	23.	23.	22.	21.
21.	20.	19.	[illegible]	[illegible]	[illegible]	17.	16.	16.	15.

STOR

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.	3.
4.	4.	5.	6.	6.	7.	7.	8.	8.	9.
10.	10.	11.	11.	12.	12.	13.	14.	14.	15.
15.	16.	17.	18.	20.	23.	26.	30.	34.	39.
44.	49.	55.	61.	68.	73.	78.	81.	83.	85.
88.	89.	89.	89.	88.	87.	87.	86.	85.	85.
84.	83.	82.	81.	80.	79.	78.	77.	77.	76.
75.	75.	74.	73.	73.	72.	72.	71.	71.	71.
70.	70.	70.	69.	69.	69.	69.	69.	68.	68.
68.	68.	68.	68.	67.	67.	67.	67.	67.	66.
66.	66.	66.	65.	65.	65.	65.	64.	64.	64.
64.	63.	63.	63.	63.	63.	62.	62.	62.	62.

STAGE

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	0.0	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	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	0.0	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
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	0.0	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	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

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1009.	478.	135.	108.	16256.
CMS	29.	14.	4.	3.	460.
INCHES		8.38	9.50	9.51	9.51
MM		212.94	241.36	241.56	241.56
AC-FT		237.	268.	269.	269.
THOUS CU M		292.	331.	331.	331.

MAXIMUM STORAGE = 89.

STATION 2, PLAN 1, RTIO 4

OUTFLOW

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.	3.	3.	3.	3.	4.	4.	4.	5.
5.	5.	5.	5.	5.	6.	6.	6.	6.	6.
6.	6.	6.	7.	7.	8.	6.	9.	9.	10.
10.	23.	84.	210.	401.	494.	551.	610.	734.	926.
1112.	1254.	1312.	1277.	1182.	1076.	983.	903.	833.	771.
714.	659.	616.	[illegible]	[illegible]	[illegible]	348.	287.	236.	195.

89.	83.	78.	73.	68.	63.	59.	55.	52.	48.
45.	43.	40.	38.	35.	33.	32.	32.	31.	31.
30.	29.	29.	28.	27.	27.	26.	25.	25.	24.
23.	23.	22.	21.	21.	20.	19.	19.	18.	17.

STOR

2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	2.	2.	2.	2.	3.	3.	4.	4.
5.	6.	7.	7.	8.	9.	9.	10.	11.	12.
12.	13.	14.	15.	16.	16.	17.	18.	19.	19.
20.	21.	22.	24.	27.	30.	34.	39.	45.	51.
57.	64.	71.	77.	81.	82.	84.	85.	86.	88.
90.	92.	92.	92.	91.	90.	89.	88.	87.	87.
86.	86.	85.	84.	82.	81.	80.	79.	78.	77.
76.	76.	75.	75.	74.	74.	73.	73.	72.	72.
72.	71.	71.	70.	70.	70.	70.	69.	69.	69.
69.	68.	68.	68.	68.	68.	68.	68.	67.	67.
67.	67.	67.	66.	66.	66.	66.	65.	65.	65.
65.	64.	64.	64.	64.	63.	63.	63.	63.	63.

STAGE

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	0.0	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	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	0.0	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
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	0.0	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	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

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1312.	652.	185.	148.	22206.
CMS	37.	18.	5.	4.	629.
INCHES		11.45	12.98	12.99	12.99
MM		290.87	329.72	329.99	329.99
AC-FT		324.	367.	367.	367.
THOUS CU M		399.	452.	453.	453.

MAXIMUM STORAGE = 92.

STATION 2, PLAN 1, RTIO 5

OUTFLOW

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.	3.	3.	[illegible]	[illegible]	[illegible]	5.	5.	5.	5.
5.	6.	6.	6.	6.	6.	6.	6.	7.	7.

7.	7.	7.	8.	8.	8.	9.	9.	10.	18.
71.	209.	430.	540.	605.	652.	714.	789.	932.	1143.
1369.	1544.	1615.	1572.	1455.	1325.	1210.	1111.	1025.	948.
879.	811.	736.	653.	589.	508.	426.	352.	290.	239.
200.	173.	156.	151.	145.	139.	133.	126.	119.	113.
106.	100.	94.	88.	83.	77.	72.	68.	63.	59.
55.	52.	49.	46.	43.	41.	38.	36.	33.	32.
32.	31.	31.	30.	29.	29.	28.	27.	27.	26.
25.	25.	24.	23.	23.	22.	21.	21.	20.	19.

STOR

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.	4.	5.	5.
6.	7.	8.	9.	10.	11.	12.	13.	14.	14.
15.	16.	17.	18.	19.	20.	21.	22.	23.	24.
25.	26.	28.	30.	33.	37.	43.	49.	55.	63.
70.	77.	81.	83.	85.	85.	86.	87.	88.	91.
93.	95.	96.	95.	94.	93.	91.	90.	89.	89.
88.	87.	86.	85.	84.	83.	81.	80.	79.	78.
77.	76.	76.	76.	75.	75.	75.	74.	74.	73.
73.	72.	72.	72.	71.	71.	70.	70.	70.	70.
69.	69.	69.	69.	69.	68.	68.	68.	68.	68.
68.	67.	67.	67.	67.	67.	66.	66.	66.	66.
65.	65.	65.	65.	64.	64.	64.	64.	63.	63.

STAGE

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	0.0	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	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	0.0	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
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	0.0	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	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

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1615.	828.	235.	188.	28163.
CMS	46.	23.	7.	5.	798.
INCHES		14.54	16.46	16.48	16.48
MM		369.29	418.19	418.52	418.52
AC-FT		411.	465.	466.	466.
THOUS CU M		507.	574.	574.	574.

MAXIMUM STORAGE = 96.

STATION 2, PLAN 1, RTIO 6

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.
3.	4.	4.	4.	5.	5.	5.	5.	6.	6.
6.	6.	6.	7.	7.	7.	7.	7.	7.	8.
8.	8.	8.	8.	9.	9.	10.	13.	53.	194.
458.	589.	674.	753.	802.	847.	897.	987.	1165.	1429.
1718.	1955.	2029.	1959.	1802.	1639.	1510.	1389.	1281.	1186.
1099.	1013.	920.	815.	700.	606.	521.	435.	361.	298.
249.	216.	195.	179.	166.	155.	151.	146.	140.	134.
127.	121.	114.	107.	101.	95.	89.	84.	78.	73.
69.	65.	61.	58.	54.	51.	48.	45.	42.	39.
37.	34.	32.	32.	31.	31.	30.	30.	29.	28.
28.	27.	26.	26.	25.	24.	24.	23.	22.	21.

STOR

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.	4.	4.	5.	6.	7.
8.	9.	10.	11.	12.	13.	15.	16.	17.	18.
19.	20.	22.	23.	24.	25.	26.	28.	29.	30.
31.	33.	35.	38.	42.	47.	53.	61.	69.	77.
82.	84.	86.	87.	87.	88.	88.	89.	91.	94.
97.	99.	99.	99.	97.	96.	94.	93.	92.	91.
90.	89.	88.	87.	86.	85.	83.	81.	80.	79.
78.	77.	77.	76.	76.	76.	76.	75.	75.	75.
74.	74.	73.	73.	72.	72.	72.	71.	71.	71.
70.	70.	70.	69.	69.	69.	69.	69.	68.	68.
68.	68.	68.	68.	67.	67.	67.	67.	67.	66.
66.	66.	66.	65.	65.	65.	65.	64.	64.	64.

STAGE

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	0.0	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	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	0.0	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
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	0.0	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	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

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2029.	1059.	301.	241.	36115.
CMS	57.	30.	9.	7.	1023.
INCHES		18.60	21.11	21.13	21.13
MM		472.33	536.27	536.68	536.68
AC-FT		525.	596.	597.	597.
THOUS CU M		648.	736.	736.	736.

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE 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	RATIO 2	RATIO 3	RATIO 4	RATIO 5	RATIO 6
				0.20	0.35	0.50	0.65	0.80	1.00
HYDROGRAPH AT	1	0.53	1	407.	712.	1017.	1323.	1628.	2035.
	(	1.37)	(	11.52)(	20.16)(	28.81)(	37.45)(	46.09)(	57.61)(
ROUTED TO	2	0.53	1	263.	682.	1009.	1312.	1615.	2029.
	(	1.37)	(	7.46)(	19.33)(	28.58)(	37.16)(	45.73)(	57.47)(

APPENDIX D

OPERATION & MAINTENANCE
INSPECTION REPORT

NY-AS-17
4-28-71
(File Code AS-12-5)

U. S. Department of Agriculture
Soil Conservation Service

OPERATION AND MAINTENANCE INSPECTION REPORT FOR STRUCTURES

Watershed Conewango Inspection: ☐ Special ☒ Annual Date: Sept. 21, 1972

Site No. 23

Name of Sponsoring Local Organization(s) having Operation and Maintenance Responsibility: Conewango Watershed Commission

Structure operation satisfactory: X Unsatisfactory: _____

Item	Condition: Satisfactory	Condition: Unsatisfactory	Describe maintenance and needed repairs	Estimated Costs	Agreed date repairs to be compld.
1 Vegetation	X				
2 Principal Spillway	X				
3 Fences	X				
4 Emergency Spillway	X				
5 Embankment	X				
6 Reservoir Area	X				
7 Outlet Channel	X				
8 Other					

Remarks: Hand work involving replacing of rocks under toe drain outlet don during inspection.

Richard L. Shields Contracting Officer

SCS Representative — Sponsoring Local Organization Rep

Distribution: Orig. - Sponsor with O&M responsibility
3 - SCS District Conservationist (1 forwarded to State Office, 1 forwarded to Area Conservationist)
1 - Each of other sponsors of watershed project
1 - N. Y. Department of Environmental Conservation

Report due - 10 days after inspection

(Check list on reverse side)

NY-AS-17
4-28-71
(File Code AS-12-5)

U. S. Department of Agriculture
Soil Conservation Service

OPERATION AND MAINTENANCE INSPECTION REPORT FOR STRUCTURES

Watershed Conewango Inspection: ☐ Special ☒ Annual Date: July 10, 1978

Site No. 33

Name of Sponsoring Local Organization(s) having Operation and Maintenance Responsibility: Conewango Watershed Commission

Structure operation satisfactory: X Unsatisfactory: ____

Item	Condition: Satisfactory	Condition: Unsatisfactory	Describe maintenance and needed repairs	Estimated Costs	Agreed date repairs to be compld.
1 Vegetation	X				
2 Principal Spillway	X				
3 Fences	X				
4 Emergency Spillway	X				
5 Embankment	X				
6 Reservoir Area	X				
7 Outlet Channel	X				
8 Other					

Remarks: Remove 3 or 4 broken limbs and tree trunks from the pool area.

Toe drains need rocks under them for support at the outlet ends.

Lawrence E. Hoover
SCS Representative

Richard L. Shields
Sponsoring Local Organization Rep.

Distribution: Orig. - Sponsor with O&M responsibility
3 - SCS District Conservationist (1 forwarded to State Office, 1 forwarded to Area Conservationist)
1 - Each of other sponsors of watershed project
1 - N. Y. Department of Environmental Conservation

Report due - 10 days after inspection

(Check list on reverse side)

The below collected by Jesse [illegible] on 7-1-77 & sent to me - received 7-5-77 - sent on to Dale Clark on 7-5-77 J.D.

Site 6

Internal drains broken on ends.

Remove debris upstr. dam.

Site 19

Gullying along downstr. left abutment

Site 1

Dead tree to be removed on upstr. side of dam

Site 3

Remove log upstr. of dam.

Cut internal drain exit pipe back and replace small animal guard (The pipe is broken)

Site 33

9A. fasten low stage trash rack.

NY-AS-17
4-28-71
(File Code AS-12-5)

U. S. Department of Agriculture
Soil Conservation Service

OPERATION AND MAINTENANCE INSPECTION REPORT FOR STRUCTURES

Watershed Conewango Inspection: ☐ Special ☒ Annual Date: May 3, 1976

Site No. 33

Name of Sponsoring Local Organization(s) having Operation and Maintenance Responsibility: Conewango Watershed Commission

Structure operation satisfactory: x Unsatisfactory: ____

Item	Condition: Satisfactory	Condition: Unsatisfactory	Describe maintenance and needed repairs	Estimated Costs	Agreed date repairs to be compld.
1 Vegetation	x				
2 Principal Spillway	x				
3 Fences		x			
4 Emergency Spillway	x				
5 Embankment	x				
6 Reservoir Area	x				
7 Outlet Channel	x				
8 Other	--				

Remarks: Removal of debris from high water needed. Three rills to be filled with stone picked from the site. Serious consideration should be given to establishing a fence parallel to pickup Hill Road to eliminate damage from vehicles which are now running over the site.

[signature] SCS Representative

[signature] Contracting Officer
Sponsoring Local Organization Rep.

Distribution: Orig. - Sponsor with O&M responsibility
3 - SCS District Conservationist (1 forwarded to State Office, 1 forwarded to Area Conservationist)
1 - Each of other sponsors of watershed project
1 - N. Y. Department of Environmental Conservation

Report due - 10 days after inspection

(Check list on reverse side)

APPENDIX E

DESIGN FOLDER

CONEWANGO CREEK

WATERSHED PROTECTION PROJECT

DESIGN REPORT

SITE 33

NY-2173

CHAUTAUQUA COUNTY, NEW YORK
US DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

FEBRUARY 1971

DESIGN SECTION, SYRACUSE, N.Y.

This is a two stage, single purpose flood control structure located in Chautauqua County, New York. approximately 1-1/4 miles southwest of Cherry Creek. Sheet 4 of this report, together with the Cherry Creek quadrangle published by the U. S. Geological Survey, may be used to locate the structure.

A summary of pertinent information is given on Sheet 3 of this report.

Criteria and procedures used in this design are given in Soil Conservation Service publications.

This is one of 20 proposed floodwater retarding dams in the Conewango Creek Watershed designed to reduce floodwater damage. It will retard a 100 year frequency storm without discharge occurring in the emergency spillway.

The structure consists of a zoned compacted earth fill of glacial till, alluvial gravel and clay. The foundation is underlain with weathered bedrock covered with alluvial gravel and glacial tills. Bed rock was encountered in right abutment, and at a lower level in the left abutment.

A drainage system is located under the downstream portion of the earth fill to control the phreatic surface and to provide a safe outlet for foundation seepage. A cutoff trench is located at the dam centerline to reduce seepage.

The principal spillway is a drop inlet structure consisting of a two stage reinforced concrete riser, 30" diameter concrete water pipe and an excavated outlet channel.

A vegetated earth excavated spillway is located on the left abutment.

U.S DEPARTMENT OF AGRICULTURE - SOIL CONSERVATION SERVICE

ELEMENT OF STRUCTURE	DETERMINING FACTOR	ELEV.	SURFACE AREA ACRES	STORAGE		INFLOW		PEAK OUTFLOW CFS
				AC. FT.	INCHES	VOLUME * INCHES	RATE CFS	
Invert of Orifice	50-year submerged sediment accumulation	1483.7	0.7	3.3 1/	0.13 1/	---	---	---
Crest of Riser	2.28"of storage 3/	1509.1	4.4	56.9 2/	2.28 2/	---	---	---
Crest of Emer. Spill.	Elev. necessary to prime prin spill controlled. 4/	1511.6	4.9	68.4 2/	2.74 2/	---	---	154
Design High Water	ES-1020 Sh. 4 of 5 **	1513.8	5.4	79.8 2/	3.19 2/	6.10	1145	351
Top of Dam	ES-1020 Sh. 5 of 5 **	1519.9	7.9	120.8 2/	4.83 2/	21.04	3841	3675

* Volume expressed in inches of runoff from controlled watershed area of 300 Ac.
** Refer to hydrologic criteria in National Engineering Memo #27

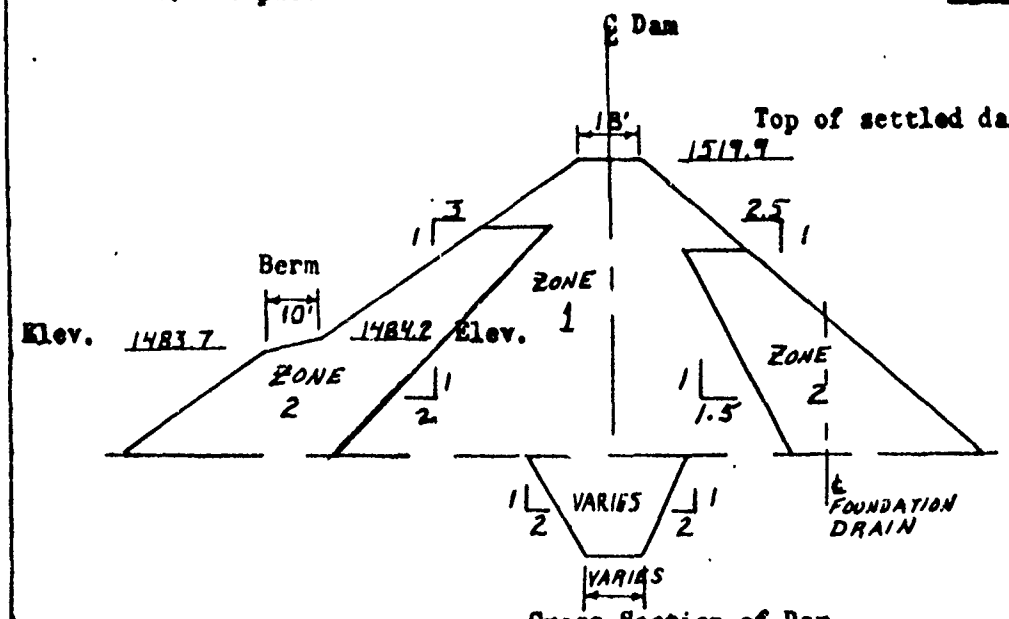
1/ Does not include 6.3 Ac. Ft. of sediment allocated to flood pool.
2/ Does not include 9.6 Ac. Ft. of sediment.
3/ Established in planning phase to provide desired level of protection.
4/ Flow does not reach E_e during the routing of the principal spillway hydrograph.

--DESIGN SECTION, SYRACUSE NY

U. S. DEPARTMENT OF AGRICULTURE — SOIL CONSERVATION SERVICE

DESIGN REPORT SUMMARY

I.	**Watershed data**	
	A. Structure class	C
	B. Drainage area	300 Ac.
	C. Time of concentration - T_c	0.53 Hrs.
	D. Hydrologic curve number - C_n Moisture Condition II	77
II.	**Principal spillway**	
	A. Conduit	
	1. Size (I.D.)	30 In.
	2. Length	220 Ft.
	B. Riser	
	1. Size	2.5 x 7.5 Ft.
	2. Height (floor to crest)	15 Ft.
	C. Weir length	15 Ft.
	D. Reservoir drain size	10 In.
	E. Type of energy dissipator	PLUNGE POOL
III.	**Emergency spillway**	
	A. Width	50 Ft.
	B. Side slopes	3:1
	C. Length of level section	50 Ft.
	D. Exit slope	0.03 Ft./Ft.
	E. Maximum velocity - in exit section (ESH)	6.6 Ft./Sec.
	F. Duration of flow (ESH) through emergency spillway	3.53 Hrs.
	G. Frequency of use	< 1%
IV.	**Earth fill**	
	A. Height	57 Ft.
	B. Volume	C.Y.
	C. Compaction	Class A & C



Cross Section of Dam

RENWOOD CREEK SITE 33

By	Date	Checked By	Date	Job No
C.S.K.	1-16-69	JJC	2-9-70	NY-2173-D

Subject: WORK PLAN – DESIGN COMPARISON — Sheet of

ITEM	UNIT	WORK PLAN	DESIGN	COMMENTS
DRAINAGE AREA	SQ. MI.	.47	.47	
STORAGE CAPACITY				
SEDIMENT (INC AERATED)	AC. FT.	15	9.6	
BENEFIGIAL	AC. FT	0	0	
RETARDING	AC FT.	78	68.4	
TOTAL	AC FT.	93	73.0	
BETWEEN HIGH & LOW S.	AC. FT.	25	55.9	EXCLUDING AERATED SEDIMENT
SURFACE AREA				
NORMAL POOL	ACRE	1	0.7	
RETARDING POOL	ACRE	5	4.92	
DESIGN HIGH WATER	ACRE	—	5.44	
VOLUME OF FILL	CU. YD.	47924	54,100	
TOP OF DAM ELEV	FEET	1520.0	1519.9	
MAX HEIGHT OF DAM	FEET	60	56.9	
EMERGENCY SPILLWAY				
CREST ELEVATION	FEET	1514.5	1511.6	EM SPWY CREST SET HIGH TO PRIME PRIN. SPWY.
BOTTOM WIDTH	FEET	200	50	
TYPE	—	VEG	VEG	
PERCENT CHANCE OF USE	—	1	<1	
AVE. CURVE NO COND. II	—	77	77	
EM. SP. HYDROGRAPH				
STORM RAINFALL – 6 HR.	IN.	15.70	8.9	
STORM RUNOFF	IN.	12.61	6.10	
VELOCITY OF FLOW–V	FPS	7.00	6.6	
PEAK DISCHARGE RATE	CFS	2320	351	
MAX. WATER SURFACE EL.	FEET	1517.4	1513.8	
FREEBOARD HYDROGRAPH				
STORM RAINFALL – 6 HR.	IN.	24.30	24.30	
STORM RUNOFF	IN.	21.04	21.04	
VELOCITY OF FLOW–V	FPS	8.5	—	
PEAK DISCHARGE RATE	CFS	3785	3731	
MAX. WATER SURFACE EL.	FEET	1518.4	1519.9	
PRINCIPAL SPILLWAY				
RISER SIZE	FT.	—	2.5 X 7.5	
MAX. LOW STAGE FLOW	CFS	10.4	9.0	LOW STAGE FLOW RE-SET AT 9.0 CFS BY PLANNING PARTY – NO RESTRICTION SET FOR HIGH STAGE FLOW
ORIFICE SIZE	FT.	—	0.5 X 0.75	
MAX. HIGH STAGE FLOW	CFS	21.2	154	
PIPE SIZE	DIA.	—	30"	
CAPACITY EQUIVALENTS				
TOTAL SEDIMENT VOL.	IN.	0.60	0.38	
RETARDING STORAGE	IN.	3.20	2.74	
EM. SPILLWAY STORAGE TO TOP OF DAM	IN.	1.32	2.10	
CLASS OF STRUCTURE	—	C	C	
CONSTRUCTION COSTS				

CONEWANGO CREEK WATERSHED
SITE 33 NY-2173-D

DESIGN CRITERIA

1. Structure Classification: Class c

2. Purpose: Single Purpose flood retarding structure.

3. Principal Spillway:
   a. Riser:
      (1) Two stage with crest of orifice set at the 50 yr. submerged sediment pool elevation.
      (2) Crest of riser is set by routing the 100 yr. evaluation storm thru low stage orifice.

   b. Release Rates:
      Capacity 1st stage - max. release rate 20. cfs.

      Capacity 2nd stage - max release rate

4. Hydrographs:
   a. Principal Spillway Hydrographs -
      Use the 100 yr. frequency rainfall.

   b. Emergency Spillway and Freeboard Hydrographs:
      Use the point rainfall from rainfall map (ES-1020) for Class c structures.

5. Top of Dam Elevation:
   Determined by the most severe of the following conditions: (1) the passage of the freeboard hydrograph, (2) the passage of the emergency spillway hydrograph, plus the necessary freeboard required for frost conditions, (3) the passage of the emergency spillway hydrograph, plus the necessary freeboard required for wave action, or (4) the elevation of the emergency spillway crest plus 3 feet.

CONEWANGO CREEK WATERSHED
SITE 33 NY-2173-D

DESIGN CRITERIA

6. Emergency Spillway:
   a. Length of level section: 50 ft.
   b. Inlet channel: S = 0.020
   c. Side slopes: 3:1

7. Earth Fill:
   a. Top Width: Determine by $W = \frac{H+35}{5}$
   b. Side Slopes: Upstream 3:1; Downstream $2\frac{1}{2}$:1
      (Pending Soils Lab recommendation)
   c. Berm: 10 ft.width set at orifice

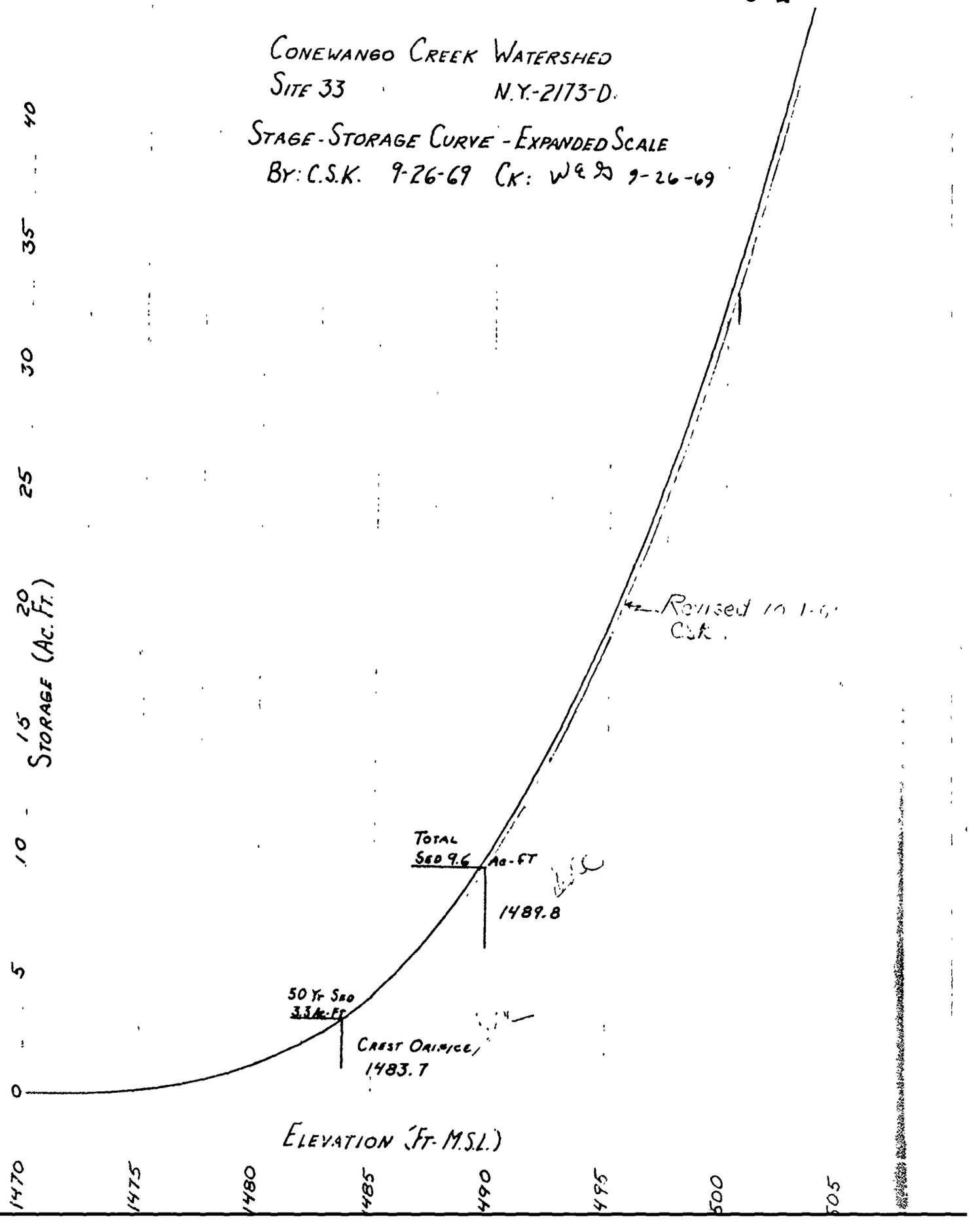
By: CSK 1-27-70
Ck: ~~DGC~~ DGC 2-2-70

CONEWANGO CREEK WATERSHED
SITE 33 NY-2173-D

DESIGN DATA

Item	Unit	Quantity
Site Location: Latitude 42°17'10" Longitude 79°06'51"		
Drainage Area:	Sq.Mi.	0.47
	Acres	300
Class of structure:		c
Principal Spillway:		
Pipe Size (inside diameter)	Inches	30
Riser Size	Ft.	2.5x7.5
Pipe Length (approx.)	Ft.	222
Orifice Invert Elev.	Ft.	1483.7
Orifice Size	Ft.	.5x.75
Riser Crest Elev.	Ft.	1509.1
Pipe Outlet Invert Elev.	Ft.	~~1459.4~~ 1457.7
Emergency Spillway:		
Bottom Width	Ft.	50
Level Section Length	Ft.	50
Entrance Length (approx.)	Ft.	200
Entrance Slope	Percent	2
Chance of Use	Percent	1 -
Roughness Coefficient (Manning)	---	.040
Crest Elev.	Ft.	1511.6
Exit Slope	Percent	3
Storages:		
Low Stage (V_{sl})	In.	.13
Retarding (Min. V_{sp})	In.	2.48
Releases:		
Peak Low Stage (Q_{ol})	c.f.s.	8.5
Peak High Stage (Q_{fh})	c.f.s.	153.7
Emergency Spillway Hydrograph (E_w)	Elev.	1513.8
Freeboard Hydrograph (E_w)	Elev.	1519.9
Top of Dam	Elev.	1519.9

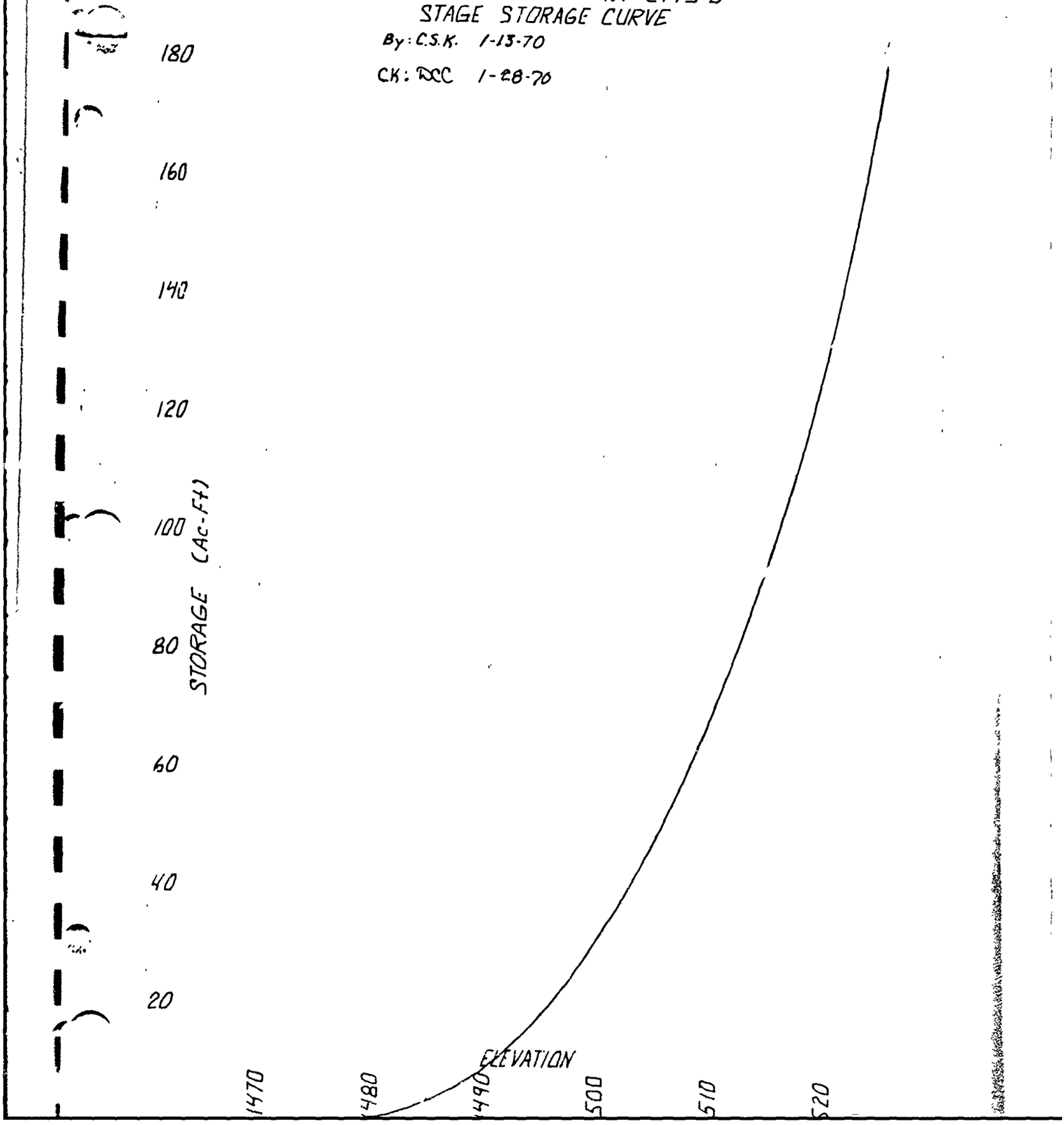
CONEWANGO CREEK WATERSHED
SITE 33 N.Y.-2173-D.
STAGE-STORAGE CURVE - EXPANDED SCALE
BY: C.S.K. 9-26-69 CK: WED 9-26-69



CONEWANGO CREEK WATERSHED
SITE 33 NY-2173-D
STAGE STORAGE CURVE

By: C.S.K. 1-13-70

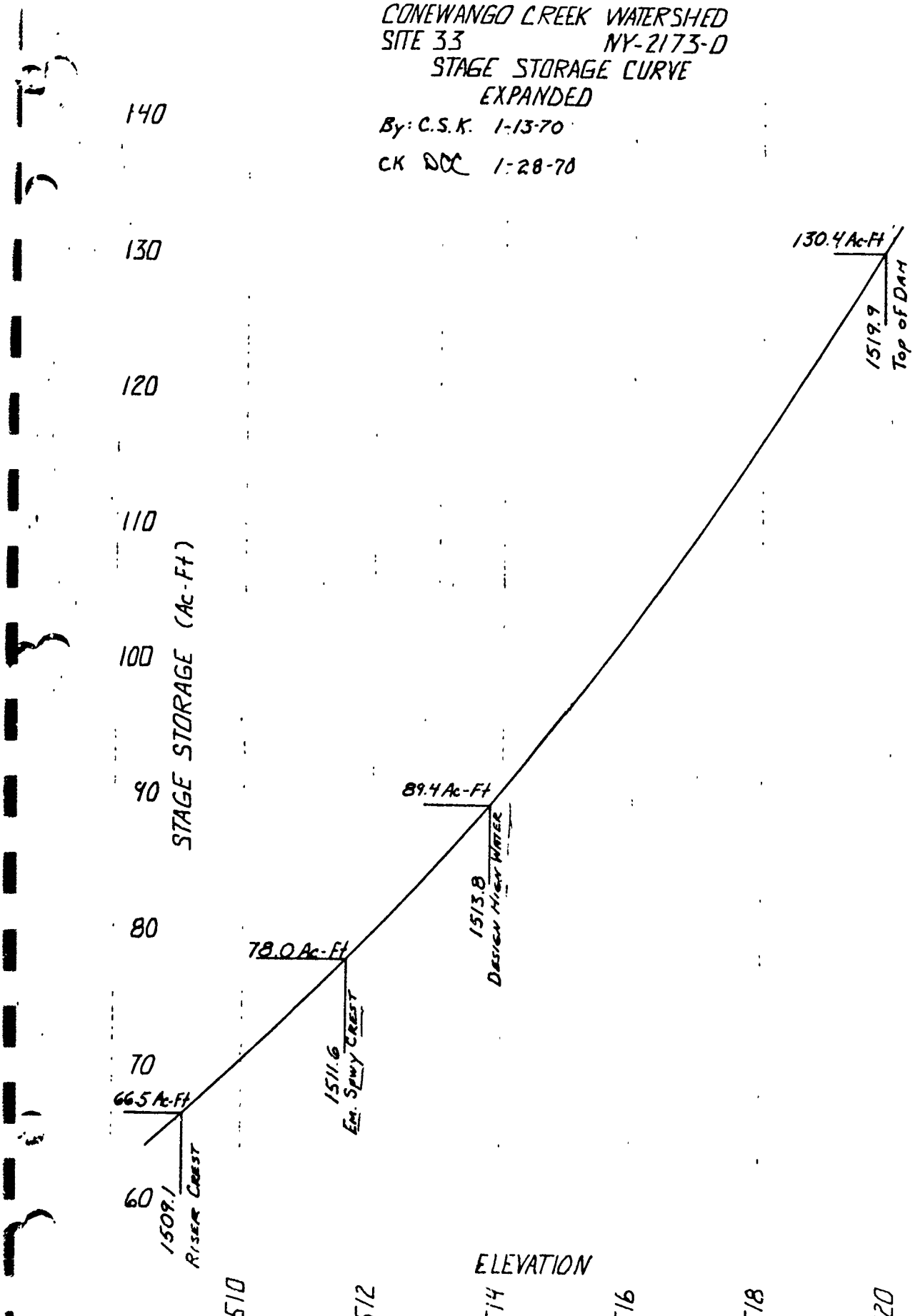
CK: DCC 1-28-70



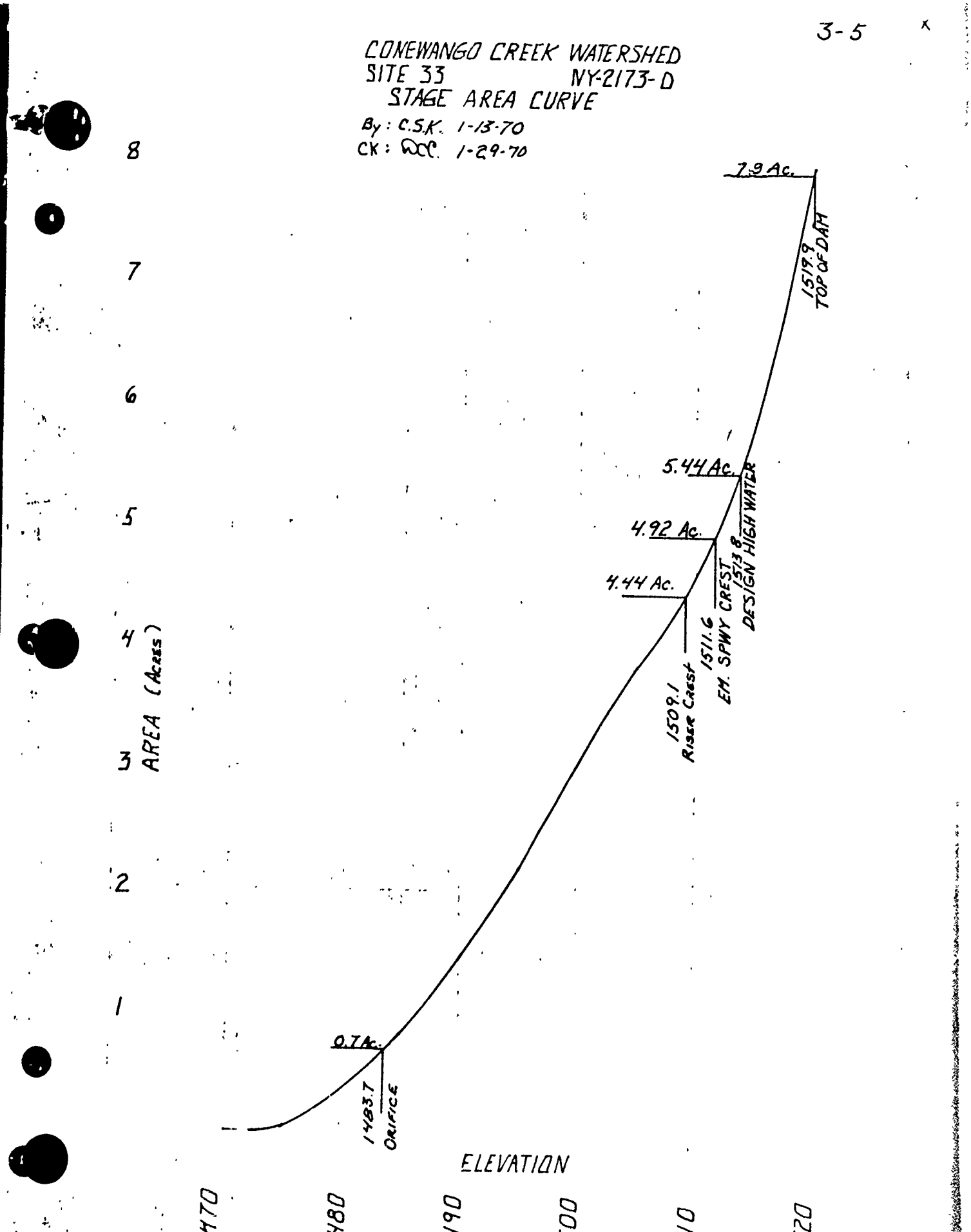
CONEWANGO CREEK WATERSHED
SITE 33 NY-2173-D
STAGE STORAGE CURVE
EXPANDED

By: C.S.K. 1-13-70

CK DOC 1-28-70



CONEWANGO CREEK WATERSHED
SITE 33 NY-2173-D
STAGE AREA CURVE
By: C.S.K. 1-13-70
CK: DCC. 1-29-70



GEOLOGY REPORT

JAN. 1959

SITE #33
CONEWANGO WATERSHED
CHAUTAUQUA COUNTY S&WCD
NEW YORK

APPROVAL:

Richard L. Phillips
State Conservation Engineer
Acting

PREPARED BY:

D. Bruce Champeon
Geologist

REVIEWED BY:

B. S. Ellis

Bernard S. Ellis
Senior Staff Geologist

REFERENCE:	U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	DRAWING NO. NY-2173 SHEET 1 OF ____

Sheet ___ of ___

SOIL CONSERVATION SERVICE

10-69

DETAILED GEOLOGIC INVESTIGATION OF DAM SITES

GENERAL

Cherry Creek 7½ min. quadrangle

State New York County Chautauqua ; ___ ¼, ___ ¼, Sec. ___, T ___ R ___ ; Watershed Conewango Creek

Subwatershed Cherry Creek Fund class WP-08-2 (FP-2, WP-1, etc.) Site number 33 Site group 1 Structure class c

Investigated by Bruce Champeon, Geol. (signature and title), Equipment used See general information (Type, size, make, model, etc.), Date 11/17-12/18/69

SITE DATA

Drainage area size .47 sq. mi, 300 acres. Type of structure Earth Fill Dam Purpose Floodwater retarding

Direction of valley trend (downstream) north Maximum height of fill 57 feet. Length of fill 320 feet.

Estimated volume of compacted fill required 41,700 yards; excavation from spillway, 17,050 c.y.

STORAGE ALLOCATION

		Volume (ac. ft.)	Surface Area (acres)	Depth at Dam (feet)
50-yr	Sediment	3.3	0.7	15.7
	Floodwater	89.4	5.44	45.8

SURFACE GEOLOGY AND PHYSIOGRAPHY

Physiographic description Allegany Plateau Topography rolling Attitude of beds: Dip essentially horizontal 1% SW Strike NW

Steepness of abutments: Left 30-68 percent; Right 47-190 percent. Width of floodplain at centerline of dam 65 feet

General geology of site: The site is located on an unnamed tributary of Cherry Creek approximately 4,900 feet southwest of the center of the village of Cherry Creek. The stream is approximately 330 feet east of Pickup Hill Road.

Bedrock is the Northeast shale, a medium gray shale with some interbedded medium gray siltstone, and is of upper Upper Devonian age.

During the last glaciation (Wisconsin) the small stream-cut valley was slightly widened and deepened by ice. As the ice sheet waned, valley-flanking kame terrace deposits of the Findley recessional moraine formed between the valley walls and the glacier in the large Conewango valley. Later, the remaining ice of the highlands stagnated leaving the major part of the region mantled with the Kent ground moraine deposits.

Site 33 is wholly within the area of Kent ground moraine, but is less than 1000' from the area mapped as kame terrace deposits.

The materials at the site seem to belong to both areas and may represent a transitional zone between the two, or more likely they represent minor fluctuations of the generally stationary margin of the ice sheet.

Modern alluvial gravel is found in the flood plain.

The supplemental borrow area east of Pickup Hill Road contains SM and ML glacial tills, GM glacial outwash gravel and some ML glacio-lacustrine sediments. Topsoil covers the area to about an average depth of one foot. The upper part of the left abutment where it is less steep has topsoil over glacial till and glacio-lacustrine CL-ML's and ML's. The steeper part of the left abutment as you approach the stream has a few feet of glacial till over very highly weathered bedrock. The steepest portion has no till, just badly weathered bedrock over fairly sound shales and siltstones. Topsoil is continuous over this whole abutment.

The flood plain is thinly mantled with topsoil over 4-6 feet of dirty alluvial gravel in the GM-GP-GW range. This gravel covers 4-5 feet of either gray or brown often silty till. Bedrock is at approximately a 10 foot depth underneath the flood plain.

Topsoil covers the entire right abutment except for the extremely steep 190% slope adjacent to the stream. Bedrock on the right abutment is very highly weathered to a depth of from 1-6 feet. Beyond that it is fairly sound. The upper part of the right abutment has 6-10 feet of glacial till over bedrock.

The right emergency spillway area contains an assortment of glacial tills, glacial outwash sands and gravels, and glacio-lacustrine CL-ML's and ML's. Bedrock in the emergency spillway is found at depths of 4-20 feet.

GENERAL INFORMATION

Backhoe work began November 17, 1969 and was finished on November 20, 1969. Twenty pits were dug with a Schield-Bantam, crawler-type, cable operated backhoe with a maximum digging depth of approximately twenty feet. Large bag samples were collected and processed in the soils laboratory in the Syracuse State Office; also several were shipped to the SML in Lincoln for further testing.

Drilling work began December 5, 1969 and was finished December 18, 1969. Holes were drilled with one trailer-mounted Acker Hillbilly rotary drill rig and one truck-mounted Acker power auger. A small John Deere bulldozer was used for mobilization between holes. Samples were obtained with a 2" O.D. split spoon sampler in conjunction with standard penetration tests, mostly of a 2' drive. Holes were advanced with casing and roller bits. Recovery was logged and stored in sealed wide-mouthed Mason jars. Bedrock was cored with an NX double-tube core barrel with diamond bit. The core was logged and stored in standard NX wooden core boxes. Water pressure tests were donducted in three holes along the centerline of dam.

Because the hazard classification was changed from class "b" to class "c" and bedrock was quite shallow in the emergency spillway, it was decided to investigate a supplemental borrow area on the left hand side of the dam between the dam and the road. Five additional pits were dug on December 17 with a rubber-tired John Deere backhoe and loader. These pits were also sampled and the materials processed in the soils lab in Syracuse.

BRIEF MATERIAL DESCRIPTIONS

CONEWANGO 33

[A] Glacial outwash and stream channel gravel, found in the borrow area, emergency spillway, and flood plain. 50-70% gravel, 10-20% slightly-moderately plastic fines. Not highly permeable. GP-GM-GW

[B] Road fill gravel, much like A, but with many roots, logs and much brush. GM

[C] Glacial outwash sand found only in one drill hole in the emergency spillway (DH 254) SM

[D] Mostly brown glacial till (sand and silt) found in the borrow area, top of both abutments, emergency spillway, and above rock in the flood plain. Ranges from SC-SM to CL-ML.

[E] Grayish glacial till, more clayey than D, and found only in the flood plain.

[F] Highly weathered bedrock found mostly on the steep abutment slopes. Ranges from SC-SM to CL-ML, rips easily.

[G] Glacio-lacustrine CL-ML found in the upper part of the left abutment and in the emergency spillway.

[H] Weathered glacial till found beneath topsoil in borrow area, upper part of both abutments, and the emergency spillway. Non-plastic ML.

[I] Glacio-lacustrine ML found in the borrow area, upper part of the left abutment, and the emergency spillway. Non-plastic.

[J] Topsoil covering the area except for the steepest part of the right abutment.

[K] Thinly bedded shale and limestone bedrock found everywhere but the borrow area. Usually weathered in the top few feet. Hopefully rippable in most cases.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

FORM SCS-376B
REV 2-64
SHEET ____ OF ____

DETAILED GEOLOGIC INVESTIGATION OF DAM SITES

FEATURE Centerline of Dam

(CENTERLINE OF DAM, PRINCIPAL SPILLWAY, EMERGENCY SPILLWAY, THE STREAM CHANNEL, INVESTIGATIONS FOR DRAINAGE OF STRUCTURE, BORROW AREA, RESERVOIR BASIN, ETC.)

DRILLING PROGRAM

EQUIPMENT USED	NUMBER OF HOLES		NUMBER OF SAMPLES TAKEN		
			UNDISTURBED	DISTURBED	
	EXPLORATION	SAMPLING	(STATE TYPE)	LARGE	SMALL
Backhoe	4	2	0	3 bag	0
Drill Rig	3	3	3 NX Core	0	16 jar
TOTAL	7	5	3 NX Core	3 bag	16 jar

SUMMARY OF FINDINGS
(INCLUDE ONLY FACTUAL DATA)

Topsoil averages about 0.8' under the embankment except the very steep 190% slope on the right abutment. Subsoil (weathered till H, ML) underlies topsoil on the upper slopes with brown till D, CL-ML to GC-GM, under subsoil. Some areas of glacio-lacustrine silts and clays and outwash sands and gravels are found high upon the abutments.

On the steeper slopes weathered bedrock F, (CL-ML) covers shale and siltstone bedrock.

In the floodplain alluvial and road-fill gravels cover gray and brown tills which rest on bedrock. Logs and brush are found along the bottom of the road fill which is found between the stream and the right abutment.

The steep slopes weep water nearly everywhere. In the flood plain water levels are at 1463 ± 0.5' in all holes along the centerline.

Bedrock recovery was acceptable in most cases, however, the RQD was low.

No areas of critically low blow counts occur anywhere below the first couple of feet.

Permeability is highest in the alluvial gravel but is not excessive.

Pressure tests were run in three holes. Results are tabulated in the summary sheet near the end of the narrative section of the report.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

FORM SCS-376B
REV. 2-64
SHEET ____ OF ____

DETAILED GEOLOGIC INVESTIGATION OF DAM SITES

FEATURE Drain Line

(CENTERLINE OF DAM, PRINCIPAL SPILLWAY, EMERGENCY SPILLWAY, THE STREAM CHANNEL, INVESTIGATIONS FOR DRAINAGE OF STRUCTURE, BORROW AREA, RESERVOIR BASIN, ETC.)

DRILLING PROGRAM

EQUIPMENT USED	NUMBER OF HOLES		NUMBER OF SAMPLES TAKEN		
			UNDISTURBED	DISTURBED	
	EXPLORATION	SAMPLING	(STATE TYPE)	LARGE	SMALL
Backhoe	3	2	0	2 bag	0
TOTAL	3	2	0	2 bag	0

SUMMARY OF FINDINGS
(INCLUDE ONLY FACTUAL DATA)

The drain line profile is essentially the same as the centerline of dam file except that the till D is found on the right side only and does not occur under the whole flood plain.

Seepage occurs all along the steep banks. Water levels were 1460.8 in TP 502 and 1459.0 in TP 303.

Bedrock was at 1356 ± 0.5' in the two holes near the stream, and is slightly shallower than at the centerline.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

FORM SCS-376B
REV. 2-64
SHEET ____ OF ____

DETAILED GEOLOGIC INVESTIGATION OF DAM SITES

FEATURE Principal Spillway and Outlet Channel

(CENTERLINE OF DAM, PRINCIPAL SPILLWAY, EMERGENCY SPILLWAY, THE STREAM CHANNEL, INVESTIGATIONS FOR DRAINAGE OF STRUCTURE, BORROW AREA, RESERVOIR BASIN, ETC.)

DRILLING PROGRAM

EQUIPMENT USED	NUMBER OF HOLES		NUMBER OF SAMPLES TAKEN		
			UNDISTURBED	DISTURBED	
	EXPLORATION	SAMPLING	(STATE TYPE)	LARGE	SMALL
Backhoe	4	0	0	0	0
Drill Rig	3	3	3 NX Core	0	18 jar
TOTAL	7	3	3 NX Core	0	18 jar

SUMMARY OF FINDINGS
(INCLUDE ONLY FACTUAL DATA)

Topsoil is from 0.4-0.8' thick in all holes.

The general sequence of materials is a road fill gravel (B), GM, over alluvial gravel (A), GM-GW, which covers either gray or brown till (E or D) CL-ML, resting on bedrock (K).

The road fill has logs and brush near the bottom and the alluvial gravel is the most permeable material, but not excessively so.

Bedrock hovers around 1456' in the upper 2/3 of the spillway and drops to around 1450' in the lower 1/3.

Water levels are apparently controlled by the creek in most cases.

Blow counts range from 13-140, but most are from 20-55.

DH 352 was pressure tested and the results tabulated in the summary sheet near the end of the narrative.

Bedrock recovery was good, but the RQD was low.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

FORM SCS-376B
REV 2-64
SHEET ____ OF ____

DETAILED GEOLOGIC INVESTIGATION OF DAM SITES

FEATURE Emergency Spillway

(CENTERLINE OF DAM, PRINCIPAL SPILLWAY, EMERGENCY SPILLWAY, THE STREAM CHANNEL, INVESTIGATIONS FOR DRAINAGE OF STRUCTURE, BORROW AREA, RESERVOIR BASIN, ETC.)

DRILLING PROGRAM

EQUIPMENT USED	NUMBER OF HOLES		NUMBER OF SAMPLES TAKEN		
			UNDISTURBED	DISTURBED	
	EXPLORATION	SAMPLING	(STATE TYPE)	LARGE	SMALL
Backhoe	8	3	0	6 bag	0
Drill Rig	4	4	4 NX Core	0	20 jar
TOTAL	12	7	4 NX Core	6 bag	20 jar

SUMMARY OF FINDINGS
(INCLUDE ONLY FACTUAL DATA)

Topsoil covers the spillway area to about 0.6' in depth. Beneath this is from of subsoil, weathered till H (ML).

Glacial till D and outwash gravel A make up most of the remaining material. However, smaller areas of glacio-lacustrine silts and clays occur also, the most noticeable being an apparently continuous layer of I, (ML) along the outer profile.

Bedrock elevations are fairly consistent except near the steeper slopes.

Blow counts range from 12-40, discounting those near bedrock and near the surface.

Water is usually absent, except for a couple of minor seeps.

No pressure tests were run in the spillway holes.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

FORM SCS-376B
REV. 2-64
SHEET ____ OF ____

DETAILED GEOLOGIC INVESTIGATION OF DAM SITES

FEATURE Borrow Area

(CENTERLINE OF DAM, PRINCIPAL SPILLWAY, EMERGENCY SPILLWAY, THE STREAM CHANNEL, INVESTIGATIONS FOR DRAINAGE OF STRUCTURE, BORROW AREA, RESERVOIR BASIN, ETC.)

DRILLING PROGRAM

EQUIPMENT USED	NUMBER OF HOLES		NUMBER OF SAMPLES TAKEN		
			UNDISTURBED	DISTURBED	
	EXPLORATION	SAMPLING	(STATE TYPE)	LARGE	SMALL
Backhoe	5	4	0	4 bag	0
TOTAL	5	4	0	4 bag	0

SUMMARY OF FINDINGS
(INCLUDE ONLY FACTUAL DATA)

The pits were dug between the dam and Pickup Hill road to the west. No graphic information was available, so they were not surveyed and plotted. They cover the entire field and show about 1.0' of topsoil over 1.5-3.5' of subsoil H.

Two pits show material A, alluvial or outwash gravel to 10'. Of the other three two show till D and the other glacio-lacustrine CL-ML, I.

Only one pit (104) showed minor seepage.

INTERPRETATIONS AND CONCLUSIONS

CONEWANGO 33

Centerline of Dam

The upper part of the left abutment around TP 1 is glacial till (D and H), with areas of glacio-lacustrine silts and clays (G and I). Bedrock is fairly shallow (6.5') in DH 51 and comes closer to the surface as you go down the slope towards the stream. The steep part of the slope is highly weathered bedrock (F) over shales and siltstones (K). Topsoil (J) covers the abutment to an average depth of about 0.8'.

The flood plain shows road fill (B) and alluvial gravel (A) over glacial tills (D and E) which cover bedrock (K). Topsoil (J) is thin. Bedrock is at about 9' across the flood plain.

The lower part of the right abutment is highly weathered bedrock (F) over shallow shales and siltstone (K). The upper part has tills (D and H) over bedrock (K).

Water is apparent only in the flood plain where the creek controls the water table and on the steep slopes which are constantly weeping because of slowly draining bedrock. This made these slopes extremely slippery all the time of the investigation.

Blow counts are adequate over the entire site. No consolidation or differential settlement should occur because of soft foundations.

I would suggest removal of all of the old road fill material (B), since it contains large amounts of brush and logs, apparently used to protect the road bed from stream erosion. This amounts to about 1200 c.y. of material to be removed.

If we adhere to what seems to have become the standard practice of flattening abutment slopes to 2:1, this means cutting the right abutment back 24 to 40' horizontally, depending upon the elevation of the bottom of the cutoff or principal spillway trench.

Looking at the centerline of dam profile, it appears that a positive cutoff could be achieved by bottoming in the glacial till (D and E). However, the till doesn't extend across the flood plain along the drain line. Since the possibility exists that the interpretation on the centerline may be incorrect and that the till may not extend completely across the flood plain, I suggest that the cutoff extend to sound rock, which should be around the 12' depth.

Consideration should be given to either stripping the material on the abutment down to sound rock or providing a cutoff through weathered materials and into sound rock.

The abutments wept continuously and were always wet and slippery, probably due to ground water carrying silt and clay from the weathering bedrock in the abutments. This condition probably will persist after construction and may keep the embankment-abutment interface wetter than normal. I suggest considering some type of drainage to handle this water.

Centerline of Dam (cont'd)

Pressure tests of rock core holes showed losses of about 1 to 13 fpd at various pressures and depths. This leakage should be either cutoff or a drain provided to intercept it.

Some type of pump and trench system will be needed to keep the principal spillway cutoff and drain line trenches dry during excavation and construction.

The gravel in the flood plain is not extremely stable on steep slopes so some caving and sloughing should be expected. It should be more stable when the water table is lowered.

The steepness of the abutments and the relief involved (about 90') indicates that the ramps (haul roads) from the spillway and borrow area will have to be quite long to reduce the slope to a workable grade during the earlier stages of construction. That is, these roads will extend quite a ways up and down the valley; therefore the construction limits on the land rights maps should reflect this.

Embankment

Several materials will be available for the embankment: alluvial gravel A, outwash sand C, glacial till D and E, highly weathered bedrock F, glacio-lacustrine silts and clays G and I, weathered till H, topsoil J, and bedrock K. I suggest spoiling road fill B because of the large amount of brush mixed in with it.

Amounts of C and G are small and represent only a minor part of the spillway excavation.

Analysis of the grain size curves shows three general groups. I suggest placement of these grouped materials as follows: fine grained materials G, H, and I in an impervious central core; coarse, cleaner gravel A in the outer parts of the dam; and materials C, D, E, F in the area between the other two.

Normal side slopes probably will suffice.

There are no soft areas in the foundation that will contribute to differential settlement. However, the steepness of the right abutment results in having a section of fill at least 57' high only 8' away from a section that is 38' high. More settlement will occur in the higher section than the lower and cracking due to differential consolidation within the embankment could result. The materials are not highly susceptible to cracking though.

Establishing vegetation should not present any problem.

Drain Line

Rotten, highly weathered bedrock F occurs on both abutments. The flood plain shows alluvial gravel A and road fill B over bedrock. Some till D is found under the ditch on the right side of the flood plain.

I suggest carrying the drain to sound bedrock over its entire length, since rock is shallow anyway. The drain should extend beyond permanent pool elevation to pick up any seepage that comes through the abutment unless it is cutoff by the core trench.

Drain Line (cont'd)

The drain will be in contact with materials A (502.1) and F (501.1), as well as the embankment materials. The grain size curves show representative samples of each material.

No natural filter material is available at the site.

Principal Spillway

There were no alternate locations considered because the valley is so narrow anyway.

Thin topsoil covers road fill B. Beneath this alluvial gravel A over tills D or E and bedrock.

Since I have previously suggested removing all the road fill material, I don't believe any further excavation is necessary. This way we could kill two birds with one stone by removing an undesirable material and excavating the spillway trench at the same time. However, it appears that the present location is too close to the steep right abutment. I suggest that the spillway be moved roughly 25' left and possibly cocked a little to more nearly conform with the alignment of the present channel. Backfill with good till D.

A lot of water will have to be removed while the trench is open, so probably some kind of pump and trench system would be best.

Camber should be minimal because there are no soft materials present.

Outlet Channel

The outlet channel will be constructed mostly in alluvial gravel A. Presently this is subject to erosion during flood flows, but after the dam is constructed, the proposed outlet discharges and velocities should not erode the natural alluvial gravels.

If the channel needs to be very deep, some sloughing and caving should be expected.

There might be enough large siltstone flags ripped out to serve as riprap, but the low RQD indicates that probably the rock would not pass the soundness or LA abrasion tests. Also the flaggy shape would not be well suited for riprap, since the thickness of the flags would be only 2-4".

Emergency Spillway

Estimated quantities of available excavation are as follows: A - 1820 c.y., GHI - 5280 c.y., CDEF - 4485 c.y., J - 1020 c.y., K - 2130 c.y.

The RQD of cores seems to indicate that the bedrock will be rippable, at least for the most part. The one tough spot might be near TP 208, where there is over 8' of rock above grade.

Emergency Spillway (cont'd)

Silt I and sand C will be exposed on the cut slope. These might be a bit unstable under wet conditions,- which were not observed. Most pits were quite dry and showed little or no seepage.

Oversize (+6") waste material can be placed on the outer slope of the embankment near the downstream toe.

Borrow Area

The lack of topographic information in the borrow area makes it difficult to accurately portray borrow area profiles and quantities. On a basis of ten-foot deep holes over an approximate area of 1 1/2 acres we have the following quantities: of available borrow: A - 6140 c.y., D - 6335 c.y., HI - 8470 c.y., J - 2420 c.y.

This leaves us a little short of material but I expect we can go the knob just north of the borrow area and can excavate to a depth greater than ten feet. I don't expect to find anything there we haven't seen yet someplace.

Probably the natural moisture is a bit below optimum since most pits don't show any seepage.

GEOLOGY REPORT

JAN. 1959

SITE #33
CONEWANGO WATERSHED
CHAUTAUQUA COUNTY SCWCD
NEW YORK

SUPPLEMENTAL REPORT

LEFT EMERGENCY SPILLWAY

APPROVAL:

Richard L Phillips

Richard L. Phillips
State Conservation Engineer

PREPARED BY:

D Bruce Champeon

D. Bruce Champeon
Geologist

REVIEWED BY:

B. S. Ellis

Bernard S. Ellis
Senior Staff Geologist

REFERENCE:	U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	DRAWING NO. NY-2173(A) SHEET 1 OF 15 DATE 2/9/71

GENERAL INFORMATION

Since a large quantity of bedrock was present in the proposed right emergency spillway excavation, it was decided to fully investigate the feasibility of moving the emergency spillway to the left side of the embankment. Five pits had been dug in the general area of the left spillway, but they were not located in the right places to give the needed information. Also, these pits were only ten feet deep because they were intended as borrow area pits.

Eight backhoe pits were dug with a Schield-Bantam, crawler type, cable-operated backhoe with a maximum digging depth of about twenty feet. Six large bag samples were collected and processed in Syracuse.

Four drill holes were drilled with a truck-mounted CME rotary drill rig. Samples were obtained with a 2" OD split-spoon sampler in conjunction with standard penetration tests, mostly of a 2' drive. Holes were advanced with 6" OD hollow stem flight augers. Recovery was logged and stored in sealed wide-mouth Mason type jars. Five jar samples were processed for correlation purposes.

All field work was done from 12/21/70 to 12/23/70.

The present design shows 35,500 c.y. of spillway excavation available and 46,500 c.y. of embankment fill needed, leaving 11,000 c.y. to be obtained from a borrow area, probably in the area of the old right spillway.

The initial report was prepared in March 1970 and covered all aspects of the site. This report adds a discussion of the new left emergency spillway and revises the borrow and embankment discussions. This report must be used in conjunction with the original. The material designations remain the same as the old ones.

S. DEPARTMENT OF AGRICULTURE
OIL CONSERVATION SERVICE

FORM SCS-376B
REV 2-64
SHEET 1 OF 2

DETAILED GEOLOGIC INVESTIGATION OF DAM SITES

FEATURE Left Emergency Spillway

(CENTERLINE OF DAM, PRINCIPAL SPILLWAY, EMERGENCY SPILLWAY, THE STREAM CHANNEL, INVESTIGATIONS FOR DRAINAGE OF STRUCTURE, BORROW AREA, RESERVOIR BASIN, ETC.)

DRILLING PROGRAM

EQUIPMENT USED	NUMBER OF HOLES		NUMBER OF SAMPLES TAKEN		
			UNDISTURBED	DISTURBED	
	EXPLORATION	SAMPLING	(STATE TYPE)	LARGE	SMALL
Backhoe	13	9	0	10 bag	0
Drill Rig	4	4	0	0	38 jar
	17	13	0	10 bag	38 jar
TOTAL					

SUMMARY OF FINDINGS
(INCLUDE ONLY FACTUAL DATA)

Topsoil "J" averages 0.9', but ranges in thickness from 0.3' to 1.5'. Beneath topsoil "J" lies from 1.0' to 3.5' of weathered ablation till subsoil "H" (ML). No material "A" was found in TP215.

Three other types of materials are present:

1) Poorly stratified, ice-contact, glaciofluvial gravel or sand "A" that may classify as any of the following (GP-GM, SC-SM, GC-GM, SM, GM). Has less than 20% fines.
2) Sandy, ice-contact glacial till "D" that may classify as SM, SC-SM, or CL-ML. Has 40-55% fines.
3) Glaciofluvial sands and silts "C" interbedded with glaciolacustrine sands, silts, and clays "G" and "I".

Glacial till "D" is found mainly beneath "H" but above grade in the upper part of the inlet section, level section, and upper part of the outlet section. This material ranges from 3-15' thick and may be lensed or interbedded with other materials.

The gravel "A" is found mainly in the outlet section beneath "H" all the way to and below grade. It also extends beneath "D" near the level section and is still at and below grade.

X

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

FORM SCS-376B
REV 2-64
SHEET 2 OF 2

DETAILED GEOLOGIC INVESTIGATION OF DAM SITES

FEATURE Left Emergency Spillway (cont'd)

(CENTERLINE OF DAM, PRINCIPAL SPILLWAY, EMERGENCY SPILLWAY, THE STREAM CHANNEL, INVESTIGATIONS FOR DRAINAGE OF STRUCTURE, BORROW AREA, RESERVOIR BASIN, ETC.)

DRILLING PROGRAM

EQUIPMENT USED	NUMBER OF HOLES		NUMBER OF SAMPLES TAKEN		
			UNDISTURBED	DISTURBED	
	EXPLORATION	SAMPLING	(STATE TYPE)	LARGE	SMALL
TOTAL					

SUMMARY OF FINDINGS
(INCLUDE ONLY FACTUAL DATA)

Most of the finer glaciofluvial sands and silts "C" and the glaciolacustrine materials "G" and "I" are found above and below grade at the level section and the inlet section. Minor amounts of "C" are found scattered elsewhere.

Bedrock "K" was found 21' below grade in DH258.

Water levels indicate that the gravel is well drained since little water was observed in these pits or holes. The inlet section holes showed fairly high water levels or seepage levels, mostly in till or the sands and glaciolacustrine fine grained materials.

Blow counts range from 9-67 discounting topsoil and the one blow count near bedrock. Most are above 20.

INTERPRETATIONS AND CONCLUSIONS

Left Emergency Spillway

Estimated quantities of excavation are as follows:
A-20,000 c.y., CD-8800 c.y., HI-4200 c.y., J topsoil)-1800 c.y. Approximately 700 c.y. of +6" material is excluded from the above figures.

All materials will be exposed at one place or another on the cutslope. The vast majority of grade will fall in material "A" and the rest will be in "C" except for very minor areas that will be in "I".

Some special consideration may need to be given to seeding the spillway, since the fines content is below 16% in gravel "A", and the area is generally dry. The inlet section is wetter and in till or lacustrines with plenty of fines.

I should point out that the profiles as shown probably present a more simplified story of deposition than really exists. The following quote should show why - "Ice-contact stratified drift shows, through details of form or internal character, that is accumulated in contact with glacier ice. Internally, three general characteristics distinguish it from outwash: (1) extreme range and abrupt changes in grain size, (2) included bodies of till, and (3) deformation. . . . . Whether accumulation takes place upon, against, or underneath the wasting terminal zone of the glacier, it is likely to be sporadic and irregular, with no intervening distance to smooth out diurnal and seasonal differences in rate of melting and release of sediment. The same site may successively see a rushing stream, a quiet pool, a small avalanche of boulders, and actual over-riding by ice, folding or faulting the layers of sediment or smearing till on them . . . . . In such a place anything can happen, and it usually does.[1]"

Borrow Area

Most of the old right emergency spillway above rock will probably be used as additional borrow. The estimated quantities of excavation available are as follows: A-1800 c.y., CD-4500 c.y., GHI-5300 c.y. Approximately 200 c.y. of +6" material is excluded from the above figures.

The present land rights map may be a bit restrictive if the borrow area has to be expanded. Some consideration should be given to enlarging the land rights if necessary. As far as materials are concerned, there is no reason this area can not be expanded.

This area is also generally dry. Little seepage was observed.

Embankment

Every material will be available for use in the embankment, with the possible exceptions of bedrock K, which might not be excavated, and road fill B, which should be spoiled because of the large amount of brush in it. Only minor amounts of E and F will be available.

[1]Flint, Richard Foster, 1957, Glacial and Pleistocene Geology, John Wiley & Sons, London, p. 146.

Analysis of the grain size curves shows three general groups. I suggest placement of these grouped materials as follows: fine grained GHI in the impervious central core; coarse, clean gravel A in the outer parts of the dam; and CD in the area between the other two.

It may be necessary to add moisture to the gravel "A" to get it up to optimum moisture.

Establishing vegetation may require a seed mix set up for low moisture and few fines, since the gravel "A" will be on the outside of the embankment.

UNITED STATES DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE - Soil Mechanics Laboratory

800 "J" Street, Lincoln, Nebraska 68508

SUBJECT: ENG 22-5, New York WP-08, Conewango Creek Site No. 33 (Chautauqua County)

DATE: September 14, 1970

TO: Richard L. Phillips, State Conservation Engineer
SCS, Syracuse, New York

ATTACHMENTS

1. Form SCS-354, Soil Mechanics Laboratory Data, 2 sheets.
2. Form SCS-355A, Triaxial Shear Test Data, 2 sheets.
3. Form SCS-352, Compaction and Penetration Resistance, 4 sheets.
4. Form SCS-372A & B, Placement of Earth Fill Materials, 3 sheets.
5. Form SCS-357, Summary - Slope Stability Analysis, 2 sheets.
6. Form SCS-130, Drain Materials, 1 sheet.
7. Investigational Plans and Profiles.

INTRODUCTION

Proposed Site 33 is located in the Allegany Plateau physiographic area where the topography is described as rolling. This is a class "c" dam with a maximum height of 57' and will contain approximately 41,700 cubic yards of fill.

DISCUSSION OF DATA

FOUNDATION MATERIALS

A. Bedrock. Bedrock on this site is a medium gray shale with some interbedded gray siltstone and occasional limy sandstone beds. The shale is Northeast shale of Upper Devonian age. The shale is usually very weathered in the top few feet.

B. Classification. The upper part of the left abutment has glacial till and glacio-lacustrine CL-ML's and ML's underneath the topsoil. Samples 1.1 and 1.2 from this area were tested at the Syracuse lab. Sample 1.1 classified as a CL (LL = 31, PI = 11) with 82% fines. Sample 1.2 classified as a nonplastic ML with 92% fines.

The steeper part of the left abutment has a few feet of glacial till overlying very highly weathered bedrock. The glacial till disappears at about the permanent pool elevation.

Across the floodplain about 4' to 6' of dirty alluvial gravels are present. These soils were logged as GM, GP, and GW. About 4' to 5' of silty till underlie the alluvium and serve as the bedrock contact. Sample 502.1 from the alluvium classified as a GW-GM with 68% gravel and only 8% fines.

Topsoil covers the entire right abutment except for the extremely steep slope adjacent to the stream channel. Bedrock on the right abutment is very highly weathered to a depth of 1' to 6'. The upper portion of this abutment has about 6' to 10' of glacial till over bedrock. Sample 4.1 from the weathered bedrock classified as a CL-ML (LL = 26, PI = 7) with 50% fines. Emergency spillway samples 206.1 through 206.4 represent the glacial till and classified as GP-GM, GM, and ML soils.

C. Dry Density and Blow Count. Standard penetration tests were made in several holes. Blow counts were relatively high and ranged from 9 to 153.

D. Consolidation. Settlement in the foundation materials is expected to be very minor based on blow counts and classifications.

E. Permeability. Field pressure tests were made at three locations in the bedrock materials. In DH-51 in the left abutment, the permeability rate varied from 2.3 to 5.5 ft/day. In DH-302 in the floodplain, the rate was between 0.8 and 3.0 ft/day. In DH-53 in the right abutment, the permeability rate ranged from 4.1 to 13.2 ft/day. The alluvial gravels are expected to have at least moderate permeability rates.

F. Shear Strength. No undisturbed samples were submitted from the foundation for shear testing. Based on the information available, the shear strength of the foundation materials was assumed to be no weaker than the embankment materials.

EMBANKMENT MATERIALS

A. Classification. There are about seven types of materials available to construct the dam. These are summarized in the following tabulation:

Type	Description	Location	Class
G	Glacio-lacustrine	℄ dam, E. Spwy.	CL-ML, CL
H	Glacial till	Borrow, E. Spwy.	ML
I	Glacio-lacustrine	℄ dam, Borrow, E. Spwy.	ML
C	Outwash	E. Spwy.	SM
D	Glacial till	Borrow, E. Spwy.	GM, SM, SC, CL-ML
F	Highly weathered bedrock	℄ dam, Drain Line	CL-ML, ML
A	Outwash and alluvium	Borrow, E. Spwy, Drain Line	GP-GC, GC, GP-GM, GW-GM

B. Compacted Dry Densities. Four large samples were submitted to the Laboratory for testing. The results are shown below for Standard Proctor effort on the minus No. 4 fraction:

Field No.	Laboratory No.	Type	Class	Max. γ_d pcf	w_o %
101.1	71W46	A	GC	122.0	12.0
102.1	71W47	D	GM	122.0	10.5
103.1	71W48	H	ML	107.5	16.0
104.1	71W49	I	ML	111.0	13.5

C. Consolidation. An average consolidation potential of 1.5% is estimated for Types G, H, and I materials. Settlement in the embankment materials was estimated to be 0.9' at the maximum section.

D. Permeability. Type A materials are expected to be the most permeable embankment soils and are suggested for placement in the outer zones of the fill.

E. Shear Strength. Consolidated undrained triaxial shear tests were made on Samples 102.1 (71W47) and 103.1 (71W48). The 1.4" test specimens were remolded to 95% of maximum D-698-A dry density at close to optimum moisture content. The specimens were allowed to soak to saturation and then tested. The results are shown below:

Field Sample	Class	Type	Test γ_d (pcf)	% Saturation	ϕ (Deg.)	c (psf)
102.1	GM	D	116.5	91	28.5	375
103.1	ML	H	102.0	94	26.5	800

SLOPE STABILITY ANALYSIS

A modification of the Swedish circle method was used to check the slope stability analysis of the dam. Refer to Form SCS-357 (2 sheets) for a detailed summary of the analysis. No unusual conditions were encountered and the proposed slopes are adequate.

CONCLUSIONS AND RECOMMENDATIONS

A. Cutoff. A cutoff extending to sound bedrock across the floodplain is recommended. It should also extend up the abutments to approximate elevation 1485'. From there to the top of the dam, a depth sufficient

to remove any loose surface disturbances, roots, etc., should be satisfactory. A 20' wide bottom with 2:1 side slopes is suggested.

Backfilling with Types G, H, or I soils compacted to 95% of D-698-A dry density is also suggested.

The SML also concurs in the geologist's suggestion to remove all of the old road fill material (Type B). This fill contains a large amount of old brush and logs. Only 1200 cubic yards of this material are involved.

B. Principal Spillway. The proposed alignment crosses the centerline of dam near the base of the right abutment. Topsoil, old road fill, alluvial gravel, and tills in that order overlie bedrock. As previously discussed, removal of the road fill is recommended. This leaves only about 5' to 7' of alluvium and till under the maximum section. Settlement was estimated as 0.2' based on the limited foundation information available. No joint gap problems are anticipated.

Consideration should be given to moving the conduit closer to the stream channel and away from the steep right abutment.

A camber of 0.2' is suggested.

An effective ϕ angle of 30° is recommended for conduit loading computations.

C. Drainage. In order to control seepage through the foundation materials, it is recommended that a pipe and filter trench drain be installed across the floodplain and up the abutments to approximate elevation 1500'. Locate the trench at a c/b ratio of 0.7. The trench should extend down to bedrock at all locations except between elevations 1490' and 1500' in the left abutment. Bottoming the trench in the SM soils (Type D) between these elevations should be adequate.

Refer to Form SCS-130 for a satisfactory gradation of the filter materials. The coarse filter shown should be satisfactory for use against Type A & B foundation soils and Type A embankment soils. However, a finer filter such as ASTM C33 is needed against Type F foundation materials.

D. Embankment Design.

1. Placement of Materials. Refer to Forms SCS-372A & B (3 sheets) for recommended placement and control of the embankment materials.

2. Slopes. The proposed 3:1 slopes upstream with a 10' wide berm at elevation 1483.7' are satisfactory. The proposed 2½:1 slopes downstream are also satisfactory.

3. Overfill. An overfill of 1.1' is suggested across the floodplain to allow for residual settlement of the foundation and embankment.

E. Shaping of the Right Abutment. In order to reduce the possibilities of harmful differential settlement in the area near the base of the right abutment, it is recommended the slopes be flattened to 2:1.

Prepared by:

Charles H. McElroy

Reviewed and Approved by:

Lorn P. Dunnigan
Head
Soil Mechanics Laboratory

Attachments

cc:
Richard L. Phillips (1)
Bernard S. Ellis, Geologist, Syracuse, N. Y.
J. S. Wicks, Little Valley, N. Y.
N. F. Bogner, Upper Darby, Pa.

Grade C 41,100 cu yd Floodwater Retarding

NEW YORK

LABORATORY SAMPLE NUMBER	FIELD NUMBER	LOCATION AND DESCRIPTION	DEPTH	FIELD CLASSIFICATION	MECHANICAL ANALYSIS GRAIN SIZE DISTRIBUTION EXPRESSED AS PERCENT FINER BY DRY WEIGHT																ATTERBERG LIMITS	
					FINES					SAND						GRAVEL						
					.0002 mm	0.025	0.02	0.05	#200 0.074	#140 0.105	#60 0.250	#40 0.42	#20 0.84	#10 2.0	#4 4.76	3/8" 9.525	1/2" 12.7	3/4" 19.05	1" 25.4	1 1/2" 38.1	3" 76.2 mm	LL	PI
71W		Conewango Creek Site: 33																				
46	101.1	Borrow A material L. Bag	4-10	GM-GP	5	3	12	15	20	17	15	17	22	29	40	51	[illegible]	[illegible]	79	82	85	23	7
		A Material; Alluvial gravel																				DRY
		7,960 c.y.																				
		Gradation from Syracuse Lab							9	10	10	12	14	23	35	44	[illegible]	57	64	73	87	30	8
												*Corrected for 13% + 3"										
47	102.1	Borrow D material L. Bag	3-10	SM	7	12	22	34	40	44	51	55	59	64	69	75	77	80	83	84	100	18	2
		D Material; Glacial Till																				DRY DE
		9,970 c.y.																				
		Gradation from Syracuse Lab.			13	23	38	44		48	56	59	63	67	72	77	80	[illegible]	85	[illegible]	90		NP
												*Corrected for 10% + 5"										
48	103.1	Borrow H material L. Bag	1-3'	ML	11	17	23	32	37	39	82	83	85	87	90	93	95	[illegible]	[illegible]	99		25	3
		H Material; Glacial Till																				DRY DE
		7,050 c.y.																				
		Gradation from Syracuse Lab			14	20	29	30	37	39	81	82	85	87	90	93	94	98	100			NP	
49	104.1	Borrow I material L. Bag	4.5-10'	ML	11	17	41	76	90					100								20	2
		I Material; Glacio-lacustrine silt and clays																				
		4020 c.y.																				
		Gradation from Syracuse Lab			12	17	31	30	90	95			98	98	99	99	[illegible]					NP	

1

erding

LABORATORY DATA

MECHANICAL ANALYSIS
GRAIN SIZE DISTRIBUTION EXPRESSED AS PERCENT FINER BY DRY WEIGHT

FINES				SAND						GRAVEL						ATTERBERG LIMITS		UNIFIED CLASSIFICATION	SOLUBLE SALTS %	DISPERSION %	MOISTURE - DENSITY RELATIONSHIPS (☐ STANDARD ☐ MODIFIED)			UNDISTURBED SAMPLE DATA		Gs	SPEC. %
.005	.002	.005	#200 .074	#140 .105	#60 .250	#40 .74	#20 .84	#10 2.0	#4 4.76	3/8" 9.525	1/2" 12.7	3/4" 19.05	1" 25.4	1 1/2" 38.1	3" 76.2	LL	PI				DRY DENSITY	MAX. lb/cu ft	%	lb/cu ft	%		
13	12	15	[illegible]	17	15	17	22	29	40	51	[illegible]	[illegible]	70	72	95	28	7	GC		13						17	
																		DRY DENSITY < NO. 4			(1)	122.0	12.0			GRAVEL FRACTION	
																										APPARENT	
																										BULK, DRY	
26		9	10	10	12	14	23	35	44	[illegible]	57	64	73	87		30	8	GP-GC	(Field Tested)							% ABSORPTION	
									*Corrected for 13% + 3"																		
17	22	34	[illegible]	44	51	55	59	64	[illegible]	75	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	18	2	GM		43						MINUS NO. 4	
																		DRY DENSITY < NO. 4			(2)	123.[illegible]	10.5			GRAVEL FRACTION	
																										APPARENT	
																										BULK, DRY	
13	23	38	41	48	56	59	63	67	72	77	80	[illegible]	85	[illegible]	90*		NP	SM-GM	(Field Tested)							% ABSORPTION	
									*Corrected for 10% + 5"																		
17	[illegible]	72	77	79	[illegible]	[illegible]	85	87	90	93	95	97	[illegible]	100		25	3	ML		24						MINUS NO. 4	
																		DRY DENSITY < NO. 4			(3)	127.5	11.0			GRAVEL FRACTION	
																										APPARENT	
																										BULK, DRY	
20	14	70	77	79	81	82	85	[illegible]	90	93	94	73	100			NP	ML	(Field Tested)								% ABSORPTION	
17	41	76	90						100							20	2	ML		24	(4)	111.0	13.5				
7	[illegible]	80	90	95			[illegible]	98	[illegible]	[illegible]	[illegible]					NP	NP	ML	(Field Tested)								

SOIL CONSERVATION SERVICE

New York

Conewango Creek, Site 33

LABORATORY SAMPLE NUMBER	FIELD NUMBER	LOCATION AND DESCRIPTION		DEPTH	FIELD CLASSIFICATION	MECHANICAL ANALYSIS — GRAIN SIZE DISTRIBUTION EXPRESSED AS PERCENT FINER BY WEIGHT: FINES 0.002 mm	0.005 mm	0.02 mm	0.05 mm	#200 0.074 mm	SAND #140 0.105 mm	#60 0.250 mm	#40 0.42 mm	#20 0.84 mm	#10 2.0 mm	#4 4.76 mm	GRAVEL 3/8" 9.525 mm	3/4" 19.05 mm	1" 25.4 mm	1 1/2" 38.1 mm	3" 76.2 mm	ATTERBERG LIMITS LL	PI	USCS
–	1.1	& Dam	G Glacio-Lacustrine	4'-8'		30	44	64	77	88	89	94	89	90	91	93	94	97	98	99	100	31	11	CL
–	203.1	E. Spwy.	" "	4.5'		15	23	41	57	63	66	71	76	80	85	91	95	97	100			24	5	ML
–	103.1	Borrow	H Glacial Till	1'-3'	✓	14	20	44	70	77	79	81	82	85	87	90	93	96	98	99	100	NP		NP
–	206.1	E. Spwy.	" "	3.2'		10	16	45	73	80	91	83	85	87	90	93	96	97	99	100		NP		NP
–	1.2	& Dam	Glacio-Lacustrine	9'-13'		19	25	44	85	92	96	98	98	99	99	100						NP		NP
–	104.1	Borrow	I " "	4.5'-10'	✓	12	17	33	80	90	95	98	98	98	99	99			100			NP		NP
–	206.4	E. Spwy.	" "	12'		6	9	22	50	66	79	92	93	94	95	96	97	98	98	99	100	NP		NP
–	251.5	E. Spwy.	C Outwash	9.6'-12.5'				17	24	27	39	50	58	84	93	97	98	99	100			NP		SP
–	102.1	Borrow	Glacial Till	3'-10'	✓		14	25	42	48	52	56	66	70	74	80	86	88	92	94	98	100	NP	SM
–	205.1	E. Spwy.	D " "	8'-11'		12	16	33	42	46	49	56	60	64	68	76	82	85	90	92	96	100	21	15	SC
–	206.3	E. Spwy.	" "	9'		16	22	37	52	55	53	62	65	68	74	81	87	90	94	95	98	100	24	5	CL ML
–	4.1	& Dam	F Highly mica. bedrk.	8'		17	24	43	48	50	51	55	58	61	65	75	82	87	90	92	97	100	26	7	CL
–	501.1	Drain	" " "	0.7'-3'		13	22	42	58	62	63	64	64	65	67	68	72	77	78	83	89	100	30	6	ML
–	101.1	Borrow	Outwash	4'-10'	✓		6	9	10	10	11	13	14	17	21	43	51	61	66	72	90	100	30	3	SM
–	204.2	E. Spwy.	A "	6'			6	10	11	11	12	13	16	27	36	51	64	72	78	85	98	100	34	9	GM
–	502.1	Drain	Alluvium	3'						8	8	10	10	14	23	32	41	48	56	64	90	100	42	12	SM

Tested at Syracuse

1

SOIL CONSERVATION SERVICE

SOIL MECHANICS LABORATORY DATA

Sheet 2 of 2

MECHANICAL ANALYSIS — GRAIN SIZE DISTRIBUTION EXPRESSED AS PERCENT FINER BY DRY WEIGHT																ATTERBERG LIMITS		UNIFIED CLASSIFICATION	SOLUBLE SALTS %	DISPERSION %	MOISTURE - DENSITY RELATIONSHIPS ☐ STANDARD ☐ MODIFIED			UNDISTURBED SAMPLE DATA		G_s	SPECIAL TESTS				
FINES				SAND						GRAVEL																					
	0.005	0.002	0.05	#200 0.074	#140 0.105	#60 0.250	#40 0.42	#20 0.84	#10 2.0	#4 4.76	3/8" 9.525	1/2" 12.7	5/8" 15.9	1" 25.4	1 1/2" 38.1	3" 76.2	LL	PI				TEST NO.	MAX γ_d pcf	w_o %	γ_d g/cc	w_o %					
	41	68	77	93	88	89	89	90	91	93	94	97	98	98	99	100	31	11	CL												
	23	41	57	63	66	67	74	80	85	90	95	97	100				24	5	CL-ML												
	20	44	70	77	79	81	82	85	87	90	93	96	98	100			NP		ML	NL											
	16	45	73	80	91	83	85	87	90	93	96	97	99	100			NP		ML												
	25	46	85	92	96	98	98	99	99	100							NP		ML												
	17	38	80	90	95	98	98	98	99	99				100			NP		ML	NL											
	9	22	50	66	79	92	93	94	95	96	97	98	98	99	99	100	NP		ML												
		17	24	27	29	35	58	81	93	97	98	99	100				NP		SM												
	14	25	42	48	52	56	66	70	74	80	86	88	92	94	98	100	NP		SM	GM											
	16	33	42	46	49	56	60	64	68	76	82	85	90	92	96	100	21	13	SC												
	22	37	52	55	53	62	65	68	74	81	87	90	94	95	98	100	24	5	CL-ML												
	27	43	48	50	51	55	58	61	65	75	82	86	90	92	97	100	24	7	CL-ML												
	22	43	58	62	63	64	64	65	67	68	72	79	79	83	89	100	30	6	ML												
	6	9	10	10	11	13	14	17	21	40	51	64	74	80	100	100	30	8	SP-SC	SC											
	6	10	11	11	12	13	16	27	36	51	64	78	79	88	98	100	34	9	GP-GM			V									
				8	8	10	10	14	23	32	41	46	56	64	80	100	42	12	GW-GM												

1

2

Form SCS 355-A
Rev 6-65

LABORATORY NO. 2116/17

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	TRIAXIAL SHEAR TEST

PROJECT and STATE: [illegible] CREEK SITE 23 NEW YORK
SAMPLE LOCATION: Borrow material

FIELD SAMPLE NO: [illegible]
DEPTH: 5-10'
GEOLOGIC ORIGIN: Glacial Till

TYPE OF SAMPLE: Compacted
TESTED AT: SML-Lincoln
APPROVED BY: CHMc
DATE: 9/70

INDEX TEST DATA

USCS GM; LL 18; PI 2
% FINER (mm): 0.002 7; 0.005 12; 0.074 (#200) 40
G_s (-#4) 2.70; G_s (+#4) ____
STANDARD: γ_d MAX. 122.0 pcf; w_o 10.5 %
MODIFIED: γ_d MAX. ____ pcf; w_o ____ %

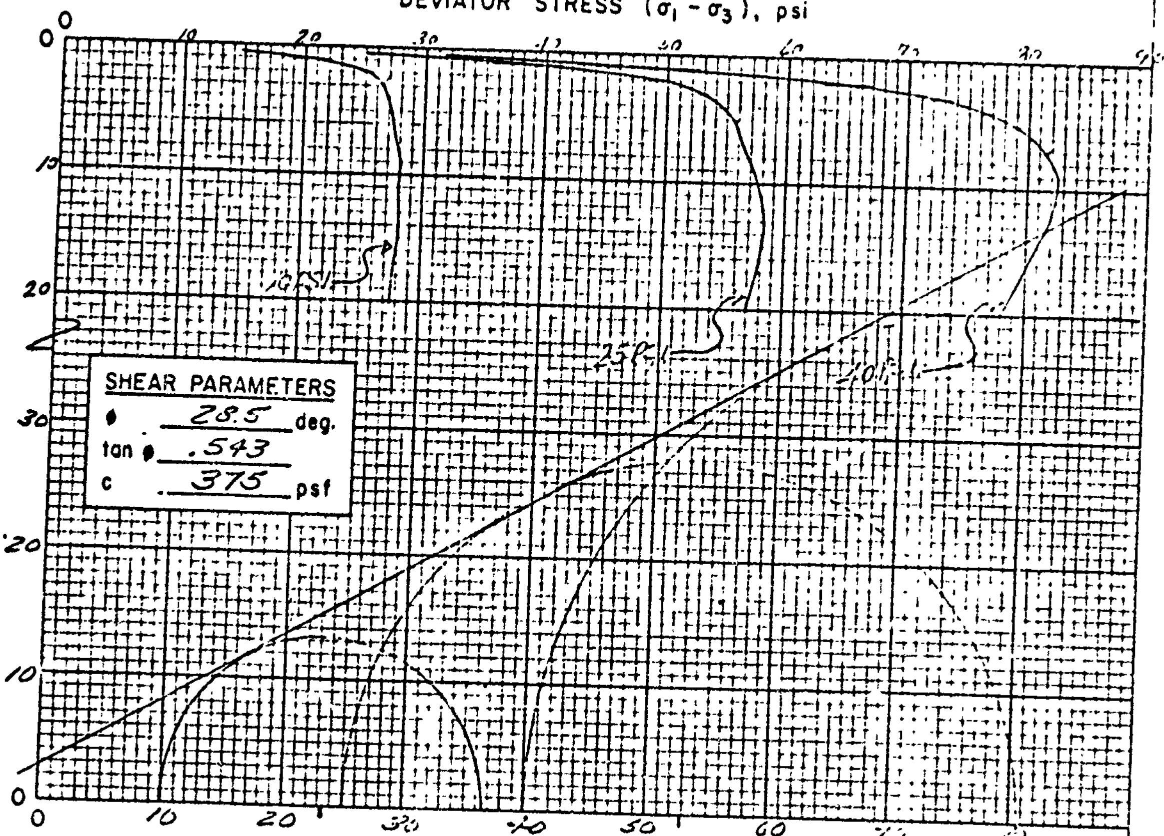
SPECIMEN DATA

HEIGHT 3.0 "; DIAMETER 1.4 "
MATERIALS TESTED PASSED #4 SIEVE
METHOD OF PREPARATION Static molded in 3 lifts [illegible]
MOLDING MOISTURE 13.2 %
MOLDED AT 97 % OF γ_d MAXIMUM

TYPE OF TEST

UU ☐
CU ☑
$\overline{CU}$ ☐
CD ☐

DRY DENSITY INITIAL pcf ☑ g/cc ☐	DRY DENSITY CONSOLIDATED pcf ☑ g/cc ☐		MOISTURE CONTENT, % START OF TEST	DEG. OF SAT AT START OF TEST	END OF TEST	TIME OF CONSOLIDATION (hrs)	MINOR PRINCIPAL STRESS σ_3 (psi)	DEVIATOR STRESS $\sigma_1 - \sigma_3$ (psi)	AXIAL STRAIN AT FAILURE, ε (%)
[illegible]	[illegible]		14.7	89.6	14.0	16.18	10	26.5	3.0
115.5	119.1		15.8	92.9	14.2	16.42	[illegible]	55.6	5.0
119.3	120.3		14.5	89.5	13.2	16.20	40	81.4	7.0



SHEAR PARAMETERS
ϕ 28.5 deg.
tan ϕ .543
c 375 psf

REMARKS

GA 7309

Form SCS 355 A
Rev 6-65

LABORATORY NO 71414-P

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	TRIAXIAL SHEAR TEST

PROJECT and STATE: [illegible] CREEK STA 33 NEW YORK
SAMPLE LOCATION: BORROW AREA MATERIAL

FIELD SAMPLE NO	DEPTH	GEOLOGIC ORIGIN
33.1	1-3'	Glacial Till

TYPE OF SAMPLE	TESTED AT	APPROVED BY	DATE
COMPACTED	SWL-LINCOLN	CHMc	9/70

INDEX TEST DATA

USCS ML ; LL 25 ; PI 3
% FINER (mm): 0.002 11 ; 0.005 12 ;
0.074 (#200) 77
G_s (-#4) 2.69 ; G_s (+#4) _____
STANDARD: γ_d MAX. 107.5 pcf; w_o 16.0 %
MODIFIED: γ_d MAX. _____ pcf; w_o _____ %

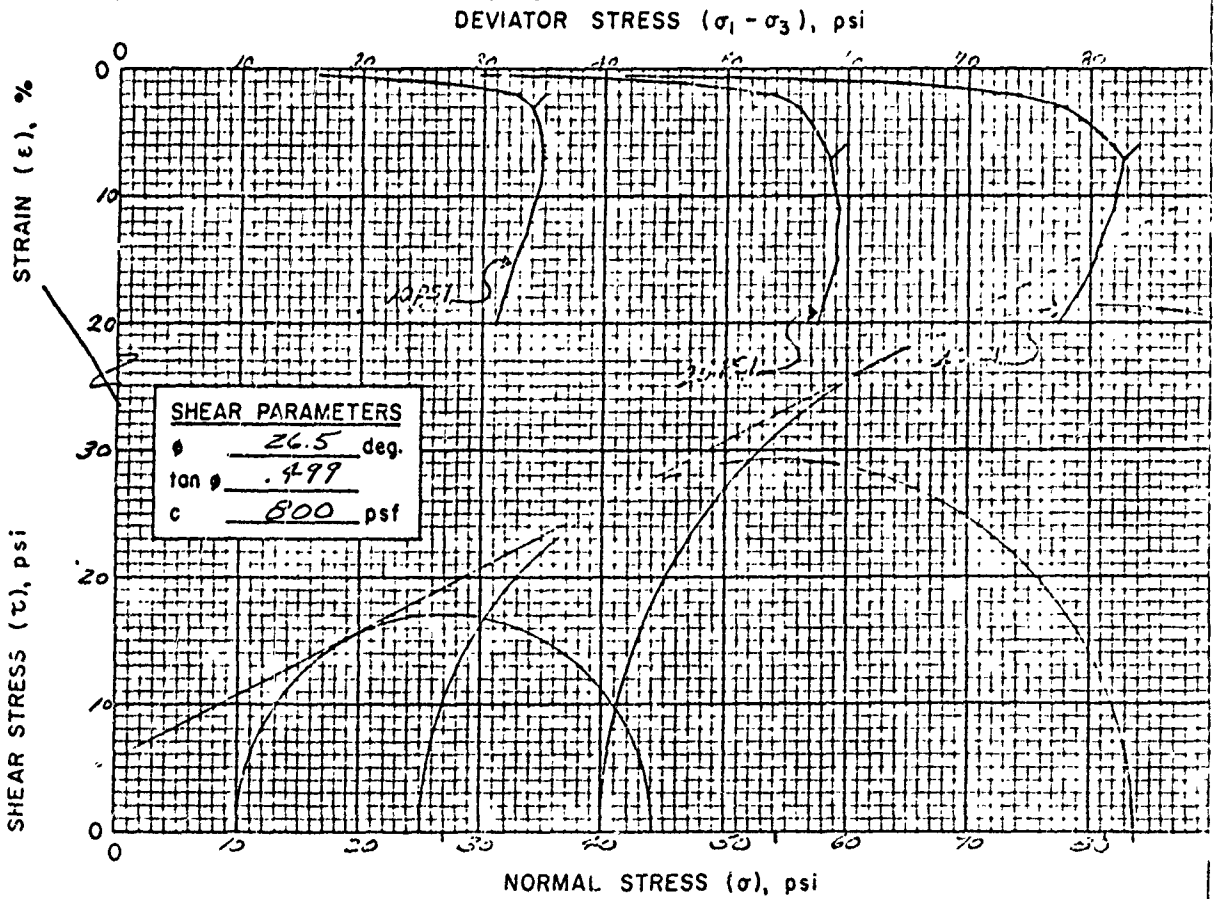
SPECIMEN DATA

HEIGHT 3.0 "; DIAMETER 1.4 "
MATERIALS TESTED PASSED #4 SIEVE
METHOD OF PREPARATION STATIC
MOLDED IN LIFTS (3 LIFTS)
MOLDING MOISTURE 18.1 %
MOLDED AT 94.8% OF γ_d MAXIMUM

TYPE OF TEST

UU ☐
CU ☑
$\overline{CU}$ ☐
CD ☐

DRY DENSITY			MOISTURE CONTENT, %			TIME OF CONSOLIDATION (hrs)	MINOR PRINCIPAL STRESS σ_3 (psi)	DEVIATOR STRESS $\sigma_1 - \sigma_3$ (psi)	AXIAL STRAIN AT FAILURE, ε (%)
INITIAL pcf ☑ g/cc ☐	CONSOLIDATED pcf ☑ g/cc ☐		START OF TEST	DEG. OF SAT. AT START OF TEST	END OF TEST				
102.4	103.2		22.7	95.4	22.2	16.21	10	34.0	3.0
101.7	103.7		22.8	94.2	21.7	16.15	25	58.5	7.0
102.0	103.9		22.7	93.8	21.0	15.82	40	82.7	7.0



REMARKS TESTED @ 94.9% STD

Form SCS 352
Rev 5-65

LABORATORY NO 21446

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	COMPACTION AND PENETRATION RESISTANCE

PROJECT and STATE: Canawango Creek #33, New York

FIELD SAMPLE NO	LOCATION	DEPTH
101.1	Borrow A Material	4-10'

GEOLOGIC ORIGIN	TESTED AT	APPROVED BY	DATE
Glacial outwash	SML-LINCOLN	CHM	9/70

CLASSIFICATION GC LL 28 PI 9 CURVE NO. 1 OF 4

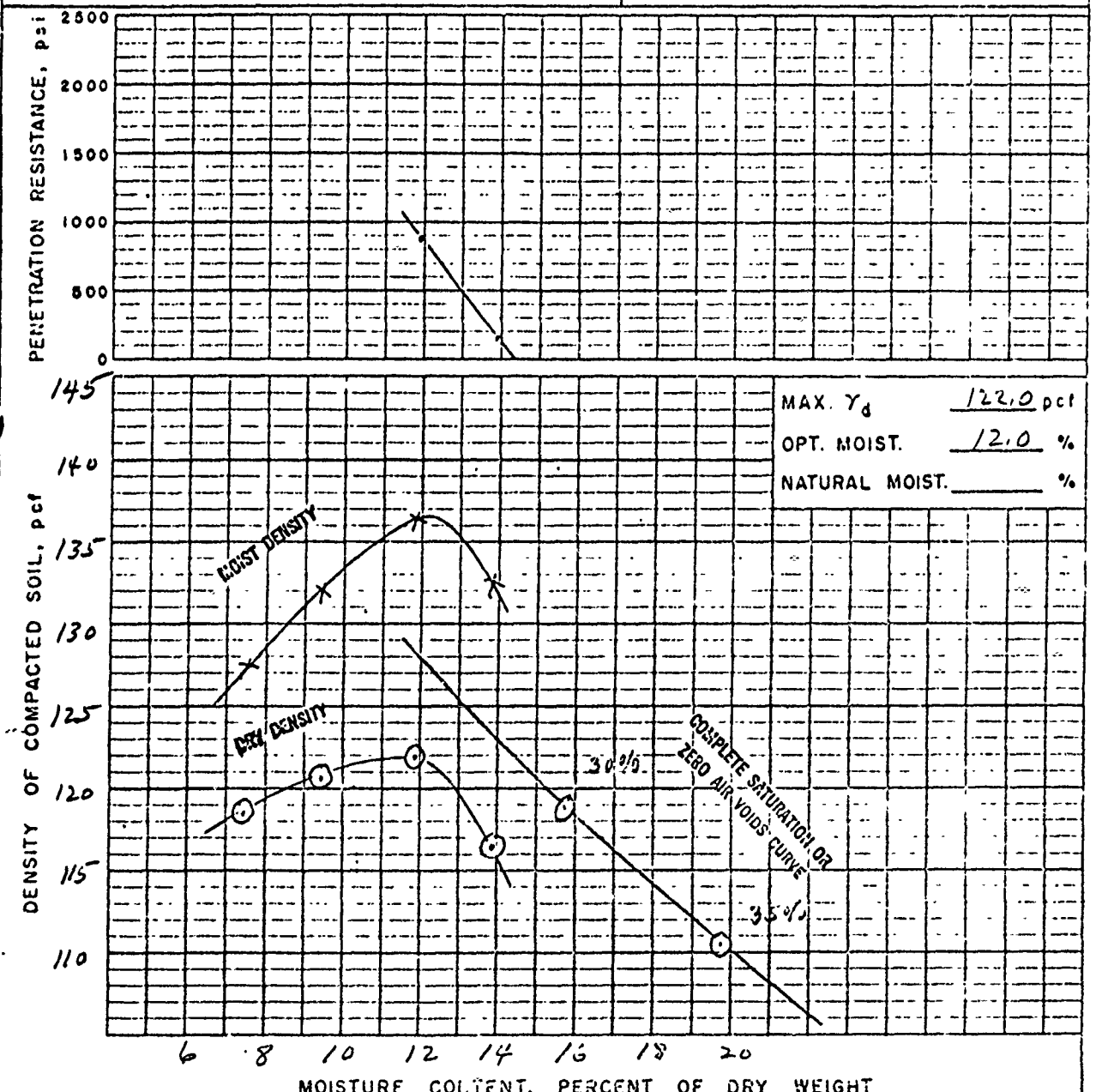
MAX. PARTICLE SIZE INCLUDED IN TEST 4 #-4 "

SPECIFIC GRAVITY (G_s) { MINUS NO. 4 2.72 / PLUS NO. 4 2.65

STD (ASTM D-698) ☒; METHOD A

MOD. (ASTM D-1557) ☐; METHOD

OTHER TEST ☐ (SEE REMARKS)



MAX. γ_d 122.0 pcf

OPT. MOIST. 12.0 %

NATURAL MOIST. ____ %

REMARKS

CURVE IS FOR THE MINUS NO. 4 FRACTION

GRADATION OF TOTAL SAMPLE

Form SCS-356
Rev. 5-63

LABORATORY NO. 11494

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	COMPACTION AND PENETRATION RESISTANCE

PROJECT and STATE: Conewango Creek #33, New York.

FIELD SAMPLE NO.	LOCATION	DEPTH
152.1	Borrow D Material	3-10'.

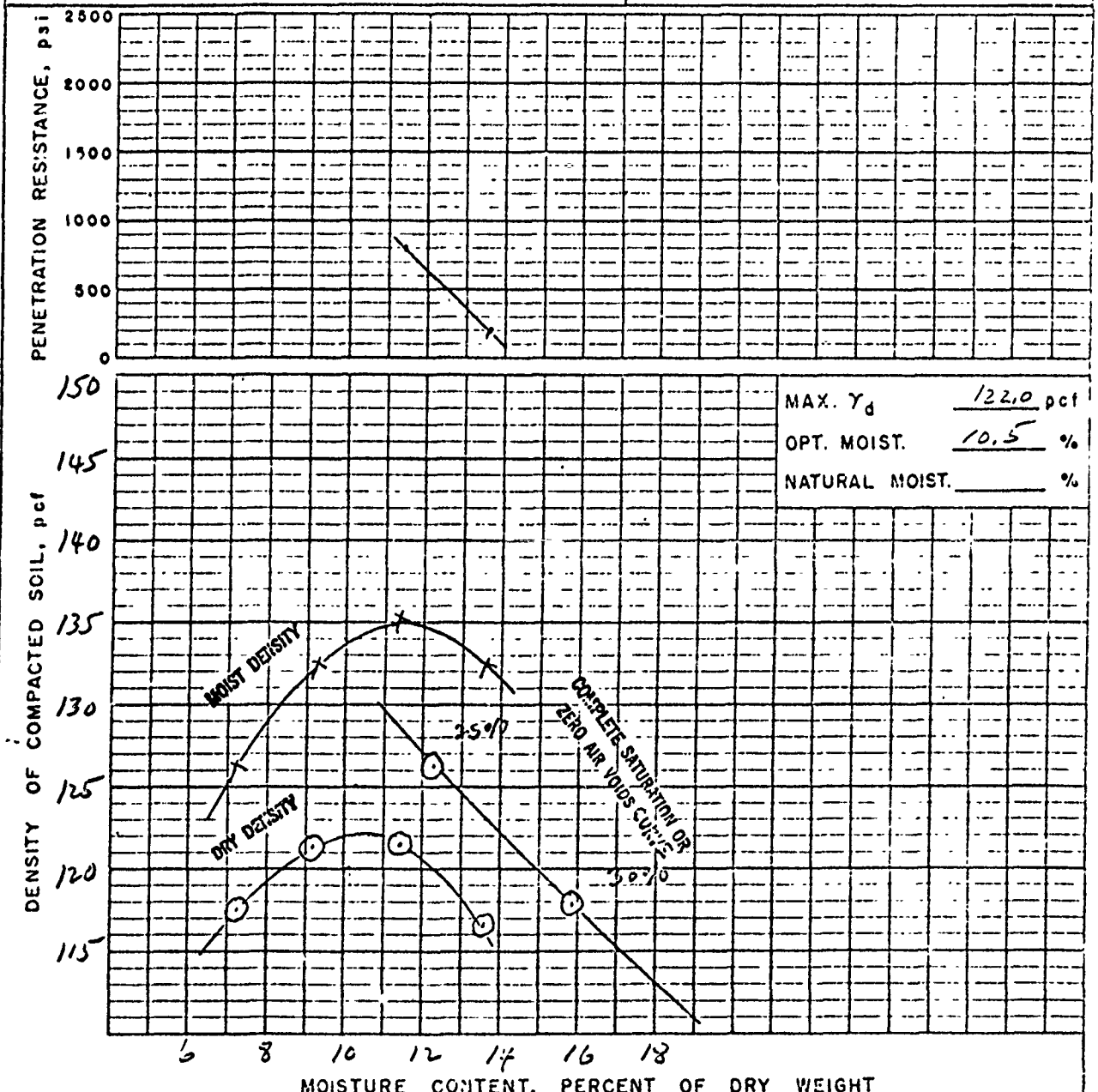
GEOLOGIC ORIGIN	TESTED AT	APPROVED BY	DATE
Glacial Till	SML-LINCOLN	CHMc	9/70

CLASSIFICATION GM LL 18 PI 2 — CURVE NO. 2 OF 4

MAX. PARTICLE SIZE INCLUDED IN TEST 4 #4 " — STD. (ASTM D-698) ☒; METHOD A

SPECIFIC GRAVITY (G_s) { MINUS NO. 4 2.70 / PLUS NO. 4 2.64 } — MOD. (ASTM D-1557) ☐; METHOD ____

OTHER TEST ☐ (SEE REMARKS)



REMARKS

CURVE IS FOR THE MINUS NO. 4 FRACTION

GRADATION OF TOTAL SAMPLE

69 6 100 %

LAB. FILE NO. 7048

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	COMPACTION AND PENETRATION RESISTANCE

PROJECT and STATE: Conewango Creek, New York.

FIELD SAMPLE NO	LOCATION	DEPTH
103.1	Borrow H Material.	1-3'.

GEOLOGIC ORIGIN	TESTED AT	APPROVED BY	DATE
Glacial Till	SML-LINCOLN	C.L.M.C.	5/70

CLASSIFICATION ML LL 25 PI 3

MAX. PARTICLE SIZE INCLUDED IN TEST < #4 "

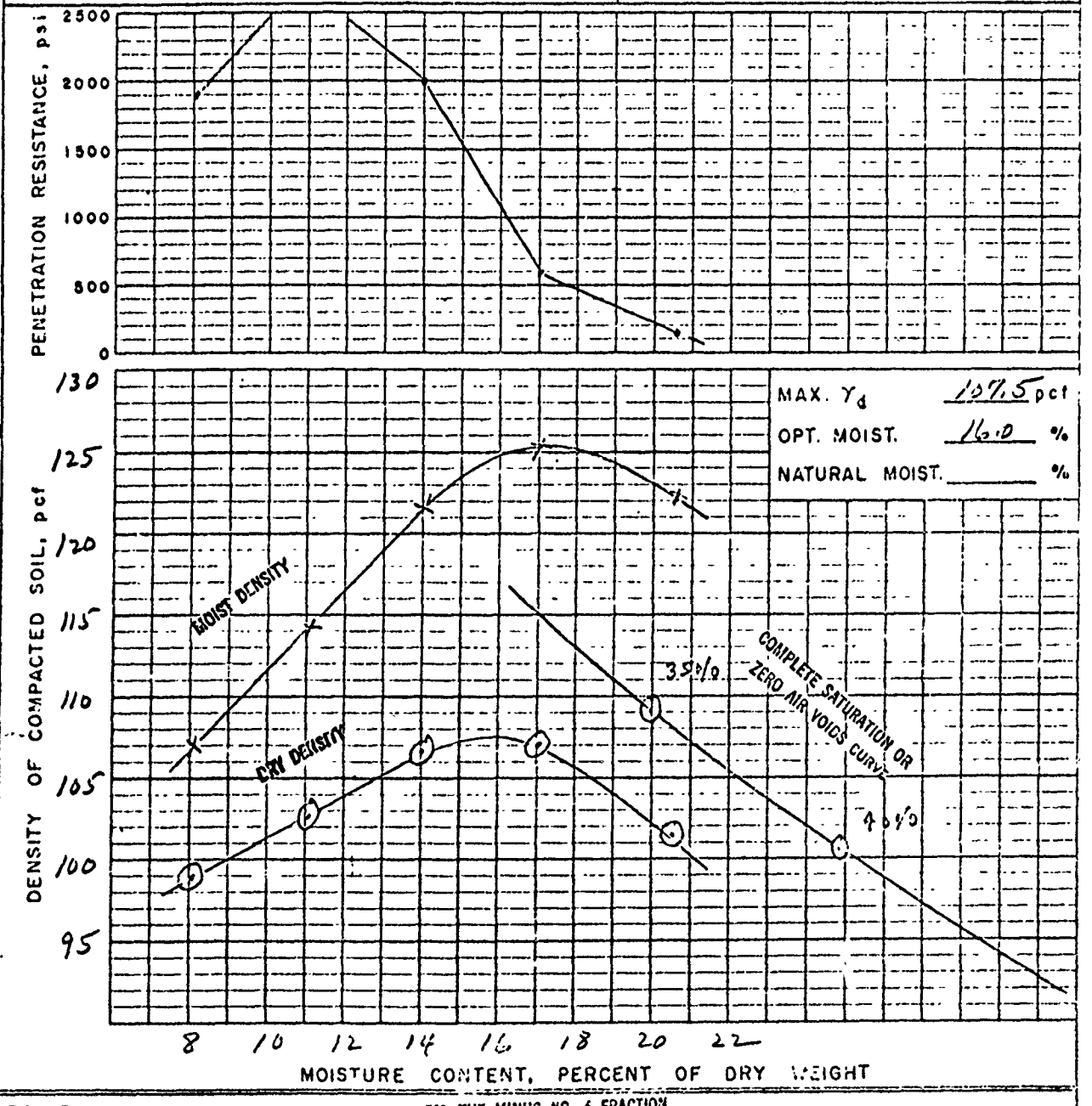
SPECIFIC GRAVITY (G_s) { MINUS NO. 4 2.69; PLUS NO. 4 2.64

CURVE NO. 3 OF 4

STD. (ASTM D-698) ☒; METHOD A

MOD (ASTM D-1557) ☐; METHOD ____

OTHER TEST ☐ (SEE REMARKS)



REMARKS

CURVE IS FOR THE MINUS NO. 4 FRACTION

GRADATION OF TOTAL SAMPLE

< NO. 200 77 %; < NO. 4 90 %; < 1/4 IN. 100 %

Form SCS 552
Rev. 5-65

LABORATORY No. 71w49

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	COMPACTION AND PENETRATION RESISTANCE

PROJECT and STATE: Conewango Creek #33, New York

FIELD SAMPLE NO	LOCATION	DEPTH
104.1	Borrow I Material	4.5-10'

GEOLOGIC ORIGIN	TESTED AT	APPROVED BY	DATE
Glacio-Lacustrine	SML-LINCOLN	CHMc	9/70

CLASSIFICATION ML LL 20 PI 2 CURVE NO. 4 OF 4

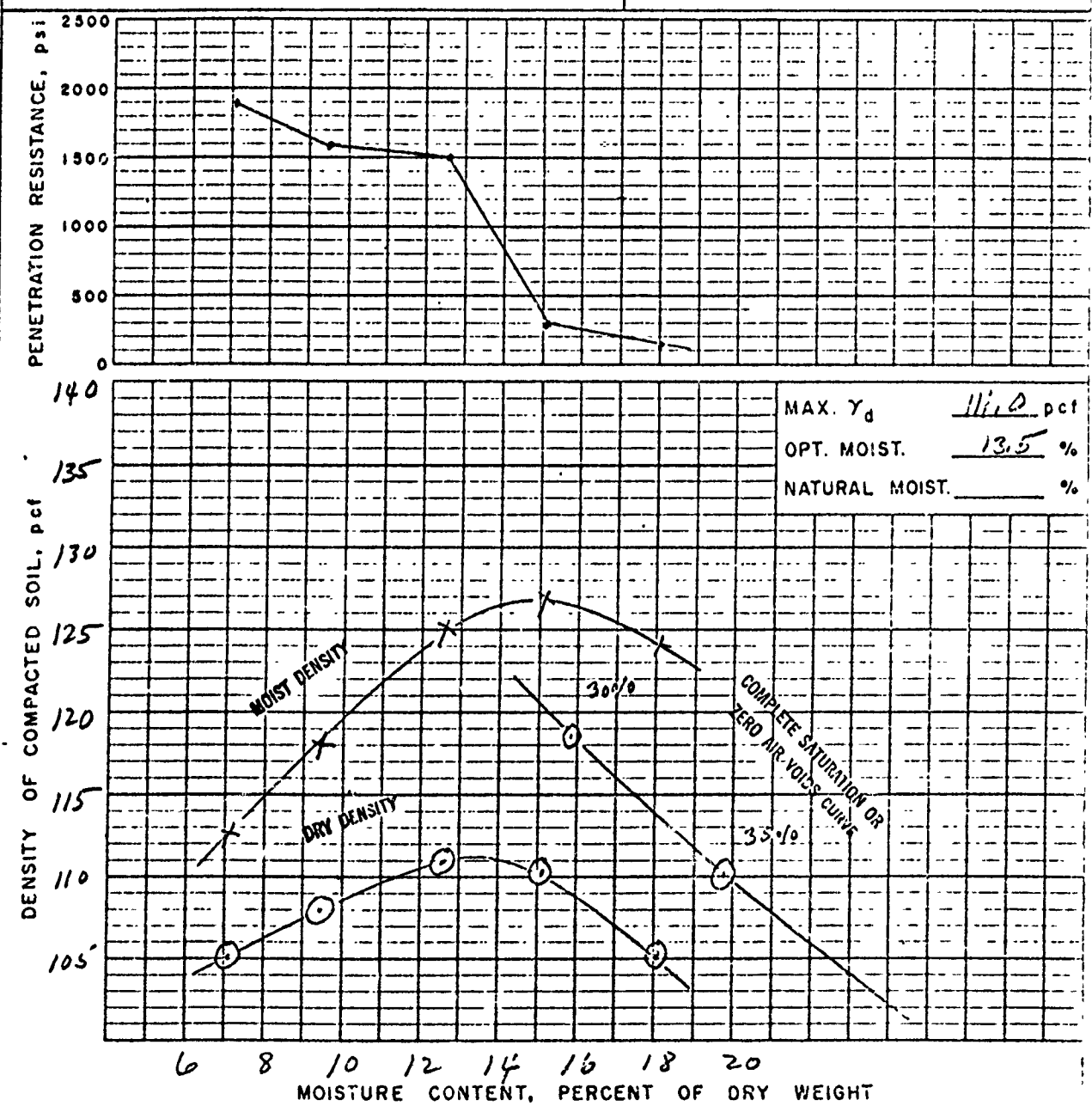
MAX. PARTICLE SIZE INCLUDED IN TEST < #4 "

SPECIFIC GRAVITY (G_s) { MINUS NO. 4 2.72 / PLUS NO. 4 ____

STD (ASTM D-698) ☒; METHOD A

MOD (ASTM D-1557) ☐; METHOD ____

OTHER TEST ☐ (SEE REMARKS)



REMARKS

Form SCS 372-A
10-65

U.S. DEPARTMENT of AGRICULTURE
SOIL CONSERVATION SERVICE

MATERIALS TESTING REPORT

PLACEMENT OF EARTH FILL MATERIALS

PROJECT and STATE: Cornwarroo Creek Site 33, N.Y.

BY: CHME

DATE: 9/70

Embankment Zone No.	FILL MATERIALS: Type	Location	Average Depth (ft.) From	Average Depth (ft.) To	Description (Origin, Group No., Hardness, Classification, etc)	RECOMMENDED COMPACTION REQUIREMENTS: Class	Degree of Compaction (%)	Moisture Limits (%) ± Optimum From	Moisture Limits (%) ± Optimum To	Control Test ASTM Designation	Control Test ASTM Method	REFERENCE COMPACTION TEST: Sample No. Field	Sample No. Lab.	Maximum Density (pcf)	Optimum Moisture (%)
1	G	℄ Dam	4	8	CL; Glacio-Lacustrine; clay; moderately plastic	A	95	-2	+	D-698	A	1.1	—	—	—
1	G	E. Spwy	4.5		CL-ML; Glacio-Lacustrine; sandy-silty clay; slightly plastic	A	95	-1	+	D-698	A	203.1	—	—	—
1	H	Borrow	1	3	ML; Glacial Till; silt; non-plastic to slightly plastic; Curve ③	A	95	opt.	+	D-698	A	103.1	48	107.5	16.0
1	H	E. Spwy.	3.2		ML; (same)	A	95	opt.	+	D-698	A	206.1	—	—	—
1	I	℄ Dam	8	13	ML; Glacio-Lacustrine; silt; non-plastic	A	95	opt.	+	D-698	A	1.2	—	—	—
1	I	Borrow	4.5	10	ML; Glacio-Lacustrine; silt; non-plastic to sl. plastic; Curve ④	A	95	opt.	+	D-698	A	104.1	49	111.0	13.5
1	I	E. Spwy.	12		ML; Glacio-Lacustrine; silt; nonplastic	A	95	opt.	+	D-698	A	206.4	—	—	—
2	C	E. Spwy.	7.6	12.3	SM; Outwash; silty sand; nonplastic	A	95	opt.	+	D-698	A	254.5	—	—	—
2	D	Borrow	3	10	GM; Glacial Till; silty, sandy gravel; nonplastic to sl. plastic; Curve ②	A	95	opt.	+	D-698	A	102.1	47	122.0	10.5

71W

REMARKS

Form 368 372 A
10-65

MATERIALS TESTING REPORT — PLACEMENT OF EARTH FILL MATERIALS

U. S. DEPARTMENT of AGRICULTURE — SOIL CONSERVATION SERVICE

PROJECT and STATE: Conewango Creek, Site 33, N.Y.

BY: CHMc

DATE: 9/70

Embankment Zone No.	FILL MATERIALS: Type	Location	Average Depth (ft.) From	Average Depth (ft.) To	Description (Origin, Group No., Hardness, Classification, etc.)	RECOMMENDED COMPACTION REQUIREMENTS: Class	Degree of Compaction (%)	Moisture Limits (%) From	Moisture Limits (%) To	± Optimum	Control Test ASTM Designation	Control Test ASTM Method	REFERENCE COMPACTION TEST: Sample No. Field	Sample No. Lab.	Maximum Density (pcf)	Optimum Moisture (%)
														71W		
2	D	E. Spwy.	8	11	SC; Glacial Till; clayey sand; moderately plastic	A	95	opt		+	D-698	A	205.1	—	—	1
2	D	E Spwy.	9		CL-ML; Glacial Till; Silty, sandy clay; slightly plastic	A	95	opt.		+	D-698	A	206.3	—	—	1
2	F	E Dam	8		SC-SM: Highly wea. bedrock; slightly plastic	A	95	opt.		+	D-698	A	4.1	—	—	1
2	F	Drain Line	0.7	3	ML; (Same)	A	95	opt.		+	D-698	A	501.1	—	—	1
3	A	Borrow	4	10	GP-GC; Outwash; Clayey-silty gravel; slightly plastic; Curve ①	*							101.1	46	122.0	12.0
3	A	E. Spwy.	6'		GP-GM; Outwash; slightly plastic;	*							206.2	—	—	1
3	A	Drain Line	3'		GW-GM; Alluvium; relatively clean silty gravel; moderately plastic	*							502.1	—	—	1

REMARKS

* Use a method specification that will produce a minimum mass density equaled to 95% D-698A dry density corrected for 40% rock.

Form SCS 357
Rev 6-65

U.S. DEPARTMENT of AGRICULTURE
SOIL CONSERVATION SERVICE

MATERIALS TESTING REPORT

SUMMARY - SLOPE STABILITY ANALYSIS

PROJECT and STATE: CONEWANGO CREEK SITE 33 NEW YORK

METHOD OF ANALYSIS: SWEDISH CIRCLE

ANALYZED AT: SYRACUSE LINCOLN

APPROVED BY:

DATE: 8-17-70

	SOURCE AND USE OF MATERIALS	CLASSIFICATION	ADOPTED DESIGN DATA γ_d (pcf)	γ_m (pcf)	γ_{sat} (pcf)	γ_{sub} (pcf)	ϕ (deg)	tan ϕ	c (psf)	REMARKS
①	EMBANKMENT	GM	124.0	134.5	140.5	78.0	28.5	.543	375	CORRECTED FOR 5% HXA
②	EMBANKMENT	ML	105.0	121.0	128.5	66.0	26.5	.499	800	CORRECTED FOR 10% ROCK
③										
④										
⑤										
⑥										
⑦										
⑧										

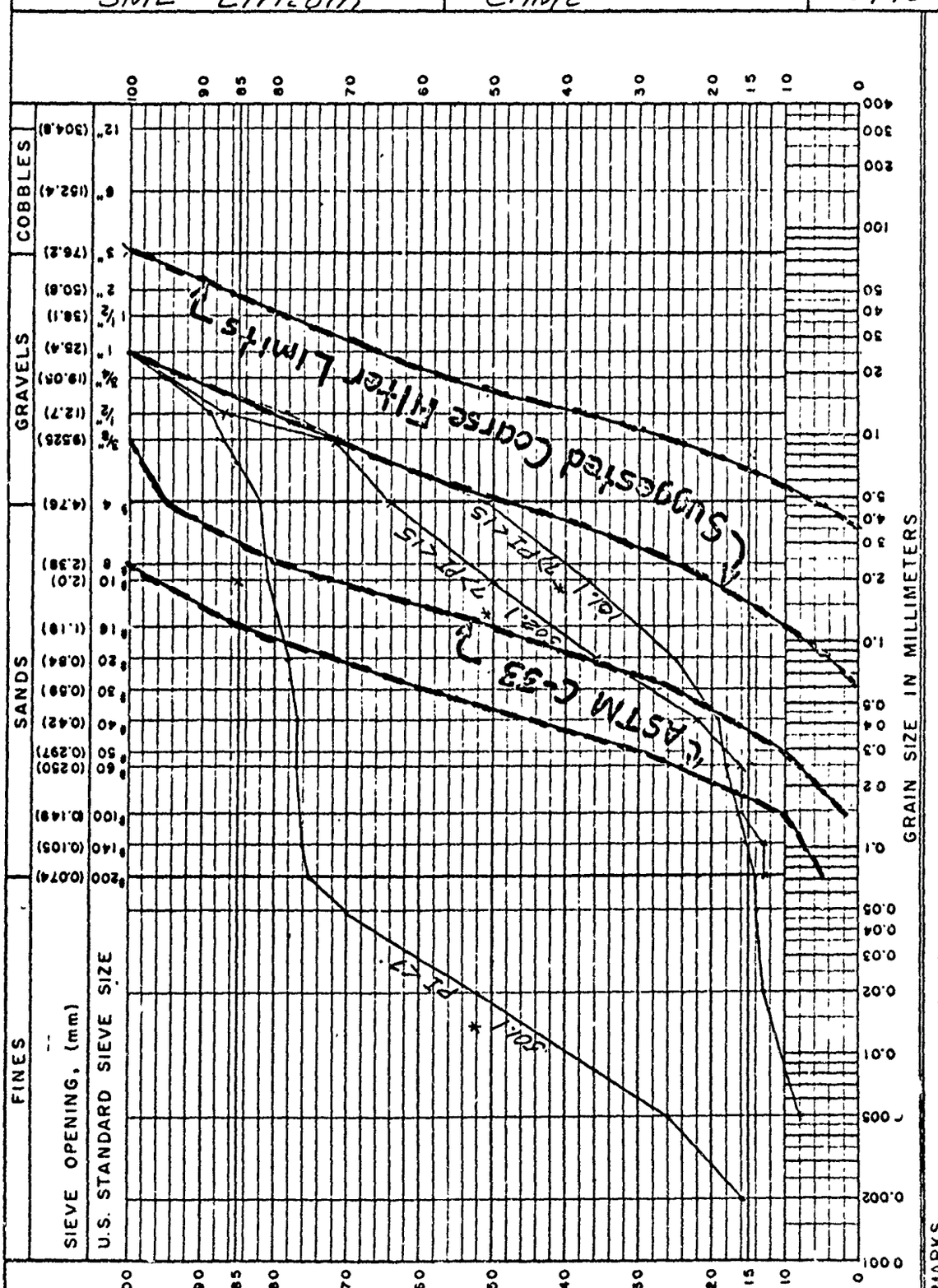
TRIAL NO.	SLOPE	CONDITIONS	F_s
		MAXIMUM SECTION	
UP	3:1	FULL DRAWDOWN - NO BERM - ARC CUT FROM OPPOSITE	
		SLOPE THRU EMB. (28.5°-375) ONLY	1.72
UP	3:1	FULL DRAWDOWN - NO BERM - ARC CUT FROM OPPOSITE	
		SLOPE THRU EMB. (26.5°-800) ONLY	2.2
UP	3:1	SAME CONDITIONS AS TRIAL #1	1.79
UP	3:1	SAME CONDITIONS AS TRIAL #1	1.76
DN	2½:1	DRAIN @ $c/b = 0.5$ - NO BERM - ARC CUT FROM OPPOSITE	
		SLOPE THRU EMB. (28.5°-375) ONLY	1.92
DN	2½:1	SAME CONDITIONS AS TRIAL #4	2.0
DN	2½:1	SAME CONDITIONS AS TRIAL #4	2.1

Form SCS 130
5-65

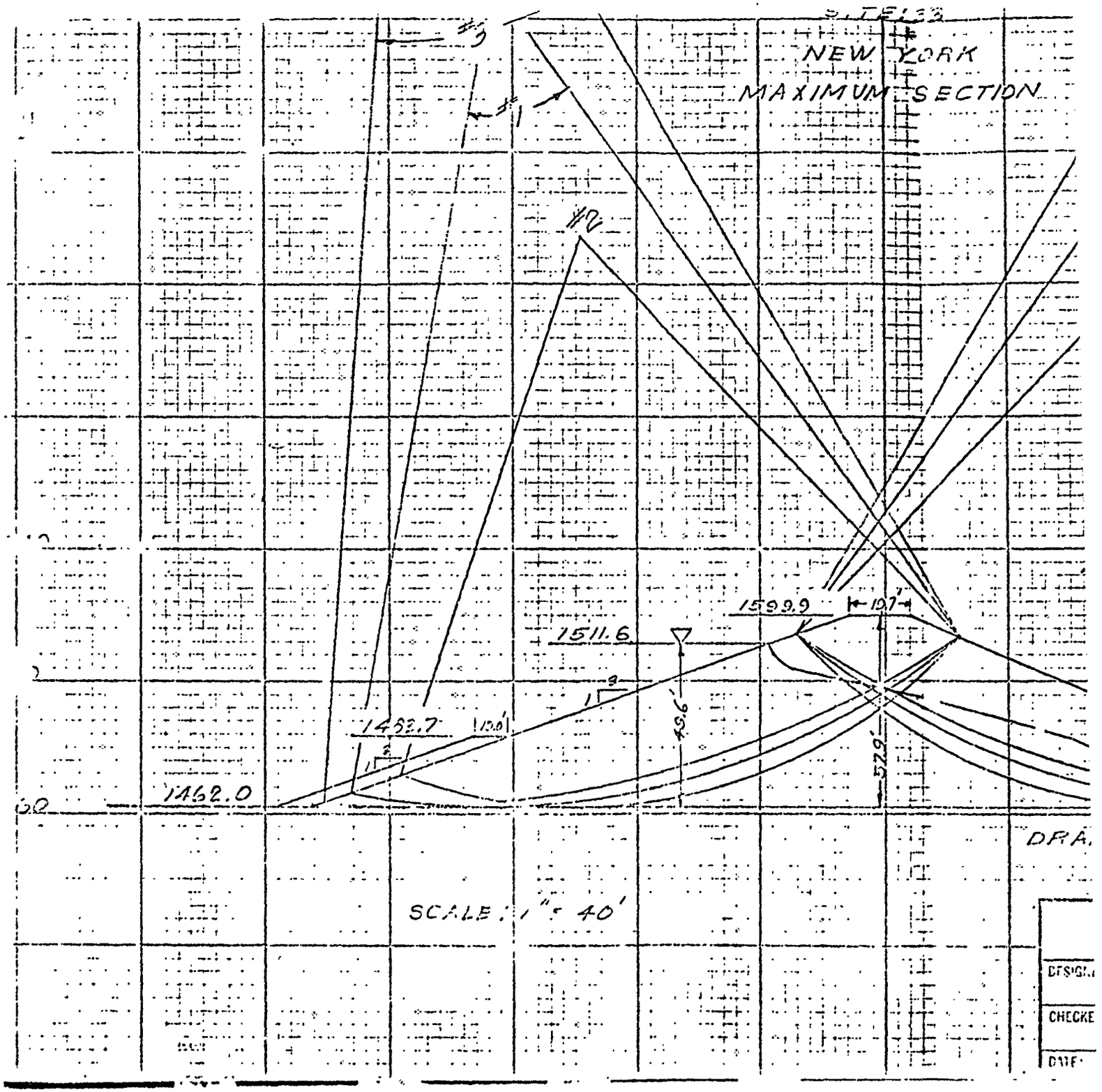
MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	DRAIN MATERIALS

PROJECT and STATE: Conewango Creek, Site 33, New York

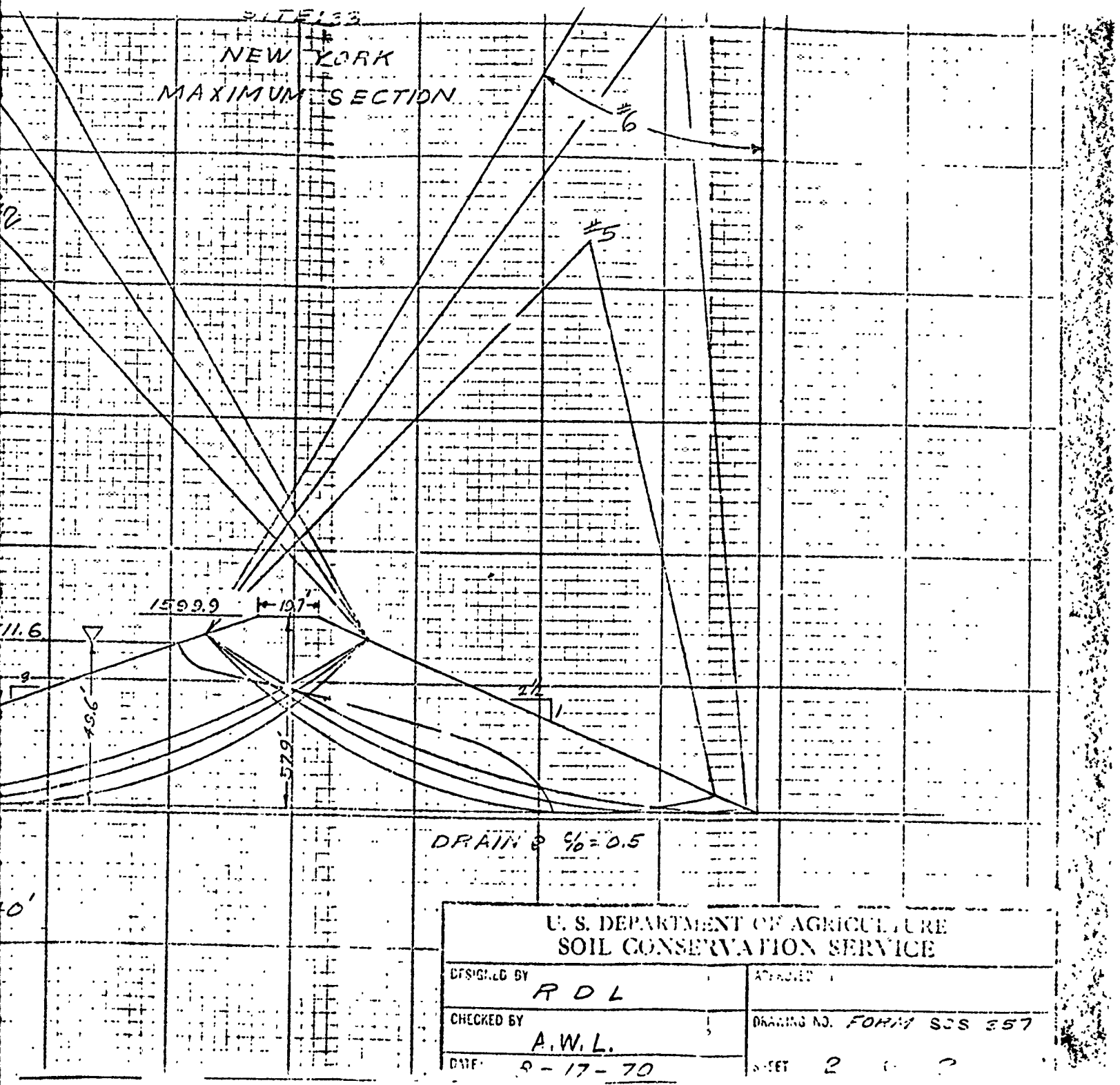
DESIGNED AT: SML - Lincoln | BY: CHMc | DATE: 9/70



REMARKS * Regraded to minus 1"


NEW YORK
MAXIMUM SECTION
#3
#1
#2
1599.9
19.1'
1511.6
49.6'
1482.7
13.0'
1462.0
57.9'
SCALE: 1" = 40'

1



U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	
DESIGNED BY R D L	APPROVED
CHECKED BY A. W. L.	DRAWING NO. FORM SCS 357
DATE 9 - 17 - 70	SHEET 2

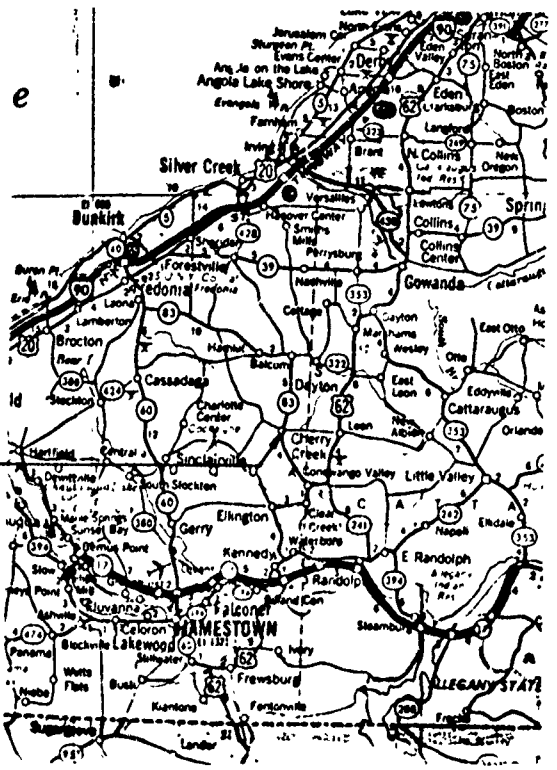
2

1

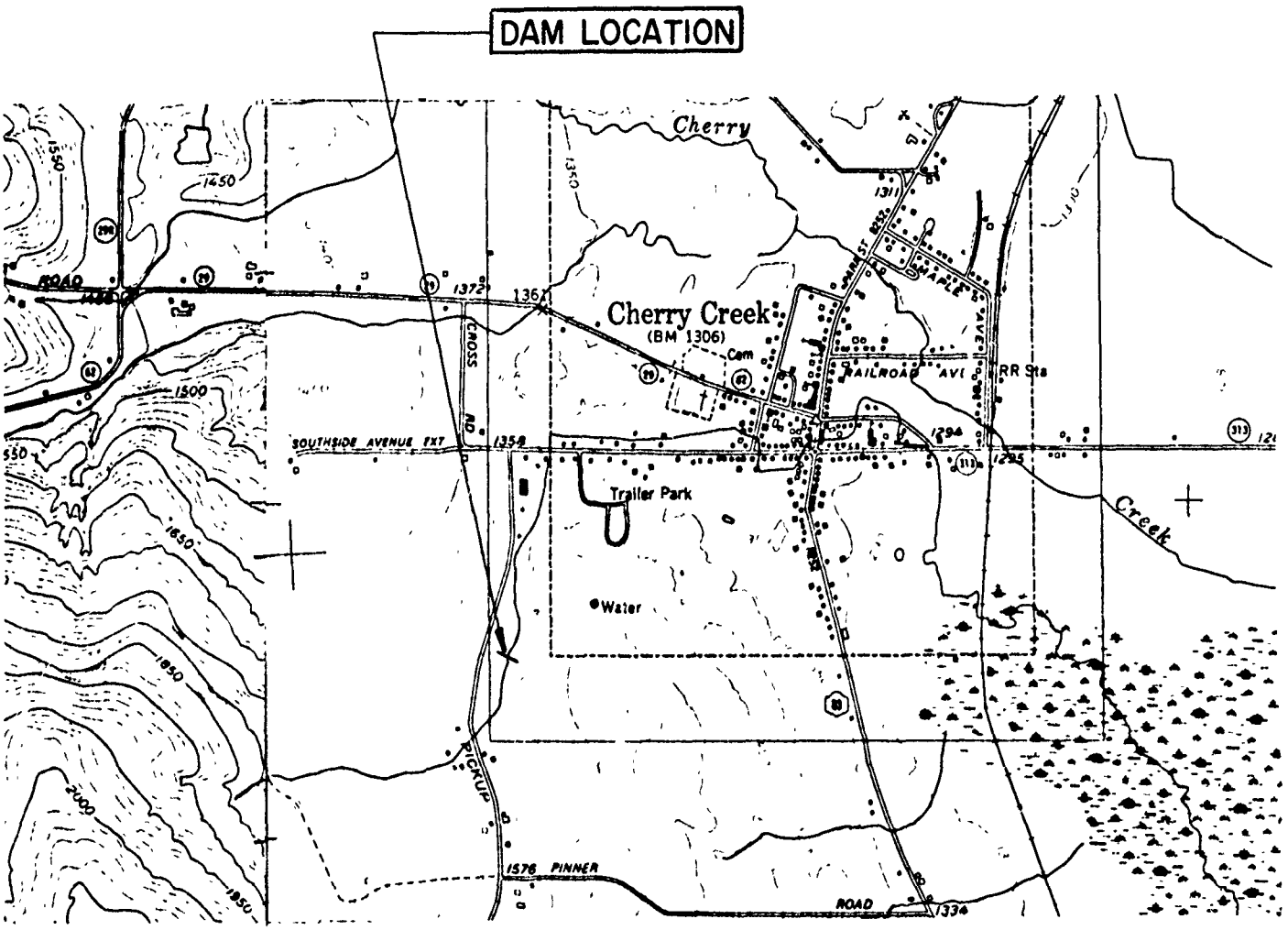
2

APPENDIX F

AS-BUILT DRAWINGS



VICINITY MAP
CONEWANGO WATERSHED PROJECT
SITE 33
I.D. NO. N.Y. 581



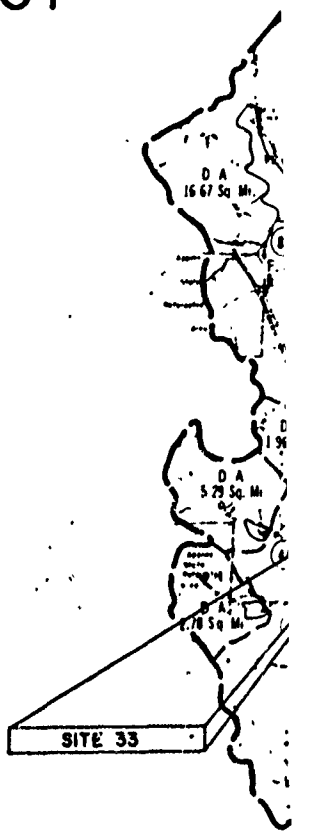
TOPOGRAPHIC MAP
CONEWANGO WATERSHED PROJECT
SITE 33
I.D. NO. N.Y. 581

CONEWANGO CREEK WATERSHED PROJECT

FLOODWATER RETARDING DAM

SITE 33 AS BUILT

DRAINAGE AREA	300 Acres
FLOOD STORAGE (TO EMERGENCY SPILLWAY CREST)	68 Ac.Ft.
WATER SURFACE AREA (SEDIMENT POOL)	0.7 Acres
HEIGHT OF DAM	57 Feet
VOLUME OF FILL	~~54,100~~ 50,676 Cu.Yds.



BUILT UNDER THE WATERSHED PROTECTION AND FLOOD PREVENTION ACT

BY

CONEWANGO CREEK WATERSHED COMMISSION

WITH THE ASSISTANCE OF THE

SOIL CONSERVATION SERVICE

OF THE

U. S. DEPARTMENT OF AGRICULTURE

INDEX

AS BUILT

AS BUILT

ERSHED PROJECT
NG DAM
BUILT

300 Acres
68 Ac.Ft.

0.7 Acres

57 Feet
~~54,00~~ Cu.Yds.
50,676

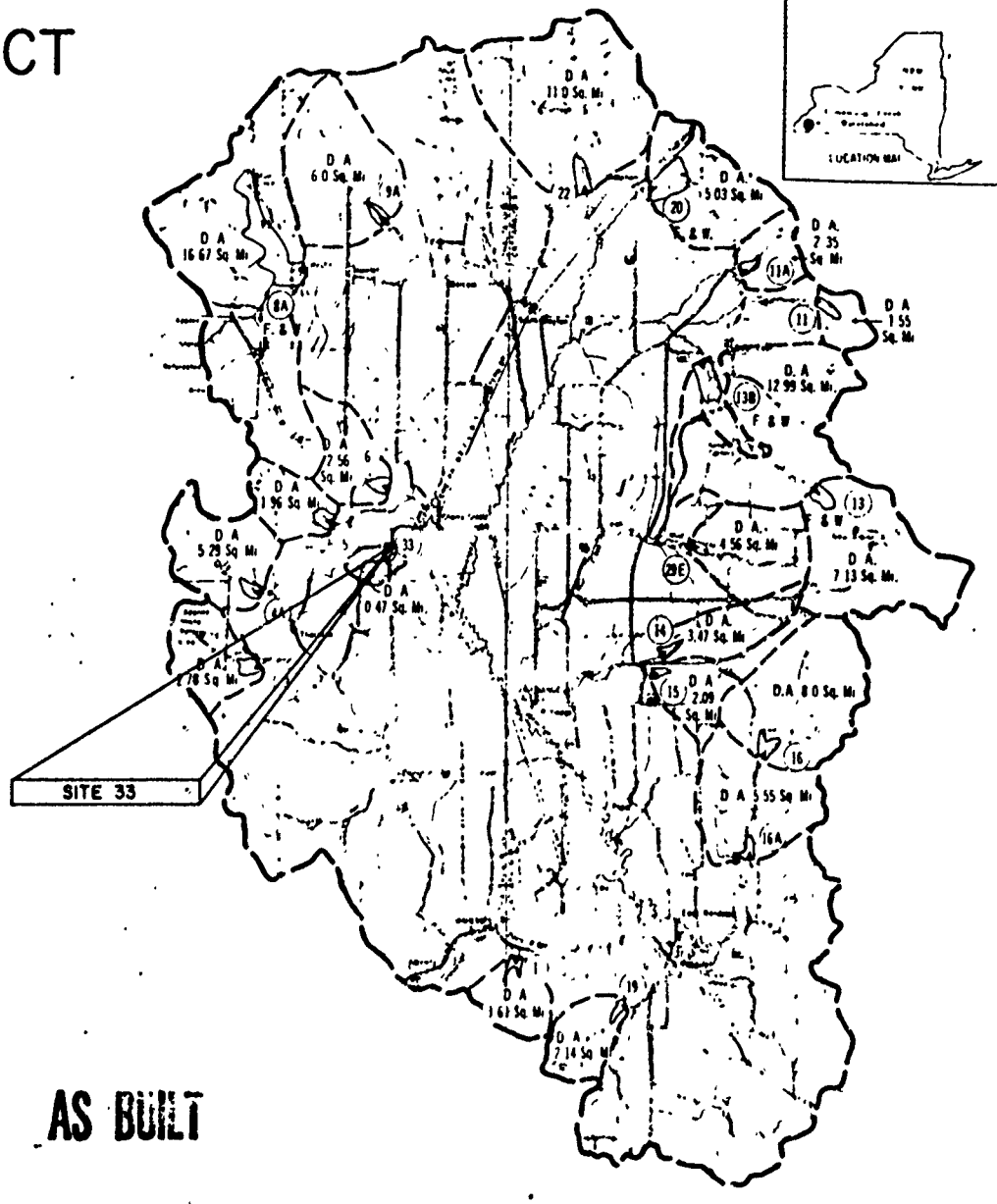
ROTECTION AND
ACT

HED COMMISSION
F THE
RVICE

ULTURE

SPILLWAY EXCAVATION

WAY



AS BUILT

AS BUILT

AS BUILT
12/9/74

CONEWANGO CREEK WATERSHED PROJECT
SITE 33
FLOODWATER RETARDING DAM
CHAUTAUQUA COUNTY, NEW YORK
COVER SHEET
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed W.A. RIEGEL Date 12/70
Drawn
Traced
Checked Lee Beck 3/71

Approved by STATE CONSERVATIONIST ENGINEER
Glenn E. Stuck
HEAD, ENG. & WS PLAN. UNIT

Sheet No. 1 of 22 Sheets
Project No. NY-2173-P

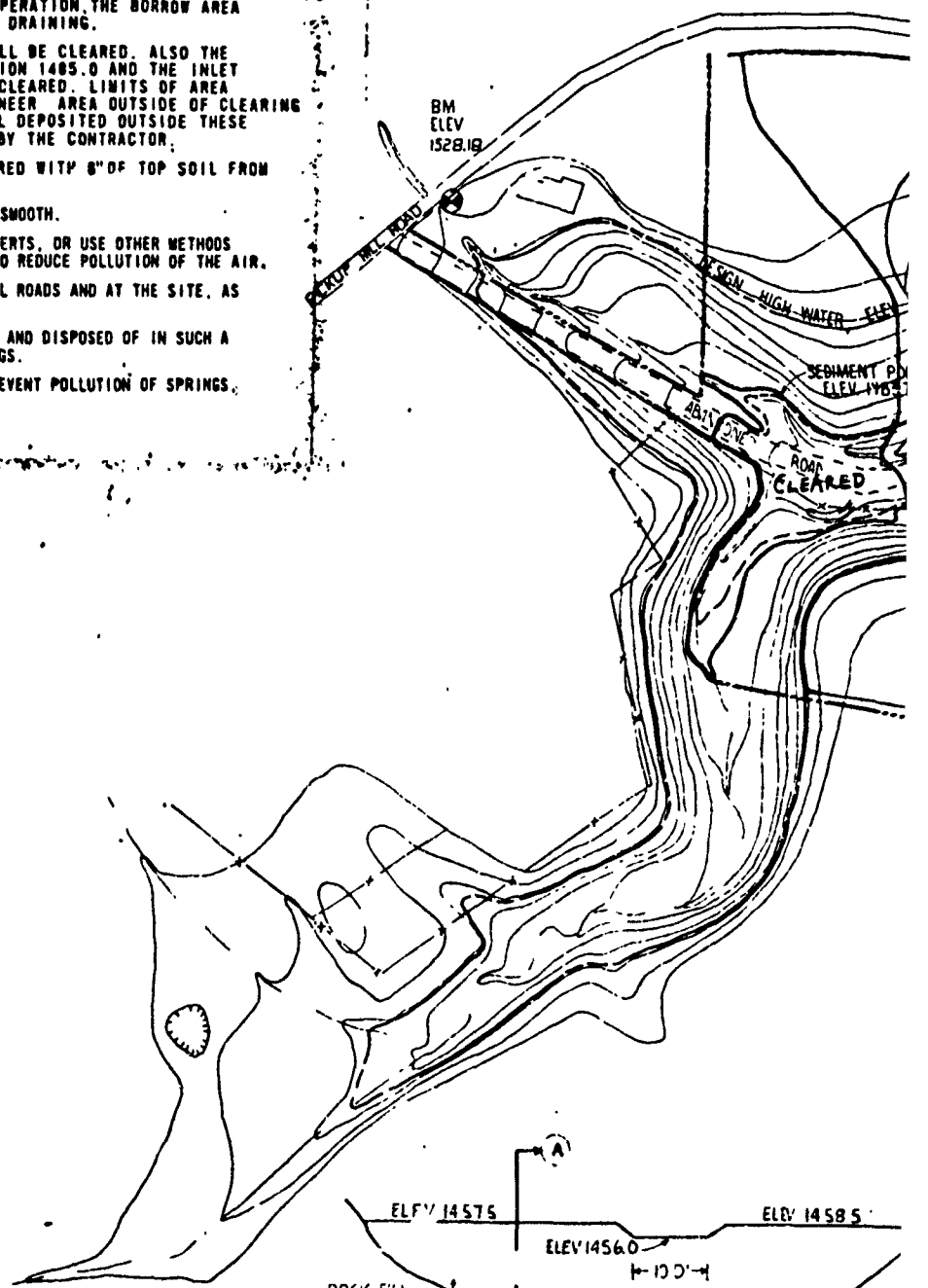
1

2

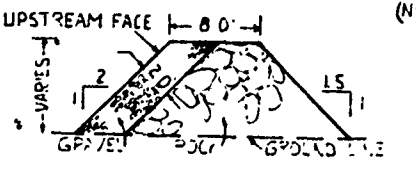
32

CONSTRUCTION DETAILS

1. AREAS UNDER THE DAM (INCLUDING 15 FEET OUTSIDE THE UPSTREAM AND DOWNSTREAM TOES), AND SEDIMENT BASIN, AND IN EMERGENCY SPILLWAY (INCLUDING 15 FEET OUTSIDE THE CUT SLOPE), AND BORROW AREA TO BE CLEARED AND GRUBBED. LIMITS OF AREA TO BE CLEARED AND GRUBBED SHALL BE STAKED IN THE FIELD BY THE ENGINEER.
2. DEPTHS AND LIMITS OF BORROW EXCAVATION SHALL BE DETERMINED IN THE FIELD BY THE ENGINEER AS REQUIRED. AT THE COMPLETION OF EARTHFILL OPERATION, THE BORROW AREA SHALL BE LEFT GENTLY SLOPING, GENERALLY SMOOTH AND FREE DRAINING.
3. AREAS UPSTREAM FROM DAM AND BELOW ELEVATION 1485.0 SHALL BE CLEARED. ALSO THE AREA 50.0' WIDE ON THE LEFT ABUTMENT BORDERED BY ELEVATION 1485.0 AND THE INLET CHANNEL OF THE EMERGENCY SPILLWAY (EXTENDED) IS TO BE CLEARED. LIMITS OF AREA TO BE CLEARED SHALL BE STAKED IN THE FIELD BY THE ENGINEER. AREA OUTSIDE OF CLEARING AND GRUBBING LIMITS SHALL BE LEFT UNDISTURBED. MATERIAL DEPOSITED OUTSIDE THESE LIMITS BY THE CONSTRUCTION OPERATIONS WILL BE REMOVED BY THE CONTRACTOR.
4. BOTTOM SECTION OF THE EMERGENCY SPILLWAY IS TO BE COVERED WITH 8" OF TOP SOIL FROM STATION 1+50 TO APPROXIMATELY 5+80
5. WASTE AREAS SHALL BE GRADED TO BE FREE DRAINING AND GENERALLY SMOOTH.
6. THE CONTRACTOR SHALL CONSTRUCT TEMPORARY BRIDGES, INSTALL CULVERTS, OR USE OTHER METHODS APPROVED BY THE ENGINEER WHERE HAUL ROADS CROSS LIVE STREAMS TO REDUCE POLLUTION OF THE AIR.
7. THE CONTRACTOR SHALL SPRINKLE OR APPLY DUST SUPPRESSORS ON HAUL ROADS AND AT THE SITE, AS NECESSARY, TO REDUCE POLLUTION OF THE AIR.
8. ALL CHEMICALS, FUELS, AND LUBRICANTS SHALL BE LOCATED, STORED, AND DISPOSED OF IN SUCH A MANNER AS TO PREVENT THEIR ENTRY INTO STREAMS, WELLS, OR SPRINGS.
9. SANITARY FACILITIES SHALL BE LOCATED IN SUCH A MANNER AS TO PREVENT POLLUTION OF SPRINGS, WELLS, AND STREAMS.



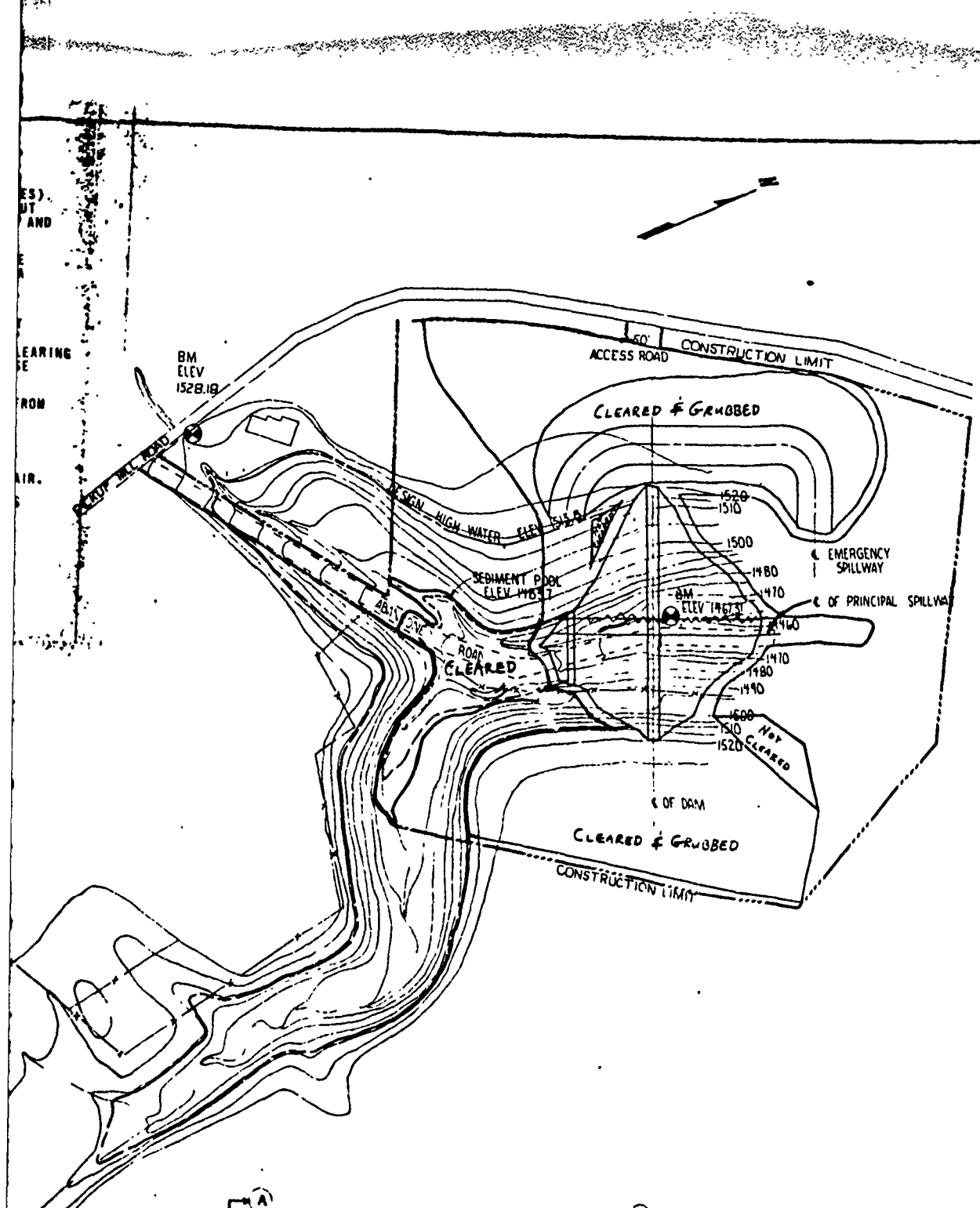
PROFILE ALONG ℄ OF SEDIMENT BASIN
(STE... 3 FOR ... ...)

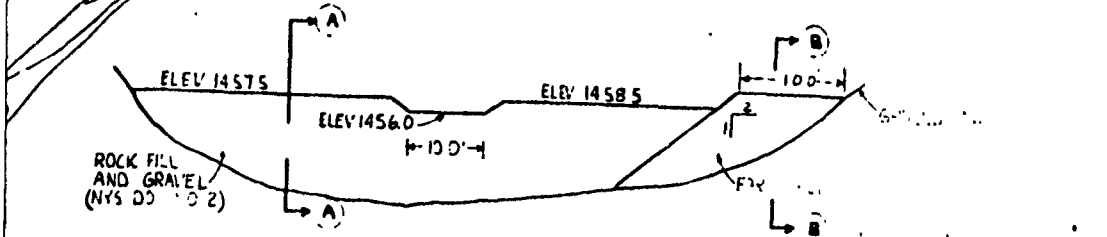


SECTION A-A

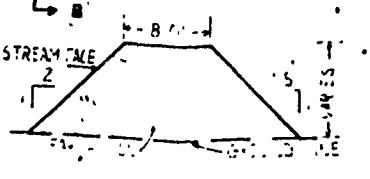
SEDIMENT BASIN CONSTRUCTION DETAILS

SEDIMENT BASIN LOCATION AND LENGTH AS SHOWN ON SI... DAM AND MAY BE ADJUSTED IN THE FIELD BY THE ENGINEER
2. EARTH FILL COMPACTION SHALL BE MADE BY A MINIMUM OF ONE PASS OF VEHICLE USED FOR PLACING MATERIAL
3. SOURCE OF EARTH FILL USED FOR SEDIMENT BASIN WILL BE DETERMINED IN THE FIELD BY THE ENGINEER





PROFILE ALONG ℄ OF SEDIMENT BASIN
(SEE SHEET 3 FOR LOCATION)



SECTION B-B

SEDIMENT BASIN CONSTRUCTION DETAILS

1. SEDIMENT BASIN LOCATION AND LENGTH AS SHOWN ON SH 3 SHALL BE STAKED AND WILL BE STAKED IN THE FIELD BY THE ENGINEER
2. EARTH FILL COMPACTION SHALL BE MADE BY A MINIMUM OF ONE PASS OF HAULAGE USED FOR PLACING MATERIAL
3. SOURCE OF EARTH FILL USED FOR SEDIMENT BASIN WILL BE DETERMINED IN THE FIELD BY THE ENGINEER

QUANTITIES

LOOSE ROCK RIPRAP	10 CY
NYS DOT NO 2 GRAVEL	60 CY
EARTH FILL	30 CY

5' CONTOUR INTERVAL

0 50 100 200
SCALE IN FEET

AS BUILT 12/1/74

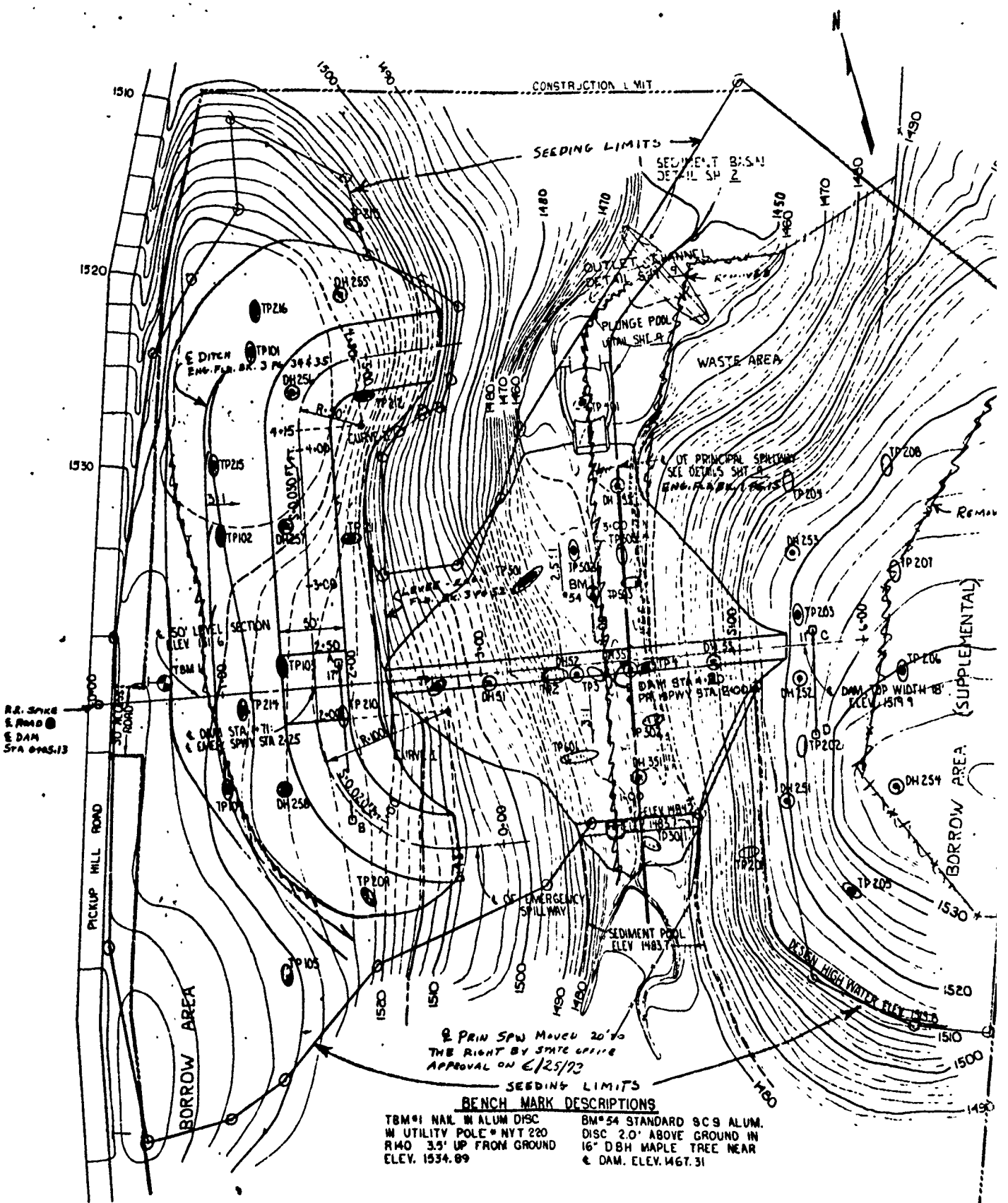
DATE	ITEM	APP'D
APRIL 72	SEDIMENT BASIN DETAILS	
	REVISION	

CONEWANGO CREEK WATERSHED PROJECT
SITE 33
FLOODWATER RETARDING DAM
CHAUTAUQUA COUNTY, NEW YORK
PLAN OF STORAGE AREA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

DESIGNED	W A RIEGEL	2-71
DRAWN	W GRAJKO JR	11/69
TRACED	D.M.C	6/69

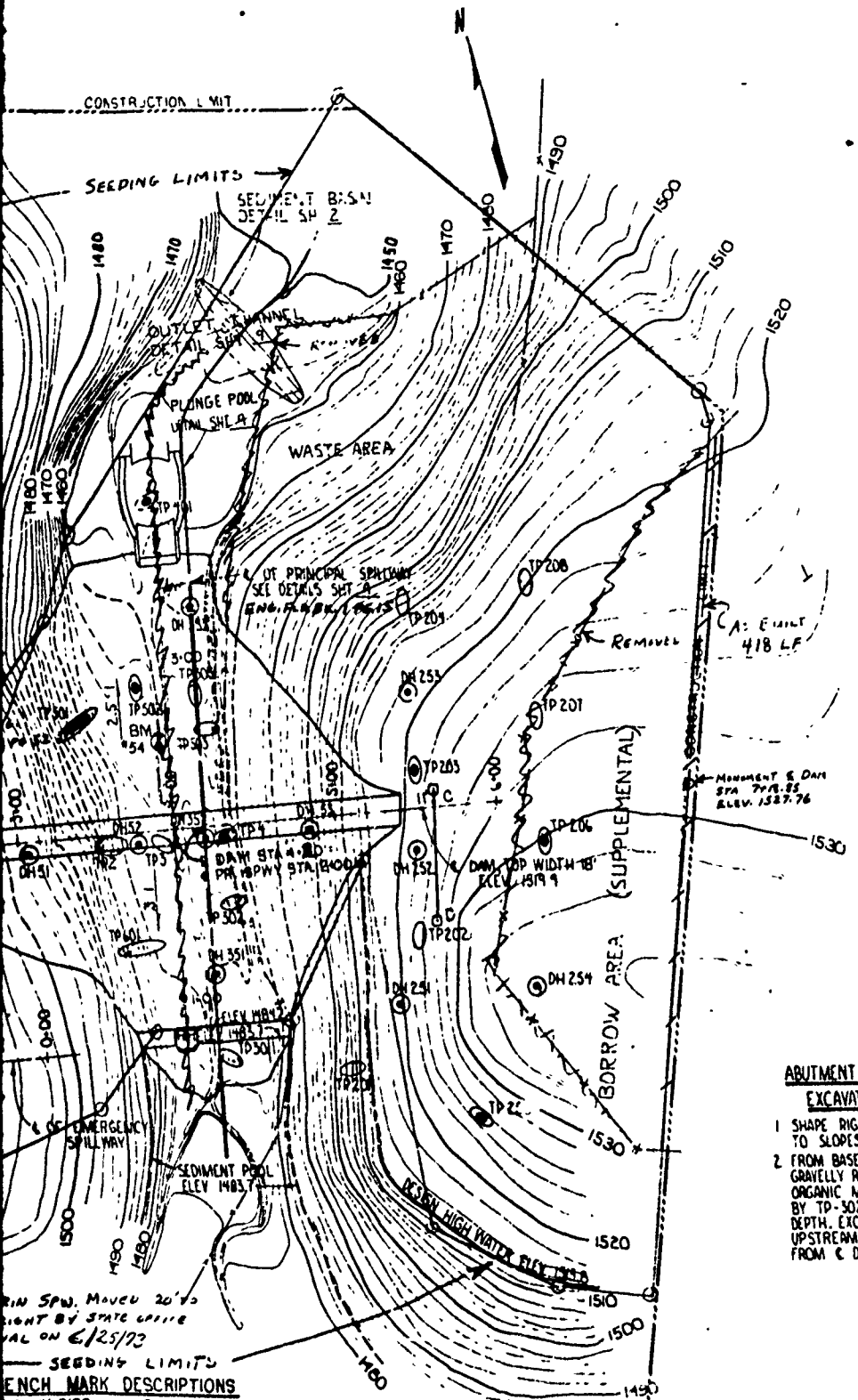
2 NY-2173-P



BENCH MARK DESCRIPTIONS

TBM #1 NAIL IN ALUM DISC IN UTILITY POLE # NYT 220 R140 3.5' UP FROM GROUND ELEV. 1534.89

BM #54 STANDARD SCS ALUM. DISC 2.0' ABOVE GROUND IN 16" DBH MAPLE TREE NEAR ℄ DAM. ELEV. 1467.31



LEGEND

- 1500 — CONTOUR LINE
- — & STREAM
- — FENCE LINE
- — BENCH MARK
- — DESIGN HIGH WATER
- — SEDIMENT POOL
- — HUB
- — FENCE LINE (EXISTING)
- — ROAD
- — TEST PIT (LOGGED ONLY)
- — TEST PIT (LOGGED & SAMPLED)
- — DRILL HOLE (LOGGED & SAMPLED)
- — CONSTRUCTION LIMIT
- — FENCE LINE (PLANNED)
- — CLEARING LIMIT
- — DESIGN HIGH WATER

CURVE I LAYOUT DATA

Δ = 90°00'	T = 100.0
R = 100.0	E = 41.42
D = 57°18	M = 29.29
L = 157.0	

℄ STA	DEFLECT ∠	CHORD DIST
2+00	0°00	—
1+75	7°10	24.94
1+50	14°19	24.94
1+25	21°29	24.54
1+00	28°39	24.94
0+75	35°49	24.94
0+93	45°00	31.93

CURVE II LAYOUT DATA

Δ = 85°57'	T = 46.57
R = 50.0	E = 18.33
D = 114°36'	M = 13.41
L = 75.0	

℄ STA	DEFLECT ∠	CHORD DIST
4+15	0°00	—
4+90	14°20	24.74
4+65	28°39	24.74
4+90	42°58	24.74

ABUTMENT AND FOUNDATION EXCAVATION DETAILS

1. SHAPE RIGHT AND LEFT ABUTMENTS TO SLOPES SHOWN ON SHEET 4.
2. FROM BASE WIDTH OF DAM REMOVE GRAVELLY ROAD FILL CONTAINING ORGANIC MATERIAL AS REPRESENTED BY TP-302 FROM 0.6' TO 3.0' DEPTH. EXCAVATION LIMITS FROM 60' UPSTREAM TO 170' DOWNSTREAM FROM ℄ DAM.

SOILS DETAILS

SEE SHEETS 18, 19, 20, 21 FOR DESCRIPTION OF TEST PITS AND DRILL HOLES.

0 25 50 100
SCALE IN FEET

2' CONTOURS

AS BUILT 12/9/74

BENCH MARK DESCRIPTIONS

ALUM. DISC
LE * NYT 220
FROM GROUND

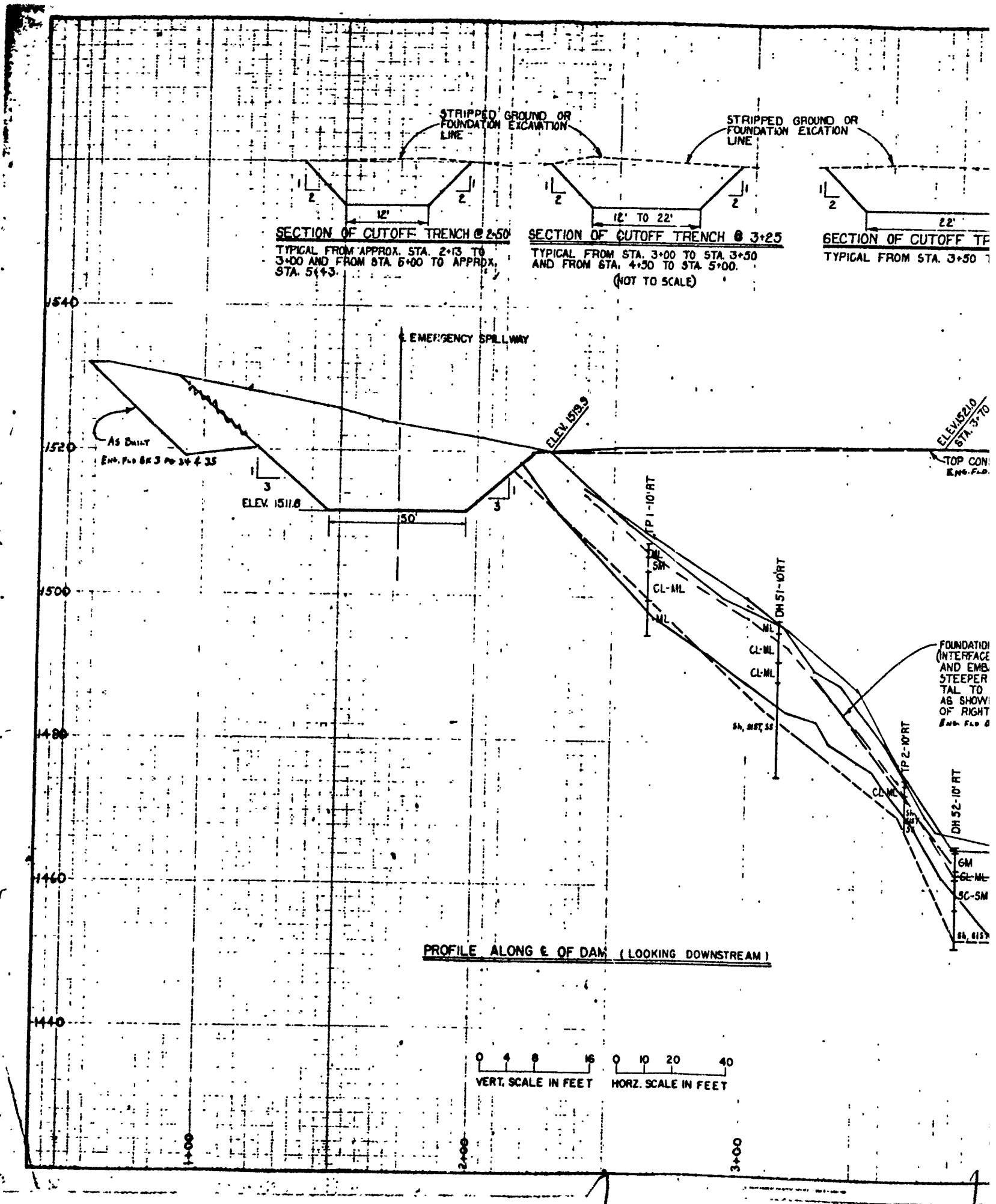
BM #54 STANDARD BCS ALUM. DISC 2.0' ABOVE GROUND IN 16" DBH MAPLE TREE NEAR ℄ DAM. ELEV. 1467.31

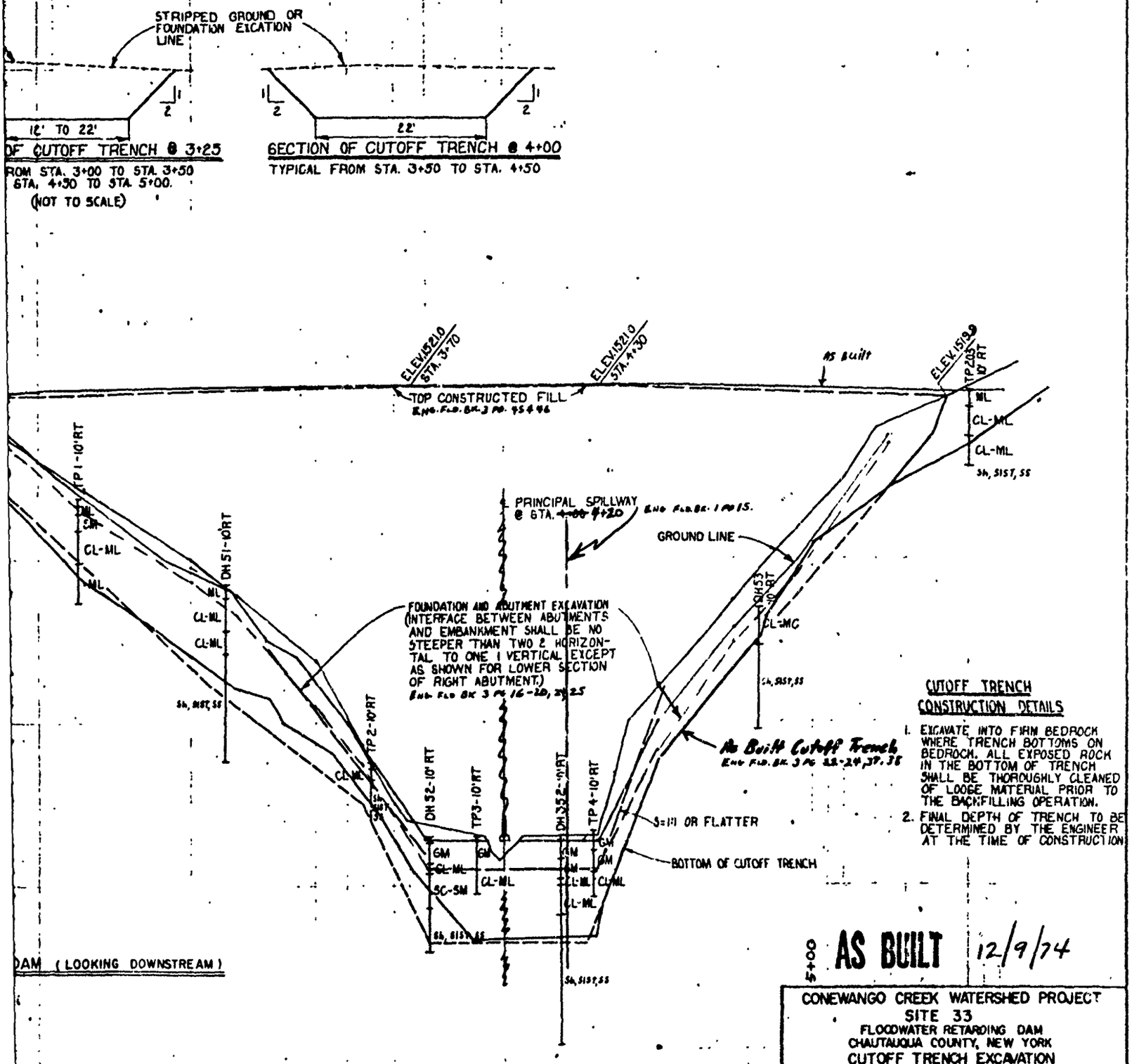
CONEWANGO CREEK WATERSHED PROJECT
SITE 33
FLOODWATER RETARDING DAM
CHAUTAUQUA COUNTY, NEW YORK
PLAN OF STRUCTURAL WORKS

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

W.A. RIEGEL	12-70	
P. ANGELO	1-71	
W. GRAJKO Jr.	1-71	
J. DE VITA III	6-69	

NY-2173-P


STRIPPED GROUND OR FOUNDATION EXCAVATION LINE
12'
SECTION OF CUTOFF TRENCH @ 2+50
TYPICAL FROM APPROX. STA. 2+13 TO 3+00 AND FROM STA. 6+00 TO APPROX. STA. 5+43.
STRIPPED GROUND OR FOUNDATION EXCATION LINE
12' TO 22'
SECTION OF CUTOFF TRENCH @ 3+25
TYPICAL FROM STA. 3+00 TO STA. 3+50 AND FROM STA. 4+50 TO STA. 5+00.
(NOT TO SCALE)
22'
SECTION OF CUTOFF TR
TYPICAL FROM STA. 3+50 T
1540
1520
1500
1480
1460
1440
℄ EMERGENCY SPILLWAY
AS BUILT
ELEV. 1511.8
50'
ELEV. 1519.5
ELEV. 1521.0
STA. 3+70
TOP CON
DH 51-10'RT
TP 1-10'RT
SM
CL-ML
ML
DH 52-10' RT
TP 2-10'RT
FOUNDATIO
(INTERFACE
AND EMB
STEEPER
TAL TO
AS SHOW
OF RIGHT
GM
GC-ML
SC-SM
1+00
2+00
3+00
PROFILE ALONG ℄ OF DAM (LOOKING DOWNSTREAM)
0 4 8 16
VERT. SCALE IN FEET
0 10 20 40
HORZ. SCALE IN FEET



CUTOFF TRENCH CONSTRUCTION DETAILS

1. EXCAVATE INTO FIRM BEDROCK WHERE TRENCH BOTTOMS ON BEDROCK. ALL EXPOSED ROCK IN THE BOTTOM OF TRENCH SHALL BE THOROUGHLY CLEANED OF LOOSE MATERIAL PRIOR TO THE BACKFILLING OPERATION.
2. FINAL DEPTH OF TRENCH TO BE DETERMINED BY THE ENGINEER AT THE TIME OF CONSTRUCTION

AS BUILT 12/9/74

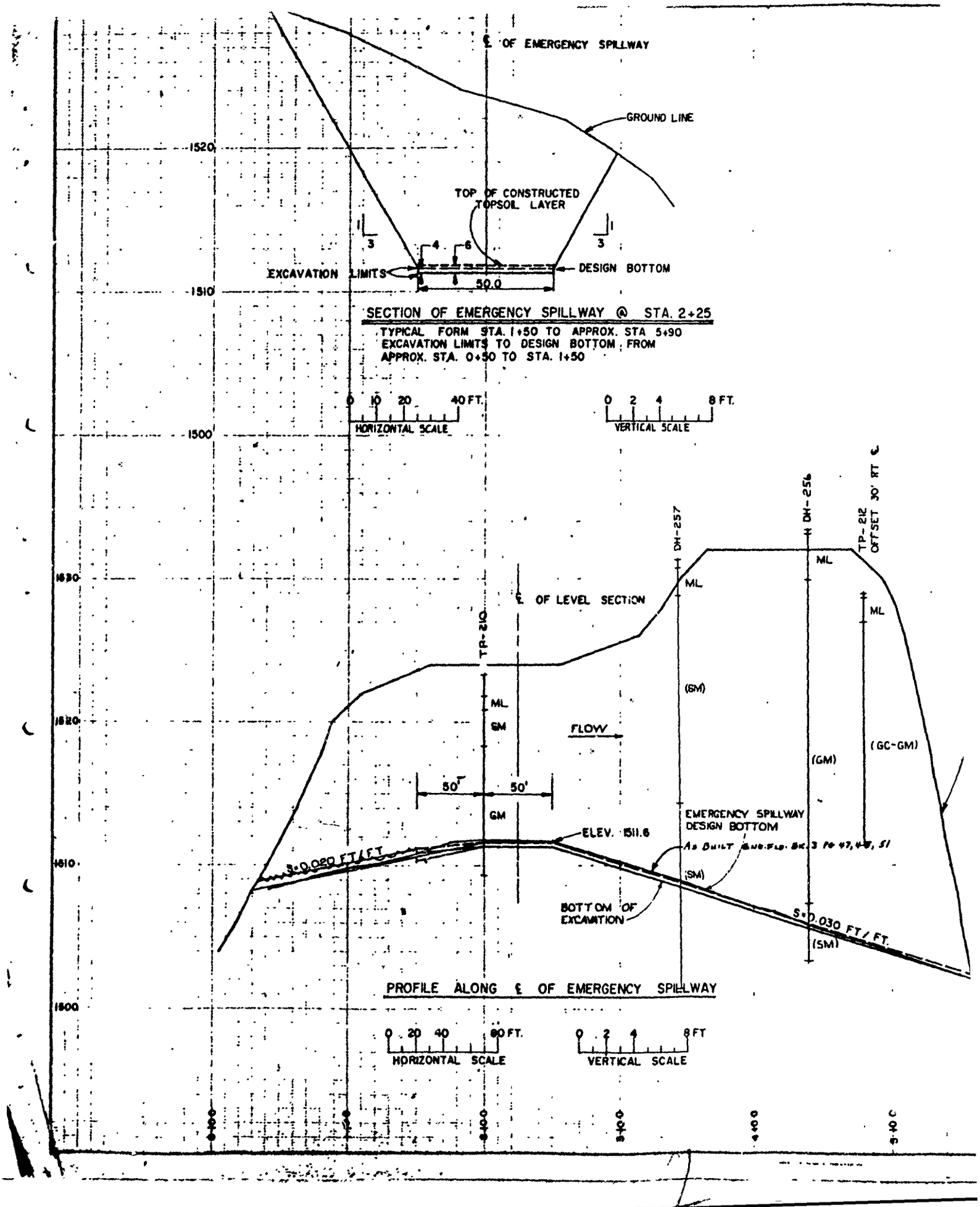
CONEWANGO CREEK WATERSHED PROJECT
SITE 33
FLOODWATER RETARDING DAM
CHAUTAUQUA COUNTY, NEW YORK
CUTOFF TRENCH EXCAVATION

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

		Date
Designed	W.A. RIEGEL	11/70
Drawn	D. BURDICK	1/71
Traced		
Checked	W.A.R.	2/71

Approved by
Title
Title
Sheet No. 4 of 23
Drawing No. NY-2173-P

SCS-ENG-316 (Rev. 2-69)


℄ OF EMERGENCY SPILLWAY
GROUND LINE
TOP OF CONSTRUCTED TOPSOIL LAYER
1
3
1
3
4
6
EXCAVATION LIMITS
DESIGN BOTTOM
50.0
1520
1510
SECTION OF EMERGENCY SPILLWAY @ STA. 2+25
TYPICAL FORM STA. 1+50 TO APPROX. STA 5+90
EXCAVATION LIMITS TO DESIGN BOTTOM, FROM
APPROX. STA. 0+50 TO STA. 1+50
0 10 20 40 FT.
HORIZONTAL SCALE
0 2 4 8 FT.
VERTICAL SCALE
1500
DH-257
DH-256
TP-212
OFFSET 30' RT ℄
1530
ML
℄ OF LEVEL SECTION
TP-210
(GM)
ML
GM
FLOW
1520
50'
50'
(GC-GM)
(GM)
EMERGENCY SPILLWAY
DESIGN BOTTOM
ELEV. 1511.6
As Built Engr. Fld. Bk. 3 Pg 47, 48, 51
S=0.020 FT/FT
1510
(SM)
BOTTOM OF EXCAVATION
S=0.030 FT/FT.
(SM)
PROFILE ALONG ℄ OF EMERGENCY SPILLWAY
1500
0 20 40 80 FT.
HORIZONTAL SCALE
0 2 4 8 FT
VERTICAL SCALE
4+00
4+00
5+00
4+00
5+00

Y SPILLWAY

GROUND LINE

1
3

ESIGN BOTTOM

AY @ STA. 2+25

ROX. STA. 5+90
TOM , FROM

0 2 4 8 FT.
VERTICAL SCALE

DH-257

DH-256

TP-212
OFFSET 30' RT ℄

ML

ML

ML

SECTION

(GM)

(GM)

(GC-GM)

GROUND LINE

EMERGENCY SPILLWAY
DESIGN BOTTOM

V. 1511.6

As Built Engr. Fld. Bk. 3 Pg 47, 48, 51

(SM)

(SM)

S=0.030 FT/FT.

OF
ON

ENCY SPILLWAY

4 8 FT
TICAL SCALE

3+00 4+00 5+00 6+00

AS BUILT 12/9/74

CONEWANGO CREEK WATERSHED PROJECT
SITE 33
FLOODWATER RETARDING DAM
CHAUTAUQUA CO'INTY, NEW YORK
EMERGENCY SPILLWAY

U. S. DEPARTMENT OF AGRI...
SOIL CONSERVATIO...

W.A. RIEGEL 12/70
W. MAVINS 12/70

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23
NY-2173-P

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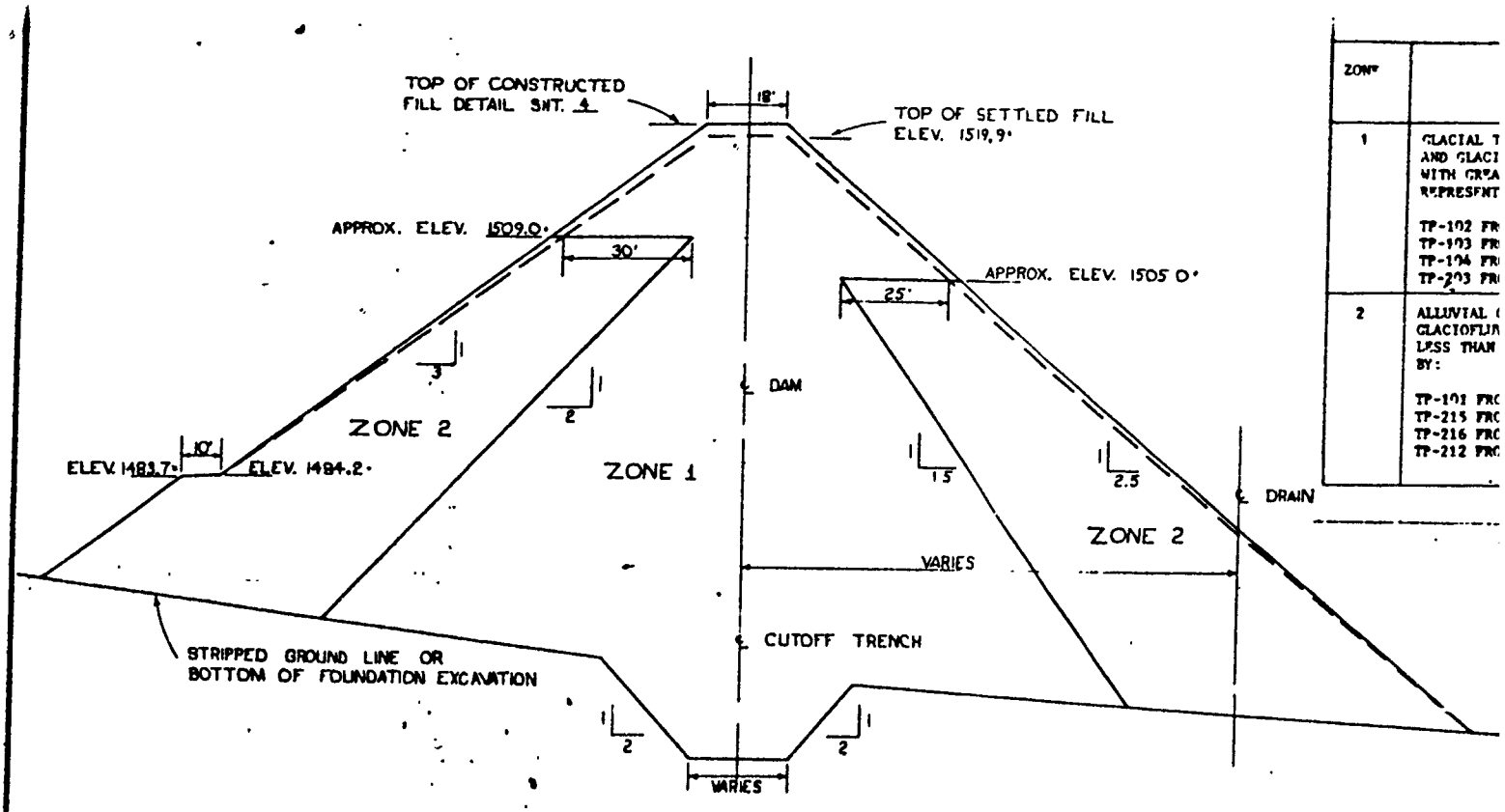
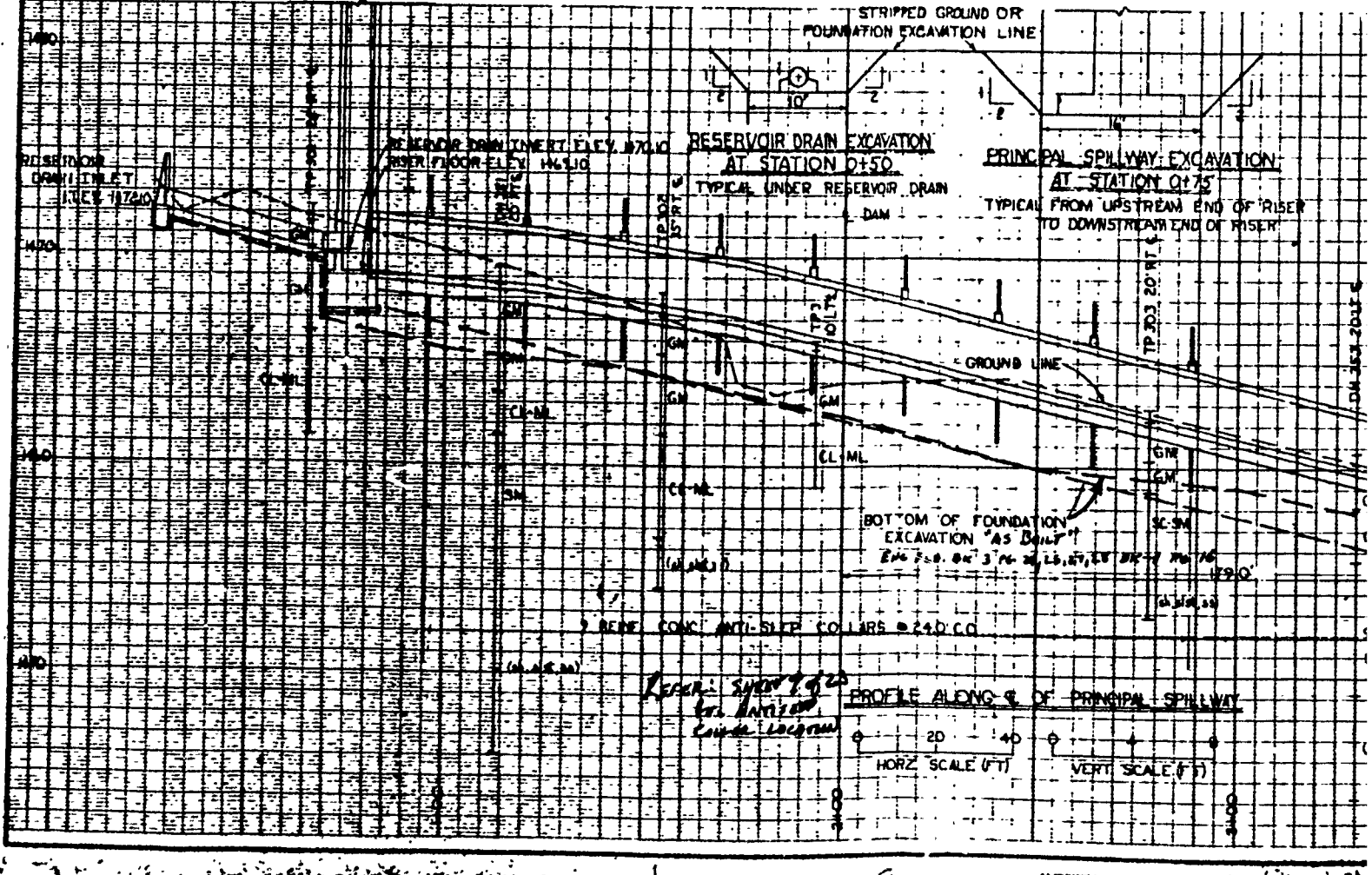


ZONE	
1	GLACIAL T AND GLACI WITH GRA REPRESENT TP-102 FR TP-103 FR TP-104 FR TP-203 FR
2	ALLUVIAL GLACIOFLU LESS THAN BY: TP-101 FR TP-215 FR TP-216 FR TP-212 FR

SECTION OF DAM AT STATION 4+25 (NOT TO SCALE)

TYPICAL FROM APPROX. STA. 2+30 TO APPROX STA 5+40



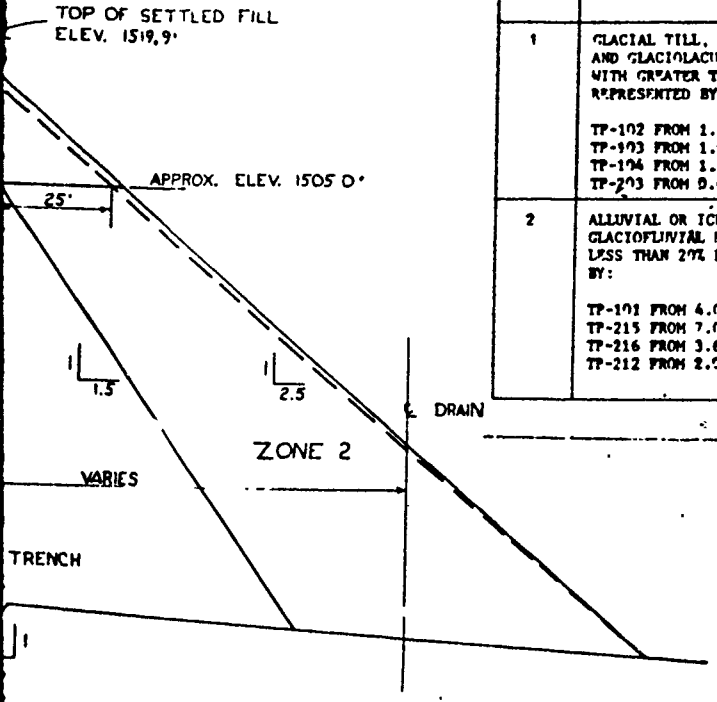
EARTH FILL REQUIREMENTS

ZONE	MATERIAL 1/	MAX. ROCK SIZE 2/	MAX. LIFT THICKNESS 3/	MIN. REQUIRED WATER CONTENT 4/	COMPACTION 5/ CLASS	COMPACTION 5/ DEFINITION
1	GLACIAL TILL, GLACIOFLUVIAL, AND GLACIOLACUSTRINE MATERIALS WITH GREATER THAN 20% FINES REPRESENTED BY: TP-102 FROM 1.0' TO 10.0' TP-103 FROM 1.0' TO 9.5' TP-104 FROM 1.0' TO 10.0' TP-203 FROM 0.6' TO 5.5'	6"	9"	2 PERCENTAGE POINTS BELOW OPTIMUM	A	95% STANDARD DENSITY BY ASTM D-698 METHOD A
2	ALLUVIAL OR ICE-CONTACT GLACIOFLUVIAL MATERIALS WITH LESS THAN 20% FINES REPRESENTED BY: TP-101 FROM 4.0' TO 10.0' TP-215 FROM 7.0' TO 16.5' TP-216 FROM 3.6' TO 16.5' TP-212 FROM 2.0' TO 17.5'	6"	9"	WET 5/	C	FOUR PASSES PER LAYER OF FILL BY A SMOOTH WHEEL VIBRATING ROLLER AT LEAST 72"WIDE, WEIGHING AT LEAST ONE TON (STATIC SERVICE WEIGHT) PER FOOT OF WIDTH AND CAPABLE OF EXERTING A DYNAMIC IMPACT OF AT LEAST 20,000 POUNDS AT THE RATE OF AT LEAST 1,200 TIMES PER MINUTE.

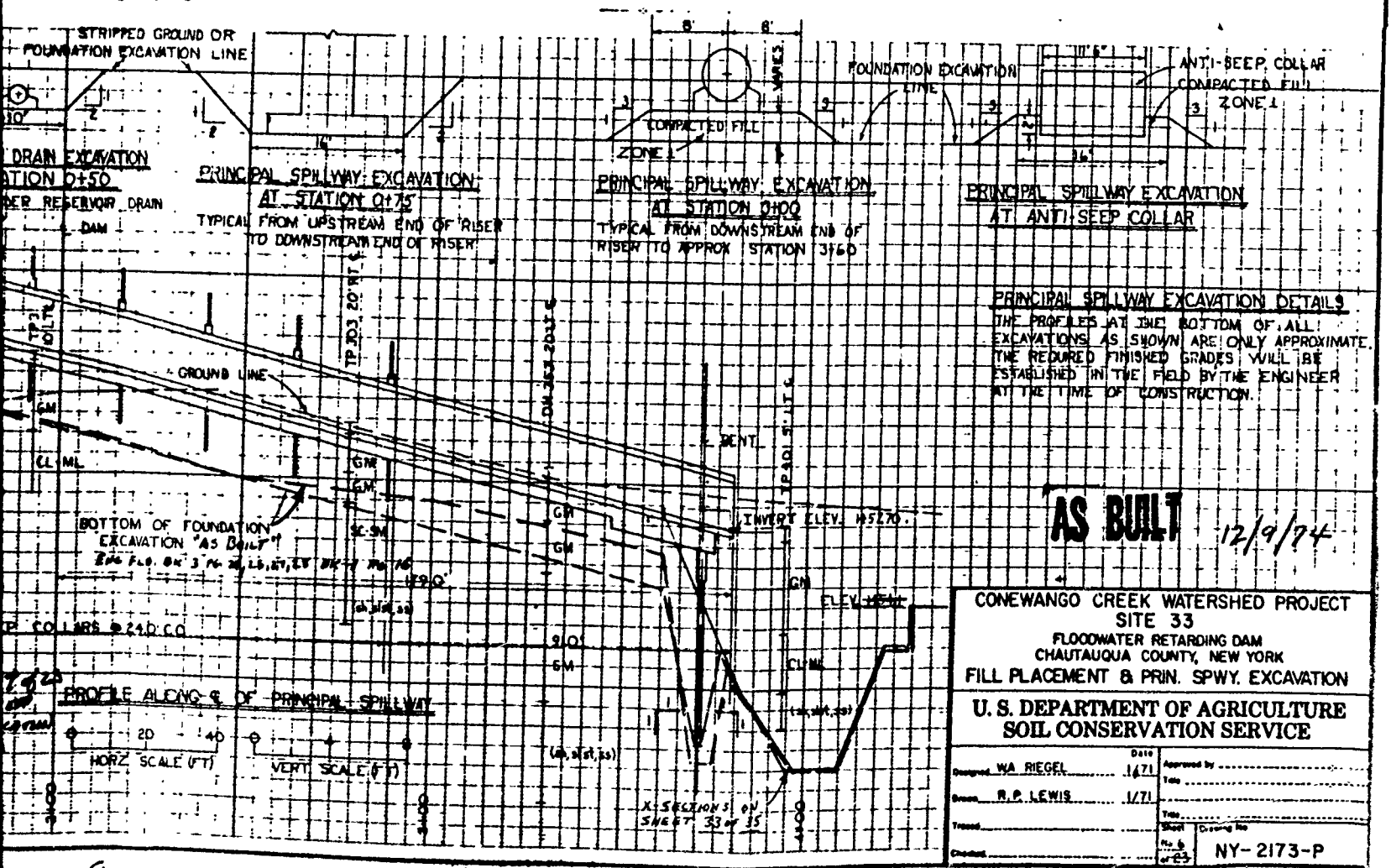
1/ THE PLACEMENT TABLE INDICATES ESTIMATED USE OF MATERIALS.
2/ MAXIMUM ROCK SIZE PLACED IN BACKFILL COMPACTED BY MEANS OF HAND TAMPING OR MANUALLY DIRECTED POWER TAMPERS OR PLATE VIBRATORS SHALL BE 3".
3/ MAXIMUM LIFT THICKNESS PRIOR TO COMPACTION.
4/ WATER CONTENT AT TIME OF COMPACTION.
5/ THOROUGHLY WET BUT:
a. NOT MORE THAN 14% MOISTURE CONTENT ON THE MATERIAL PASSING THE #4 SIEVE UNLESS MODIFIED BY THE ENGINEER AT THE TIME OF CONSTRUCTION.
OR b. NOT SO WET AS TO CAUSE ADHERENCE OF THE SOIL TO THE WHEELS OR TRACKS OF EQUIPMENT, NOR TO CAUSE BOGGING DOWN OF EQUIPMENT.
6/ FOR TYPICAL COMPACTION CURVES SEE SHEET 22

CONSTRUCTION DETAILS

1. ZONE 2 BOUNDARIES INDICATED ARE APPROXIMATE. ADJUSTMENTS WILL BE MADE BY THE ENGINEER TO PERMIT THE CONTRACTOR TO UTILIZE ALL COARSE MATERIAL (LESS THAN 20% FINES) FROM REQUIRED EXCAVATIONS, WITHIN THE NEAT LINES OF THE EMBANKMENT.
2. TOPSOIL THAT IS SUITABLE FOR USE AND NOT USED ON THE SPECIFIED AREA OF THE EMERGENCY SPILLWAY SHALL BE INCORPORATED WITHIN THE SLOPES OF THE EARTH FILL AS DIRECTED BY THE ENGINEER.



STATION 4+25 (NOT TO SCALE)
TO APPROX STA 5+40



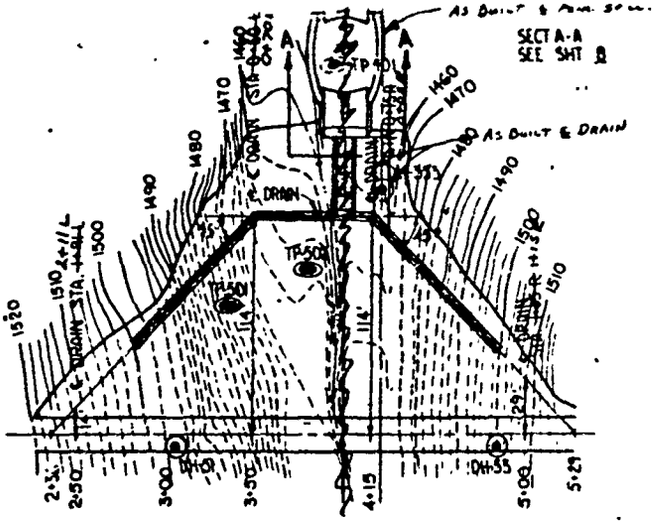
AS BUILT 12/9/74

CONEWANGO CREEK WATERSHED PROJECT
SITE 33
FLOODWATER RETARDING DAM
CHAUTAUQUA COUNTY, NEW YORK
FILL PLACEMENT & PRIN. SPWY. EXCAVATION

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

	Date	
Designed WA RIEGEL	1/71	Approved by
Drawn R.P. LEWIS	1/71	Title
Traced		Title
Checked		Sheet No. 6 of 23 — Drawing No. NY-2173-P

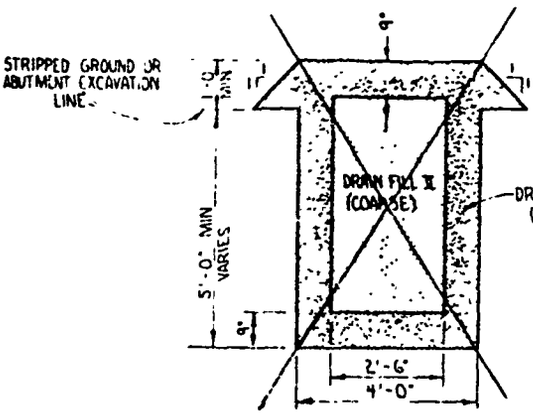
3932



PLAN VIEW

0 25 50 100

SCALE IN FEET



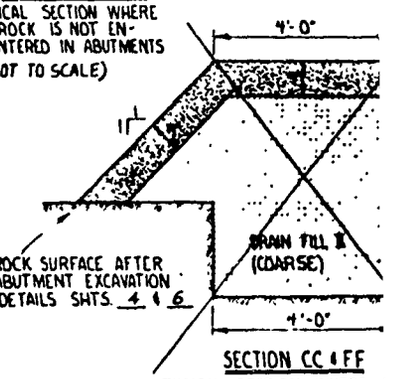
SECTION BB & GG

TYPICAL SECTION WHERE BEDROCK IS NOT ENCOUNTERED IN ABUTMENTS

(NOT TO SCALE)

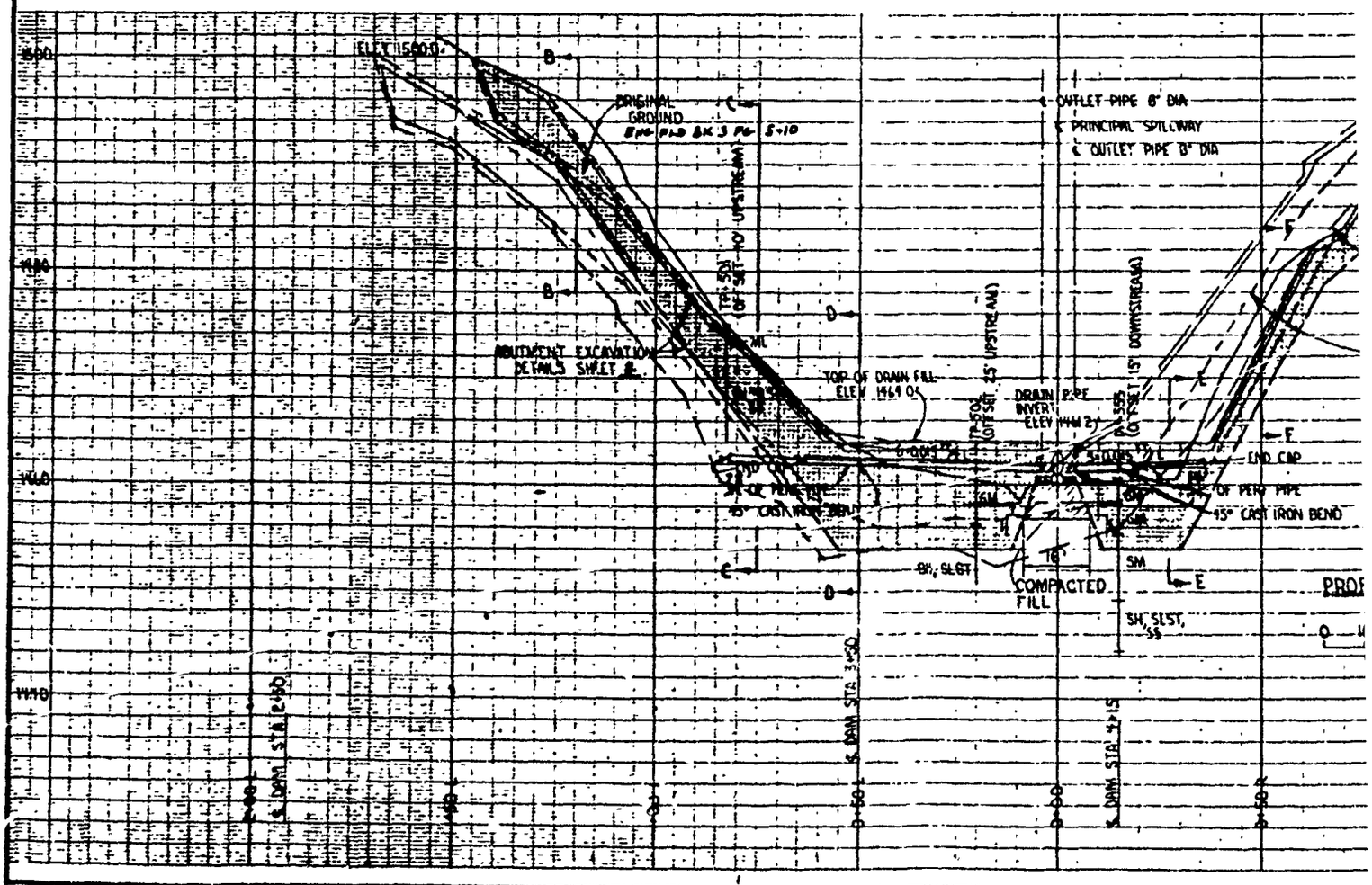
GRAIN SIZE DISTRIBUTION TABLE FOR DRAIN FILL

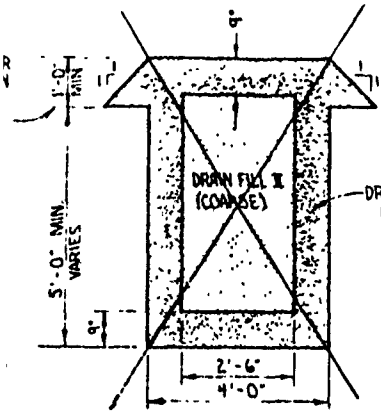
DRAIN FILL I (FINE)		DRAIN FILL II (COARSE)	
SIEVE NO	% PASSING	SIEVE NO	% PASSING
3"		3"	100
1"		1½"	87-100
⅜"	100	1"	77-100
#4	94-100	¾"	70-98
8	80-100	⅜"	42-78
16	50-85	#4	15-50
30	25-60	8	0-22
50	10-30	16	0-3
100	0-10		
200	0-3		



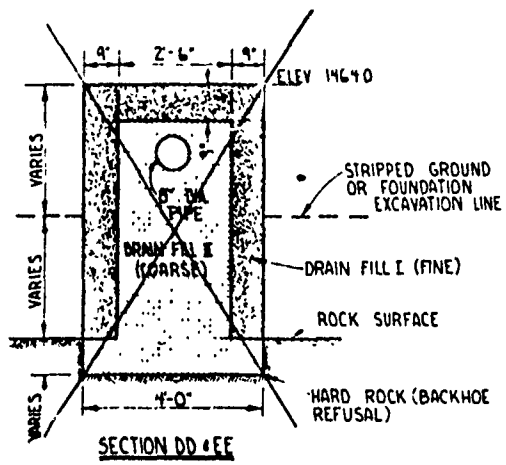
SECTION CC & FF

TYPICAL SECTION WHERE IS ENCOUNTERED IN ABU

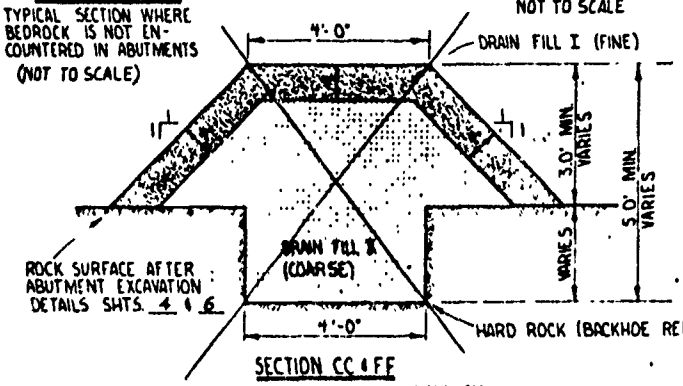




SECTION BB & GG
TYPICAL SECTION WHERE BEDROCK IS NOT ENCOUNTERED IN ABUTMENTS
(NOT TO SCALE)



SECTION DD & EE
NOT TO SCALE



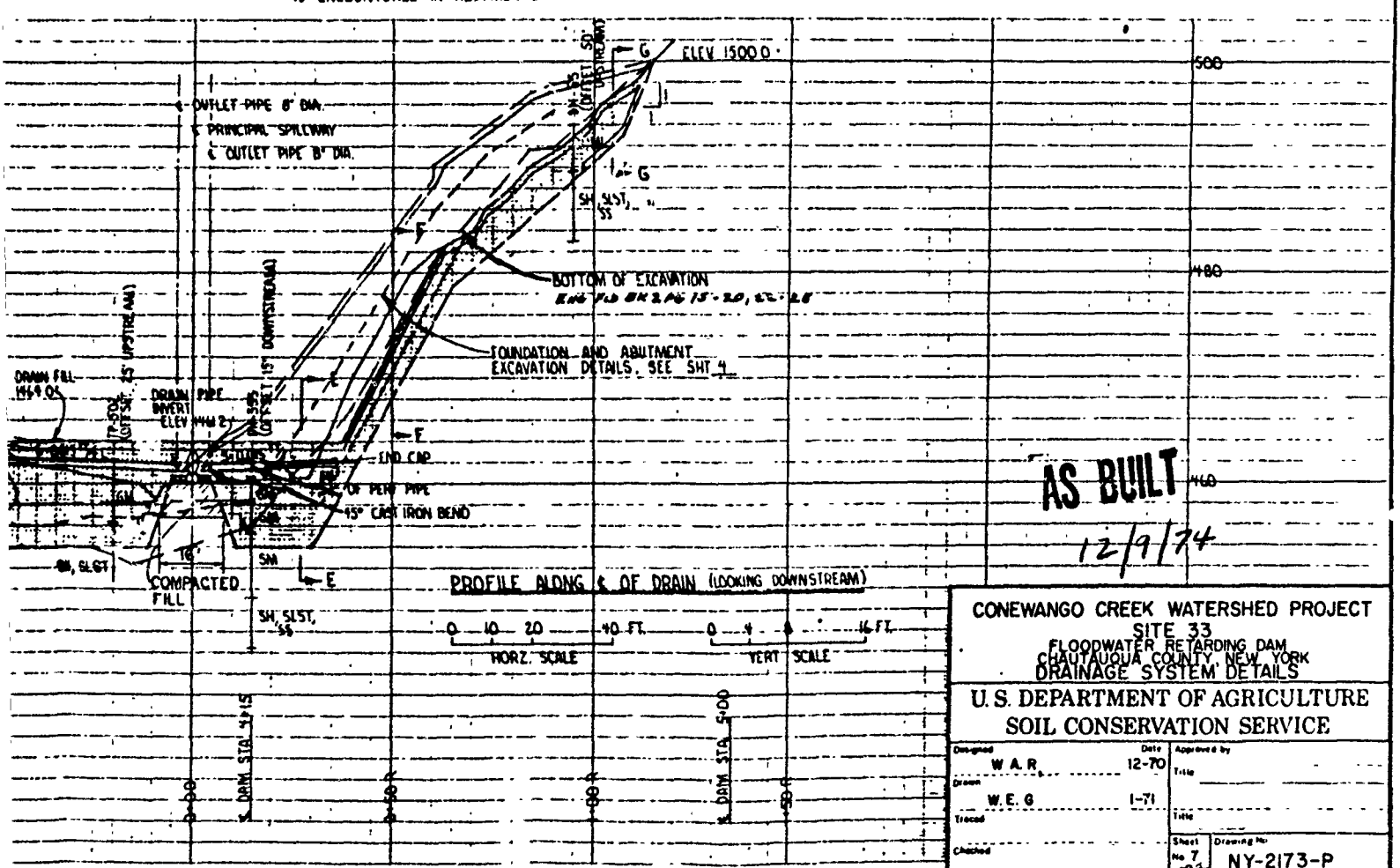
SECTION CC & FF
TYPICAL SECTION WHERE BEDROCK IS ENCOUNTERED IN ABUTMENTS

DRAINAGE SYSTEM DETAILS

1. ASBESTOS CEMENT DRAIN PIPE SHALL CONFORM TO SPECIFICATION 545 AND SHALL BE 8" DIA PRESSURE PIPE CLASS 200. TYPE II
2. THE PROFILES AT THE BOTTOM OF ALL EXCAVATIONS AS SHOWN ARE ONLY APPROXIMATE THE REQUIRED FINISHED GRADES WILL BE ESTABLISHED IN THE FIELD BY THE ENGINEER AT THE TIME OF CONSTRUCTION

QUANTITY SUMMARY

191 ~~160~~ CU YDS DRAIN FILL I (FINE)
418 ~~250~~ CU YDS DRAIN FILL II (COARSE)
182 ~~175~~ LIN FT STRAIGHT SECTION OF 8" DIA PERFORATED ASBESTOS CEMENT PIPE
26 LIN FT STRAIGHT SECTION OF 8" DIA NON-PERFORATED ASBESTOS CEMENT PIPE.
2 END CAPS
2 45° BEND - 8" DIA CAST IRON
~~2~~ 1 90° BEND - 8" DIA CAST IRON



AS BUILT
12/9/74

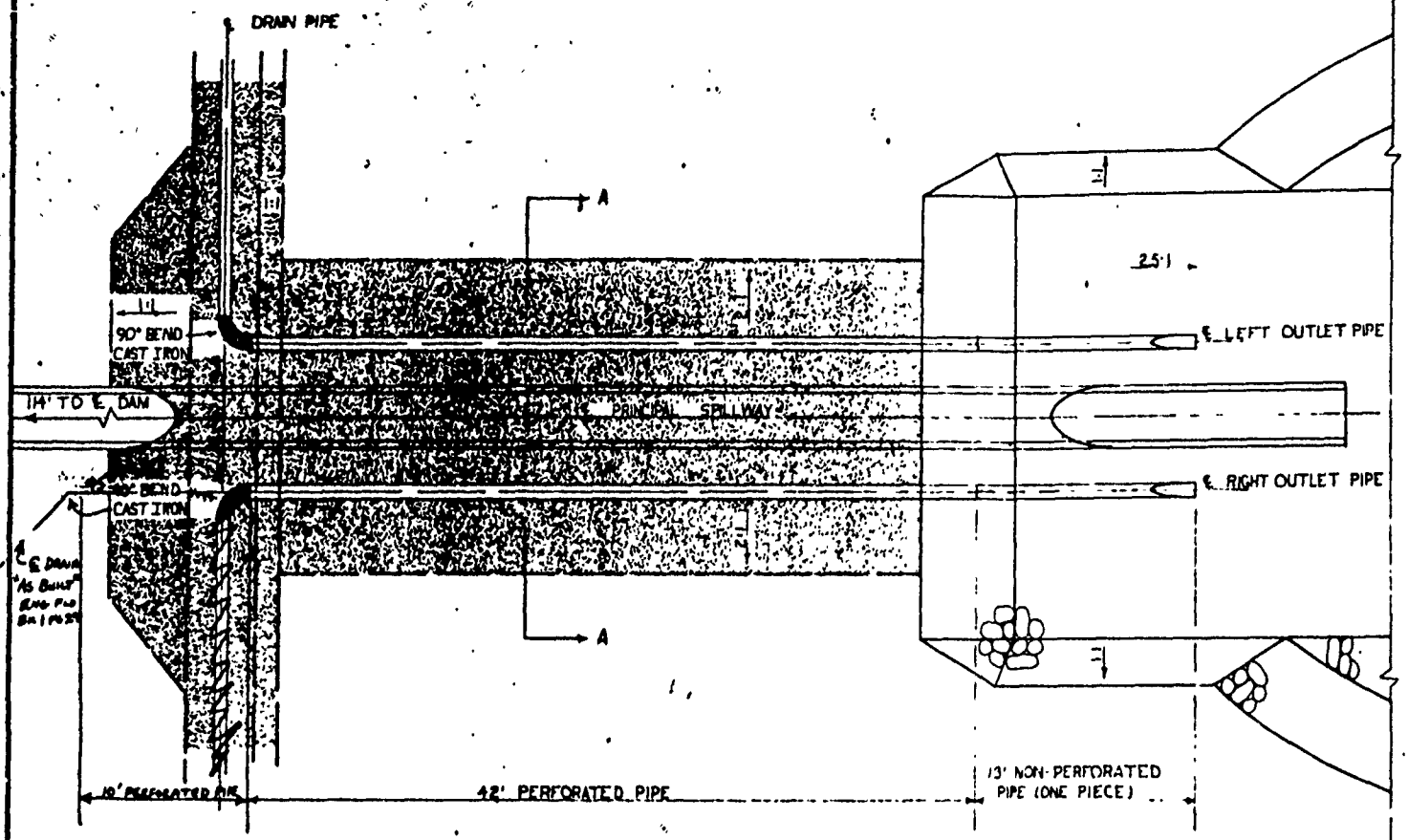
CONEWANGO CREEK WATERSHED PROJECT
SITE 33
FLOODWATER RETARDING DAM
CHAUTAUQUA COUNTY, NEW YORK
DRAINAGE SYSTEM DETAILS

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

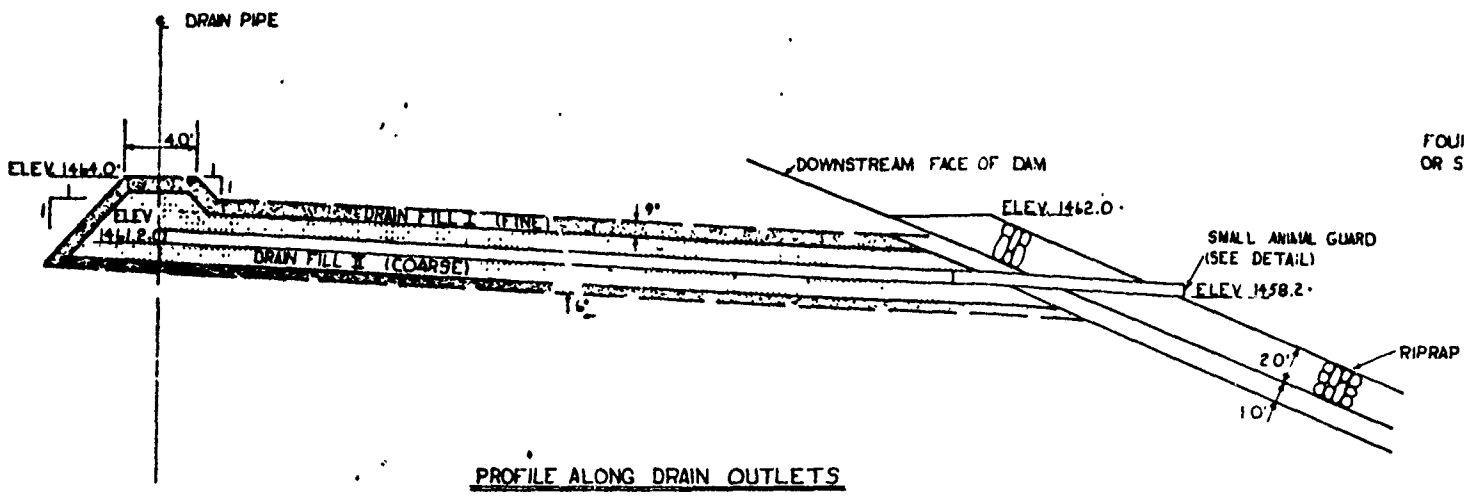
Designed W.A.R.	Date 12-70	Approved by	
Drawn W.E.G.	1-71	Title	
Traced		Title	
Checked		Sheet No. 7 of 23	Drawing No. NY-2173-P

3932

Form SCS 117 (November 1955)

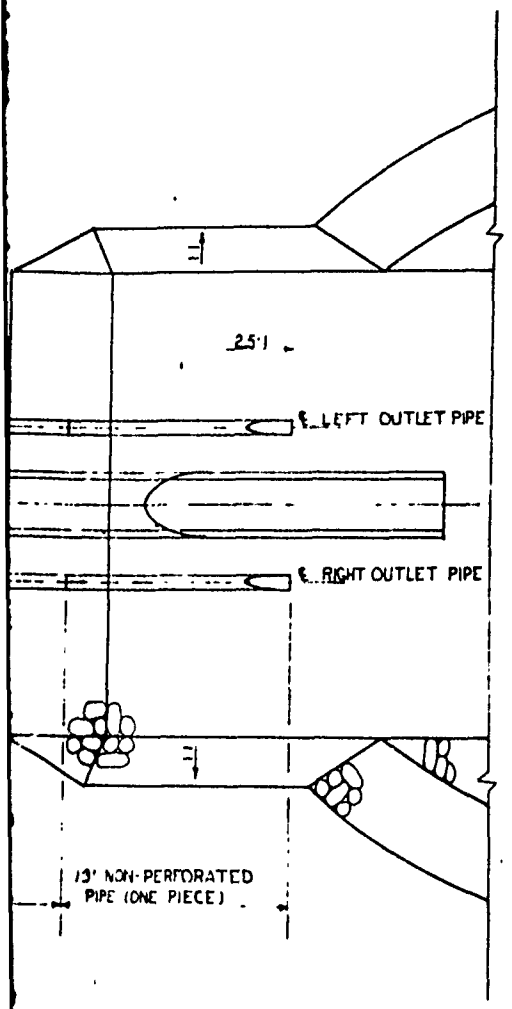


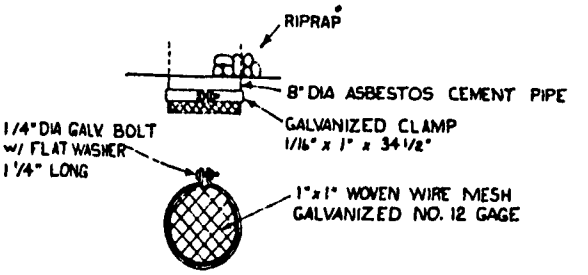
PLAN OF DRAIN OUTLETS



PROFILE ALONG DRAIN OUTLETS

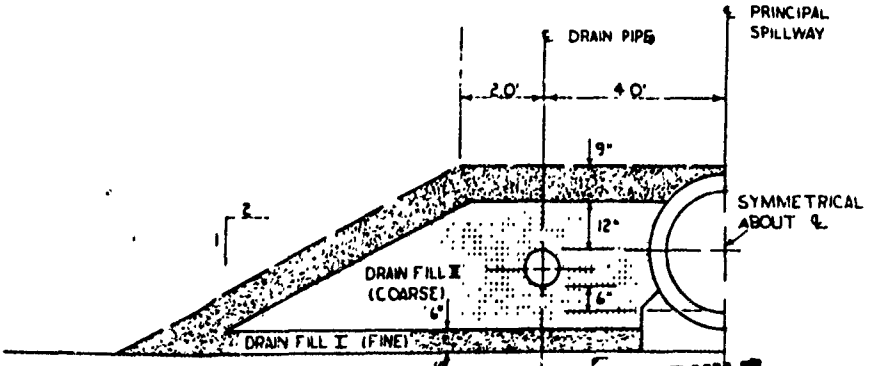
0 5 10
SCALE (FT)





SMALL ANIMAL GUARD DETAILS

2-REQUIRED



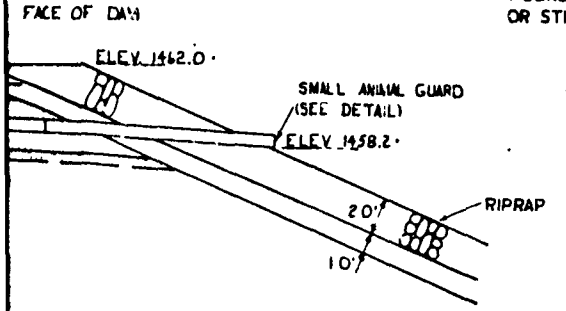
AS BUILT

12/4/74

SECTION AA

0 2 4

SCALE (FT)



CONEWANGO CREEK WATERSHED PROJECT
SITE 33
FLOODWATER RETARDING DAM
CHAUTAUQUA COUNTY, NEW YORK
DRAINAGE SYSTEM

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

		Date
Designed	W.A. RIEGEL	1/71
Drawn	R.P. LEWIS	1/71
Traced		
Checked	W.A.R.	2/71

Sheet No. 8 of 22 Sheets

NY-2173-P

3532

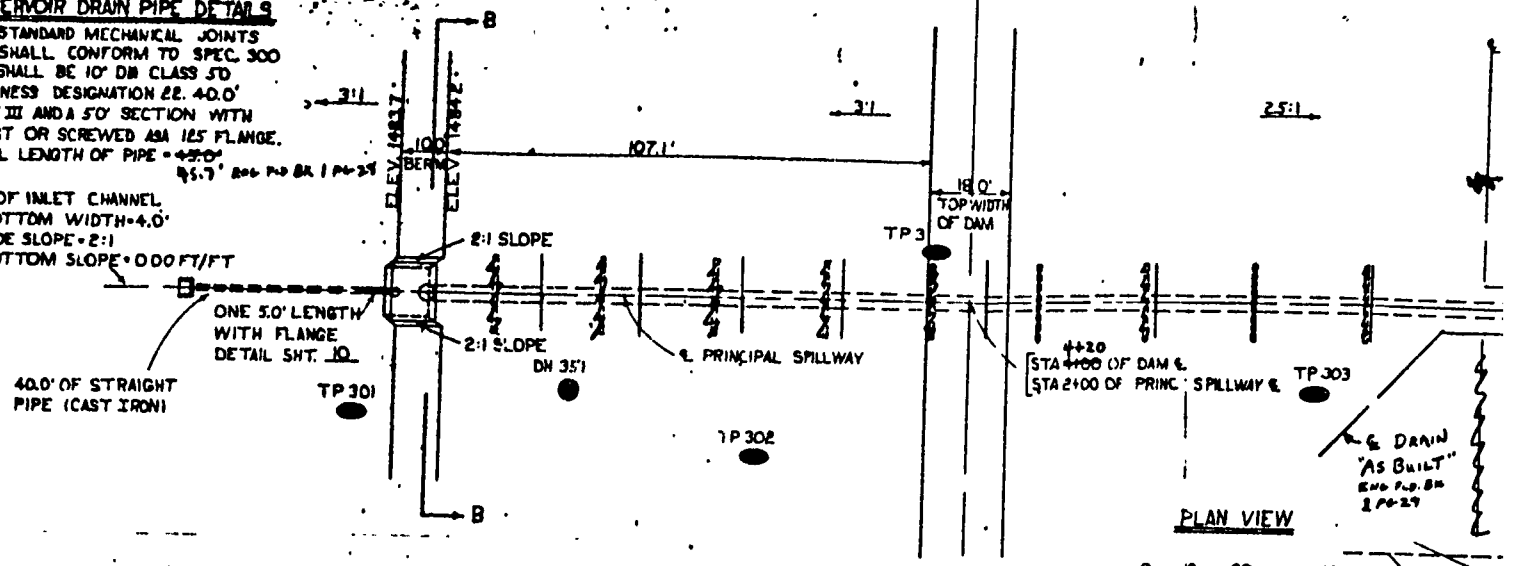
RESERVOIR DRAIN PIPE DETAILS

USE STANDARD MECHANICAL JOINTS
PIPE SHALL CONFORM TO SPEC. 300
AND SHALL BE 10" DIA CLASS 50
THICKNESS DESIGNATION 22. 40.0'
TYPE III AND A 5.0' SECTION WITH
A CAST OR SCREWED ASA 125 FLANGE.
TOTAL LENGTH OF PIPE = ~~45.0'~~
~~45.7'~~ Book Fld Bk 1 Pg 29

℄ OF INLET CHANNEL
BOTTOM WIDTH=4.0'
SIDE SLOPE=2:1
BOTTOM SLOPE=0.00 FT/FT

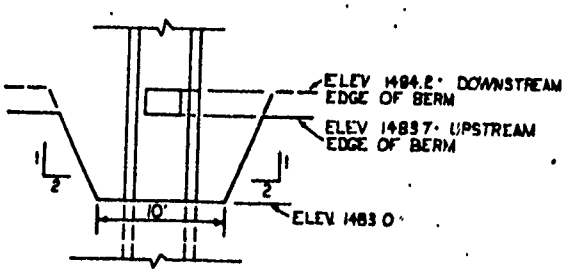
ONE 5.0' LENGTH
WITH FLANGE
DETAIL SHT. 10

40.0' OF STRAIGHT
PIPE (CAST IRON)



PLAN VIEW

0 10 20 40



SECTION BB
(NOT TO SCALE)

RIPRAP DETAIL 3

LOOSE ROCK RIPRAP SHALL BE C
A MAXIMUM SIZE OF 24" TO A M
OF 3". A MAXIMUM OF 20% SHA
THAN 6" (≈10 LBS.) AND A MAXIMU
SHALL BE LESS THAN 12" (≈80 LB

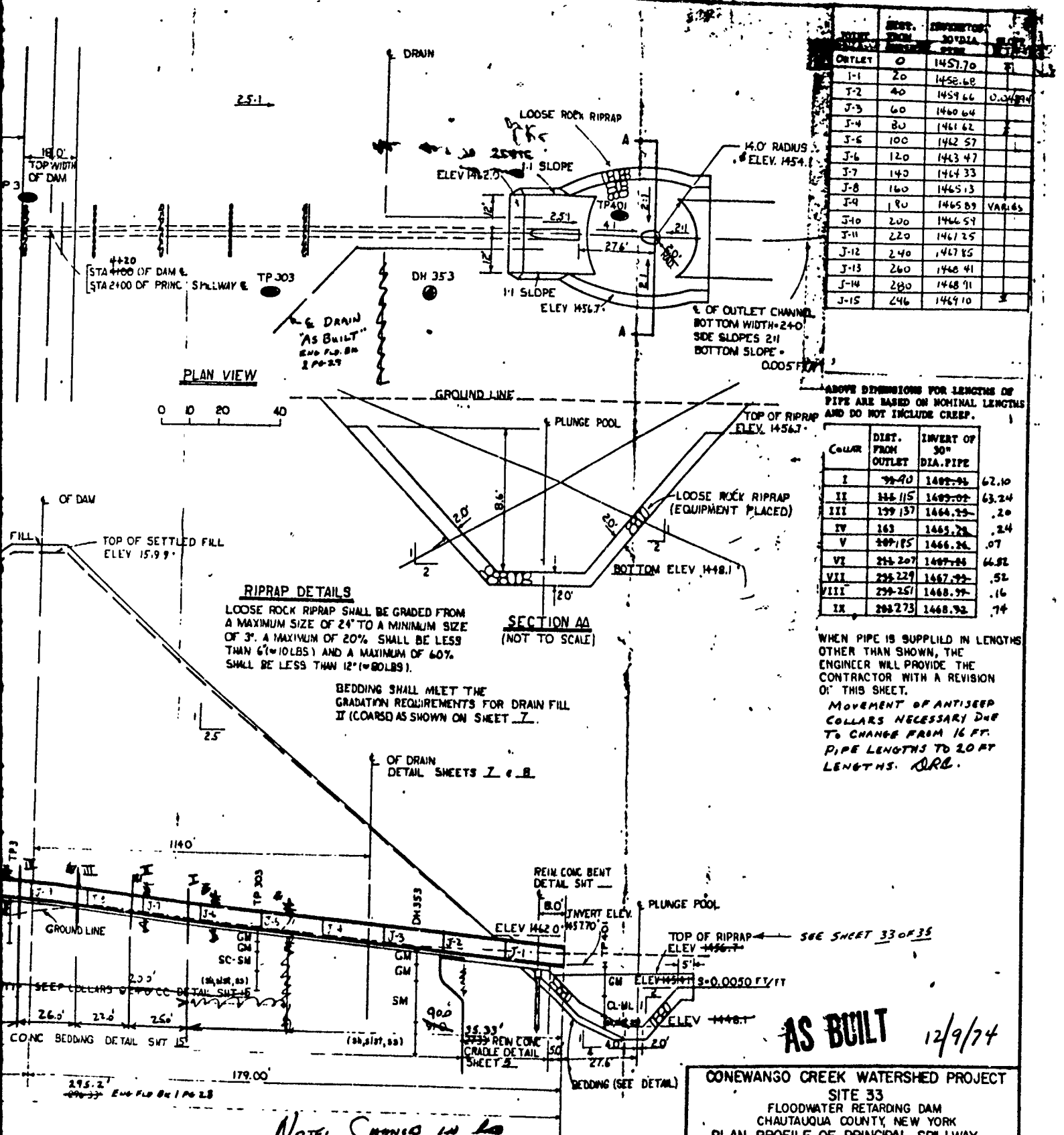
BEDDING S
GRADATION
II (COARSE

Note: Cross

PROFILE ALONG ℄ OF PRINCIPAL SPILLWAY

0 5 10 20
VERT SCALE

0 10 20 40
HORZ SCALE



OUTLET	DIST. FROM OUTLET	INVERT OF 30" DIA. PIPE	SLOPE
OUTLET	0	1457.70	
J-1	20	1458.68	
J-2	40	1459.66	0.049
J-3	60	1460.64	
J-4	80	1461.62	
J-5	100	1462.57	
J-6	120	1463.47	
J-7	140	1464.33	
J-8	160	1465.13	
J-9	180	1465.89	VARIES
J-10	200	1466.59	
J-11	220	1467.25	
J-12	240	1467.85	
J-13	260	1468.41	
J-14	280	1468.91	
J-15	296	1469.10	

ABOVE DIMENSIONS FOR LENGTHS OF PIPE ARE BASED ON NOMINAL LENGTHS AND DO NOT INCLUDE CREEP.

COLLAR	DIST. FROM OUTLET	INVERT OF 30" DIA. PIPE	
I	~~90~~ 90	~~1462.96~~ 1462.90	62.10
II	~~115~~ 115	~~1463.02~~ 1463.02	63.24
III	139 137	~~1464.95~~ 1464.95	.20
IV	163	~~1465.19~~ 1465.19	.24
V	~~187~~ 185	~~1466.26~~ 1466.26	.07
VI	~~211~~ 207	~~1467.86~~ 1467.86	64.82
VII	~~235~~ 229	~~1467.99~~ 1467.99	.52
VIII	~~259~~ 251	~~1468.99~~ 1468.99	.16
IX	~~283~~ 273	~~1468.98~~ 1468.98	.74

WHEN PIPE IS SUPPLIED IN LENGTHS OTHER THAN SHOWN, THE ENGINEER WILL PROVIDE THE CONTRACTOR WITH A REVISION OF THIS SHEET.
MOVEMENT OF ANTISEEP COLLARS NECESSARY DUE TO CHANGE FROM 16 FT. PIPE LENGTHS TO 20 FT LENGTHS. DRL.

AS BUILT 12/9/74

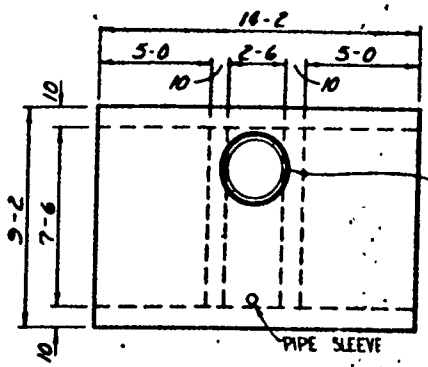
CONEWANGO CREEK WATERSHED PROJECT
SITE 33
FLOODWATER RETARDING DAM
CHAUTAUQUA COUNTY, NEW YORK
PLAN PROFILE OF PRINCIPAL SPILLWAY

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

		Date	Approved by
Designed	W A RIEGEL	1/71	Title
Drawn	R.P. LEWIS	1/71	
Traced			
Checked	J.E. POLULECH	1/71	Sheet No 9 of ~~33~~ 32

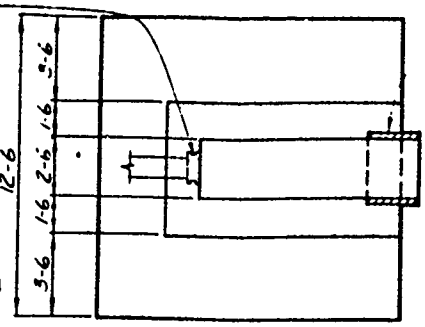
Drawing No. NY-2173-P

SCS-313-C (9-64)



PLAN-TOP

"C" TYPE WALL THIMBLE 8" DEEP 10" DIA BOLTED TO FLANGE SEE DETAIL I



SECTION B-B

Concrete Wall Footing DETAIL SHEET 12

MANHOLE ASSEMBLY DETAILS

CIRCULAR MANHOLE ASSEMBLY MIN CLEAR OPENING 30" NEENAH FOUNDRY CO MODEL R-6161-HH W/ STAINLESS CAP SCREWS OR APPROVED EQUIVALENT.

CONSTR. JOINT

1/4" x 6" Carbon steel plate, to conform to Spec 581 Continuous thru constr. joint. Splices shall be either:
1. Butt welded
2. Lapped 3" and bolted
3. Lapped 3" and fillet welded

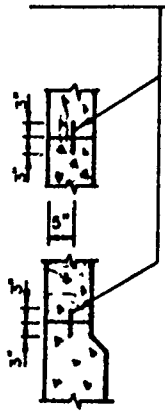
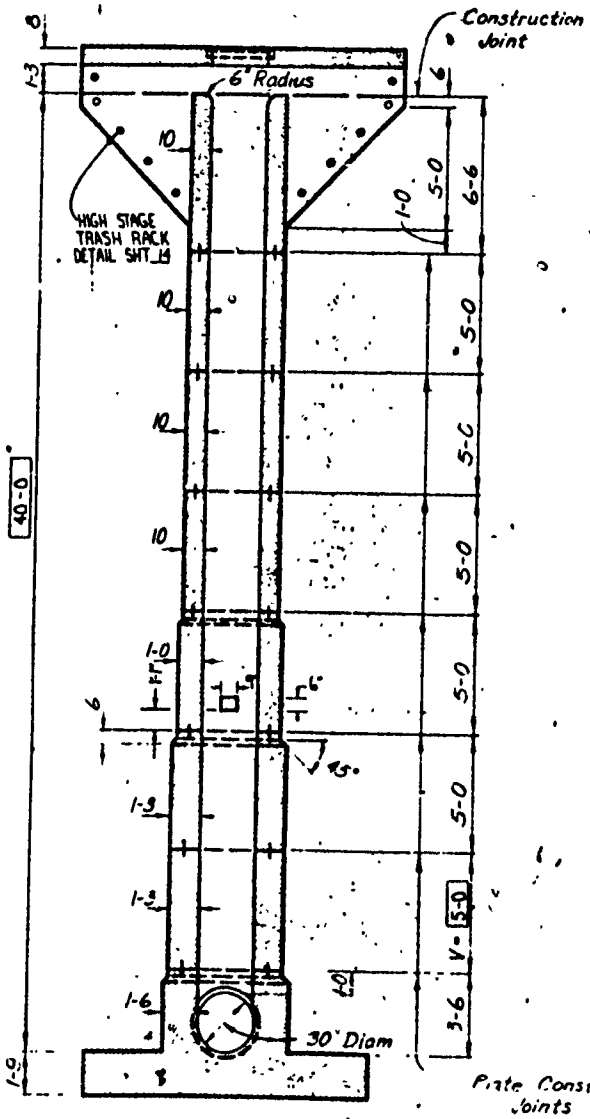


PLATE CONSTR. JOINT



SECTION A-A

SIDE ELEVATION

DETAIL I
(NOT TO SCALE)

SLIDE GATE DETAILS

1. 10' DIA FLAT FRAME SLIDE GATE
2. CLASS 0-41
3. SLIDE GATE TO CONFORM TO SPEC 573 AND SHALL BE TYPE NHS-1.
4. "C" TYPE WALL THIMBLE 8" DEEP
5. RISER STEM, STEM GUIDES AND LIFTING DEVICE SHALL BE SIZED AND SPACED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.
6. HOLES DRILLED IN BACK FLANGE OF WALL THIMBLE BY GATE MANUFACTURER ACCORDING TO A.S.A. CLASS 125 FLANGE SPECIFICATIONS
   - DIA OF BOLT CIRCLE 14 1/4"
   - DIA OF BOLT HOLES 1"
   - NO OF BOLT HOLES 12

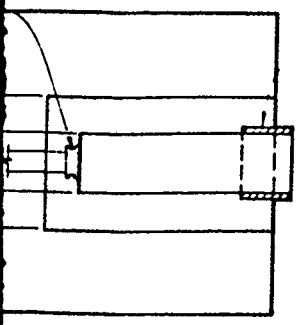
QUANTITIES

Steel

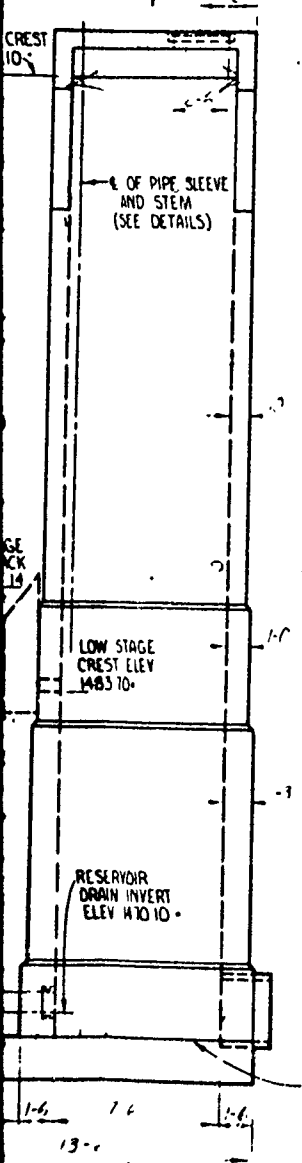
#4 Bars	520.0 Lin Ft	347	Lbs
#5 Bars	1007.0 Lin Ft	4180	Lbs.
#6 Bars	2712.9 Lin Ft	4075	Lbs
#7 Bars	413.4 Lin Ft	845	Lbs
Total		9447	Lbs

Total Concrete = (47.43) + (1.16 V) = (47.43) + (1.16 × 5.0) = 552 Cu Yds

1. SPECIFIED BA... ALL BENDS.
2. RADIUS OF BE... TO OR LESS ... FOR #8 AND
3. THE 2" AND ... CLEAR DISTAN... STEEL PLACE... HAVE A MINIM... IN CONCRETE ... CLEAR COVER
4. ALL EXPOSED ... UNLESS OTHE...



SECTION B-B



SIDE ELEVATION

Spillway Wall Detail Sheet 13

CONSTR JOINT

1/4" x 6" Carbon steel plate, to conform to Spec 581
Continuous thru constr. joint.
Splices shall be either:
1. Butt welded
2. Lapped 3" and bolted
3. Lapped 3" and fillet welded

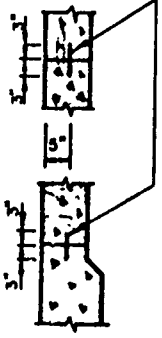
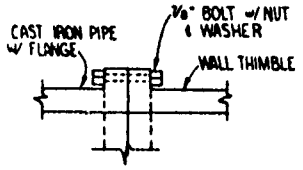


PLATE CONSTR. JOINT



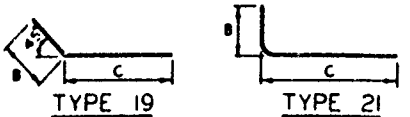
DETAIL I
(NOT TO SCALE)

STEEL SCHEDULE

Mark	Size	Quantity	Length	Type	B	C	Total Length
B1	#6	14	12-0	1			168-0
B2	#6	13	13-0	1			169-0
B3	#7	40	8-0	21	3-8	4-4	320-0
B4	#6	14	13-0	1			182-0
B5	#6	16	12-0	1			192-0
B6	#6	4	5-3	1			21-0
B7	#6	7	5-3	21	1-0	4-3	36-9
B8	#6	19	7-9	21	1-0	6-9	147-3
B9	#6	10	8-6	1			85-0
B10	#6	5	3-6	1			17-6
B11	#6	3	2-9	1			8-3
B12	#6	2	2-9	1			5-6
B13	#6	6	4-4	1			26-0
B14	#7	20	4-8	1			93-4
B15	#5	10	7-0	21	1-1	5-11	70-0
B16	#5	14	9-3	21	3-4½	5-10½	129-6
B17	#5	4	8-9	21	3-1½	5-7½	35-0
R1	#6	22	11-9	1			258-6
R2	#5	20	8-6	1			170-0
R3	#6	10	3-6	1			35-0
R4	#6	28	9-9	1			273-0
R5	#6	90	9-3	21	3-4	5-11	310-0
R6	#6	20	8-6	1			170-0
R7	#6	10	3-6	1			35-0
R8	#6	26	4-0	1			104-0
R9	#5	36	8-9	21	3-1½	5 7½	315-0
R10	#5	4	8-3	21	2-10½	5-4½	33-0
R11	#5	22	6-9	1			140-6
R12	#6	14	8-3	1			115-6
R13	#5	10	3-6	1			35-0
R14	#5	26	4-6	1			117-0
R15	#5	20	3-8	1			73-4
R16	#6	36	8-9	21	3-1	5-8	315-0
R17	#6	4	8 3	21	2-10½	5-4½	33-0
R18	#5	20	11-9	1			235-0
R19	#6	14	8-3	1			115-6
R20	#5	8	3-3	1			26-0
R21	#5	20	11-9	1			235-0
R22	#5	40	8 0	21	2-9	5-3	320-0
R23	#5	10	8-3	1			82-6
R24	#5	8	3-3	1			26-0
R25	#5	28	8-0	21	2 4	5 3	224-0
R26	#5	20	6 9	1			135-0
R27	#5	8	8-3	1			66-0
R28	#5	8	3 3	1			26-0

Mark	Size	Quantity	Length	Type	B	C	Total Length
R29	#5	20	6-9	1			135-0
R30	#5	20	8-0	21	2-9	5-3	160-0
T1	#5	18	6-0	1			108-0
T2	#5	6	8-0	1			48-0
T3	#5	4	4-9	1			19-0
T4	#5	4	3-6	1			14-0
T5	#5	4	2-3	1			9-0
T6	#5	4	9-0	19	2-0	7-0	36-0
T7	#5	12	8-3	1			99-0
T8	#5	2	3-3	1			6-6
T9	#5	2	5-9	1			11-6
T10	#5	2	10-9	1			21-6
T11	#5	2	13-3	1			26-6
T12	#5	14	6-3	1			87-6
T13	#5	6	8-0	1			48-0
T14	#5	4	6-0	1			24-0
T15	#5	4	4-9	1			19-0
T16	#5	4	3-6	1			14-0
T17	#5	4	2-3	1			9-0
T18	#5	4	9-0	19	2-0	7-0	36-0
T19	#5	24	8-0	21	2-9	5-3	192-0
T20	#5	2	3-3	1			6-6
T21	#5	2	5-9	1			11-6
T22	#5	2	8-3	1			16-6
T23	#5	2	10-9	1			21-6
T24	#5	2	13-3	1			26-6
T25	#5	4	13-9	1			55-0
T26	#5	4	13-9	1			55-0
T27	#4	18	8-3	1			115-6
T28	#5	2	4-9	1			9-6
T29	#4	7	13-9	1			96-3
T30	#4	4	5-3	1			21-0
T31	#5	24	6-9	21	1-6	5-3	162-0
T32	#5	2	6-6	21	1-6	5-0	13-0
T33	#5	2	2-6	21	1-6	1-0	5-0
T34	#4	7	13-9	1			96-3
T35	#4	4	5-3	1			21-0

BAR TYPES



TYPE 1 — TYPE 19 — TYPE 21

Ft	347	Lbs
Ft	4180	Lbs.
Ft	4075	Lbs
Ft	845	Lbs
otal	9447	Lbs

3)+(1.16 x 5.0) = 532 Cu Yds

CONSTRUCTION DETAILS

1. SPECIFIED BAR DIMENSIONS ARE MEASURED TO OUTSIDE EDGE OF ALL BENDS
2. RADIUS OF BENDS EQUALS 3 BAR DIAMETERS FOR SIZES EQUAL TO OR LESS THAN #7 RADIUS OF BENDS EQUALS 4 BAR DIAMETERS FOR #8 AND #9 BARS
3. THE 2" AND 3" DISTANCE FROM SPECIFIED CONCRETE SURFACES ARE CLEAR DISTANCES WHERE NOT OTHERWISE SPECIFIED ALL REINFORCING STEEL PLACED IN CONCRETE POURED AGAINST THE GROUND SHALL HAVE A MINIMUM OF 3" COVER ALL REINFORCING STEEL PLACED IN CONCRETE POURED IN FORMS SHALL HAVE A MINIMUM OF 2" CLEAR COVER
4. ALL EXPOSED EDGES OF CONCRETE TO HAVE A ¾" CHAMFER UNLESS OTHERWISE NOTED

AS BUILT
12/4/74

0 2 4 6
Scale in Feet

CONEWANGO CREEK WATERSHED PROJECT
SITE 33
FLOODWATER RETARDING DAM
CHAUTAUQUA COUNTY, NEW YORK
RISER STRUCTURAL DETAILS

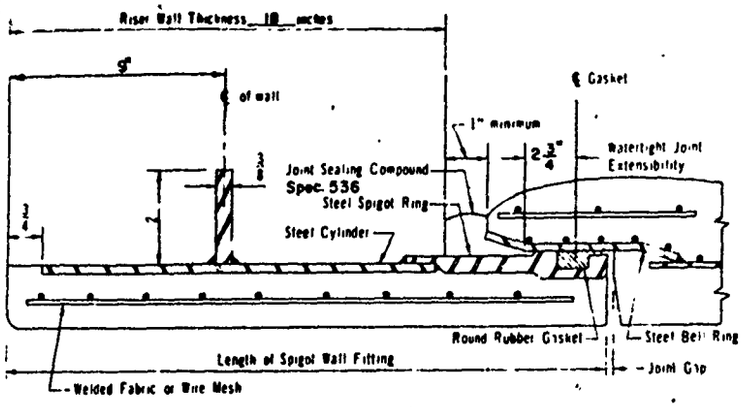
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

		Date
Adapted	W.A. RIEGEL	12-70
Drawn		
Traced		
Checked	J.E.P.	12-70

Approved by
Title
Title
Sheet No. 10 of 22
Drawing No. NY-2173-P

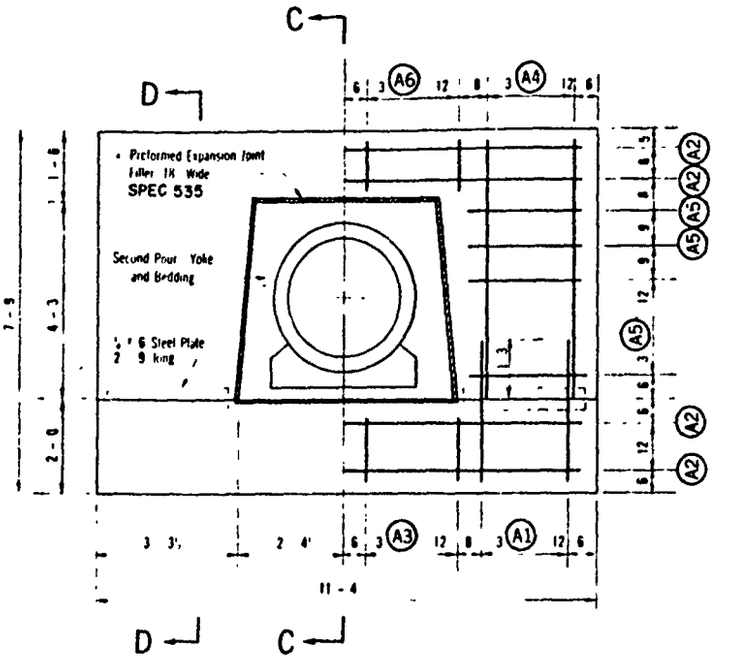
FORM SCS 313 (APRIL 1963)

35
32



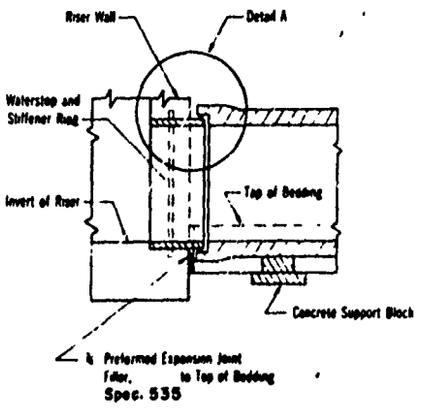
DETAIL A

SUPPLY ONE (1) SPIGOT RING WALL FITTING FOR 18" WALL.

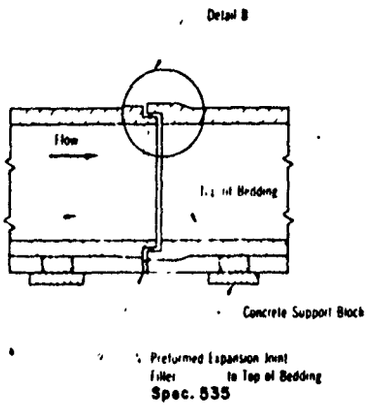


DETAIL OF ANTI-SEEP COLLAR (9 REQ'D)

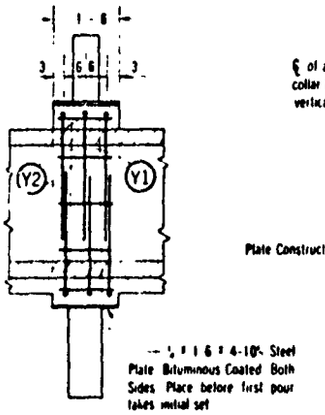
Yoke steel not shown



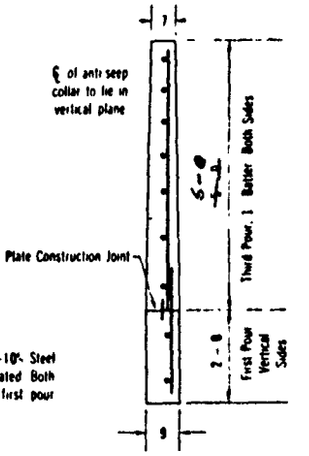
DETAIL OF SPIGOT WALL FITTING



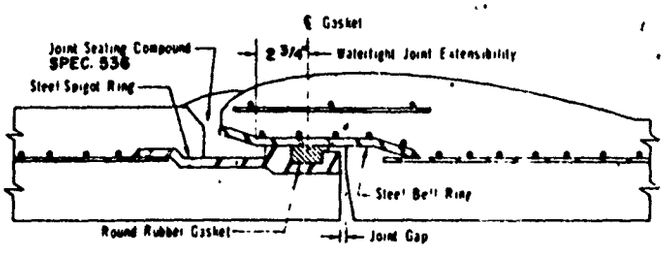
DETAIL OF PIPE JOINT



SECTION C-C



SECTION D-D



DETAIL B

JOINT REQUIREMENTS				
No. Pipe Sections	Length of Pipe Section,	Minimum Joint Length	Minimum Joint Limiting Angle	
	feet	inches	radians	degrees
Ea	16.0'	4 1/2	.0720	4° 07'
1	8.0'	4 1/2	.0720	4° 07'

Cast Outside Of Spigot Ring With Concrete On One 16.0' Section

STRENGTH R		
Inside Diameter of Pipe	Internal Load	
	Hydrostatic Pressure	
	Head of Water	
inches	feet	
30.0	550	

STANDARD CONDUIT DETAILS	
FOR REINFORCED CONCRETE PRESSURE PIPE PRINCIPAL SPILLWAY	
STANDARD DWG NO. ES-5030-BE	
DATE 2-70	SHEET 1 OF 1

Joint length equals watertight joint extensibility plus joint gap.

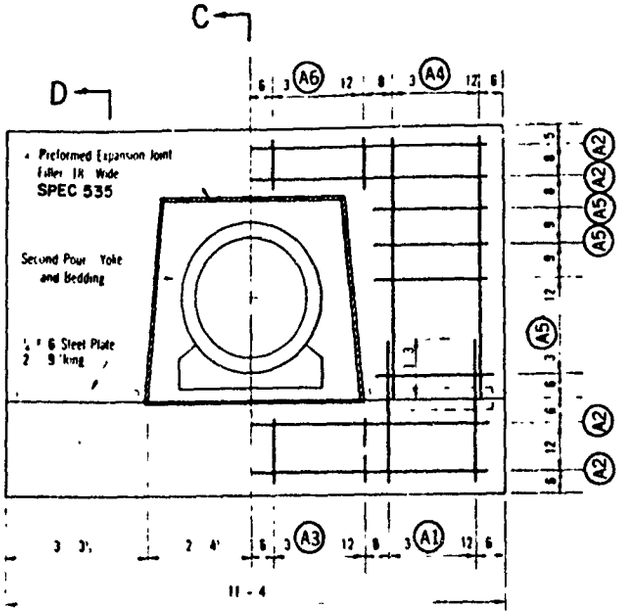
The pipe shall be drawn together so that the maximum joint gap does not exceed ¼ inch for pipe laid on a straight line. For cambered pipe or pipe laid on a curved line, the joint gap at the closest point shall not exceed ¼ inch

For pipe length other than shown, joint requirements will be determined by the Engineer

Where pipes of different length are connected, adjoining pipes shall meet the requirements of the longer pipe

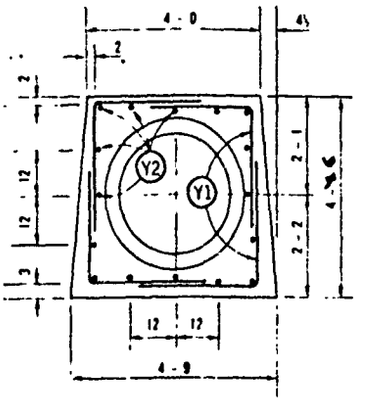
Prior to delivery of pipe, the pipe joint detail proposed for use shall be submitted to the Engineer for approval

The outside diameter of pipe Where the pipe furnished has assumed in design the three- furnished must not be less th ing strength multiplied by the the pipe furnished to the outs



DETAIL OF ANTI-SEEP COLLAR (9 REQ'D)

Yoke steel not shown



DETAIL OF ANTI-SEEP COLLAR YOKE

STEEL SCHEDULE

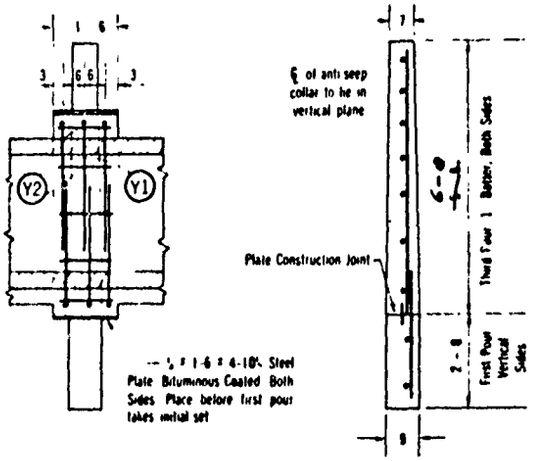
Anti-seep Collar and Yoke 9 Required

Mark	Size	Quantity per Collar	Length	Type	Total Quantity	Total Length
A1	4	6	3 - 8	1	54	162 - 0
A2	4	4	10 - 10	1	36	390 - 0
A3	4	6	1 - 6	1	54	81 - 0
A4	4	6	5 - 6	1	54	297 - 0
A5	4	10	2 - 9	1	90	247 - 6
A6	4	6	1 - 8	1	54	54 - 0
Y1	4	12	5 - 2	21	108	558 - 0
Y2	4	16	1 - 2	1	144	168 - 0

QUANTITIES

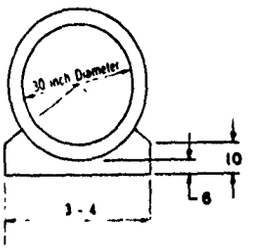
Concrete	Cu Yds
Anti seep Collar including Yoke (REINFORCED)	
Total	~~18.7~~ 20.0
Bedding (NON-REINFORCED)	
Total	~~20~~ 21.2
Steel	**Pounds**
Anti seep Collar including Yoke 1957 - 6"	1308

Concrete quantities are based on an outside diameter of pipe of 38.76 inches
Steel quantities do not change with outside diameter of pipe

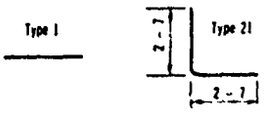


SECTION C-C

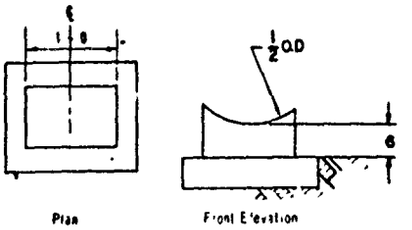
SECTION D-D



DETAIL OF BEDDING



BAR TYPES



SUGGESTED SUPPORT BLOCKS

Sufficient blocks shall be provided to support [illegible] required line and grade. The [illegible] shall determine the number and size required. Wedges may be used as an alternate

AS BUILT

12/9/74

JOINT REQUIREMENTS

Length of Pipe Section,	Minimum Joint Length	Minimum Joint Limiting Angle	
feet	inches	radians	degrees
16.0'	4 1/2	.0720	4°07'
8.0'	4 1/2	.0720	4°07'

Of Spigot Ring With Concrete On One 16.0' Section

For pipe length other than shown, joint requirements will be determined by the Engineer

Where pipes of different length are connected, adjoining pipes shall meet the requirements of the longer pipe

Prior to delivery of pipe, the pipe joint detail proposed for use shall be submitted to the Engineer for approval

STRENGTH REQUIREMENTS

Inside Diameter of Pipe	Internal Load: Hydrostatic Pressure	External Load: Minimum 3 Edge Bearing Strength in Pounds per Linear Foot of Pipe	
		Applicable Standard Specification	
		AASHTO M-170	
inches	Head of Water feet	Load to produce 0.001 inch crack one foot long	
30.0	55.0	19,146 Lbs.	

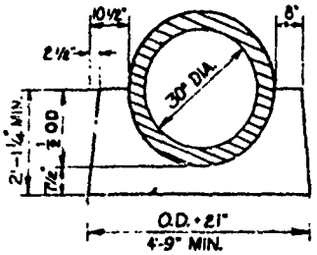
The outside diameter of pipe assumed in design is 38.76 inches. Where the pipe furnished has an outside diameter greater than assumed in design the three-edge bearing strength of the pipe furnished must be less than the specified three-edge bearing strength multiplied by the ratio of the outside diameter of the pipe furnished to the outside diameter assumed in design

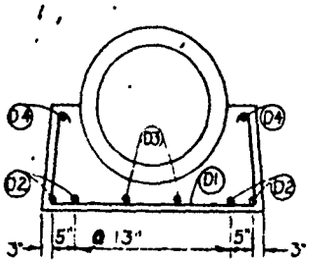
CONEWANGO CREEK WATERSHED PROJECT
SITE 33
FLOODWATER RETARDING DAM
CHAUTAUQUA COUNTY NEW YORK
CONDUIT DETAILS

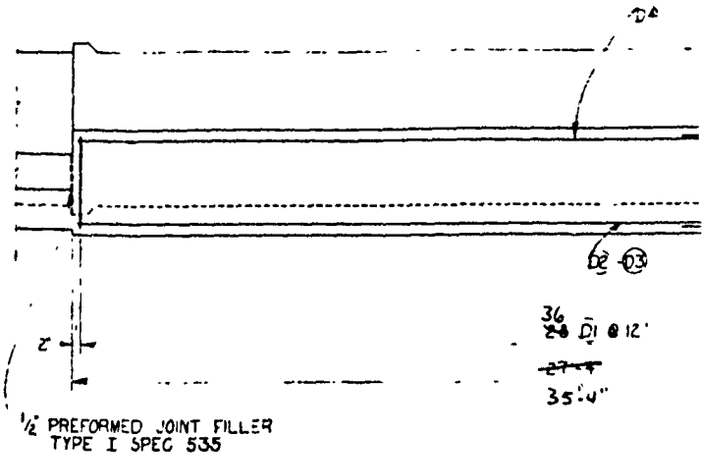
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Adopted	Date	Approved by
W.A. RIEGEL	3/71	Title
Drawn		Title
Traced		
Checked SCY.		Sheet No 15 of 23 Drawing No NY-2173-P

~~35~~ 51



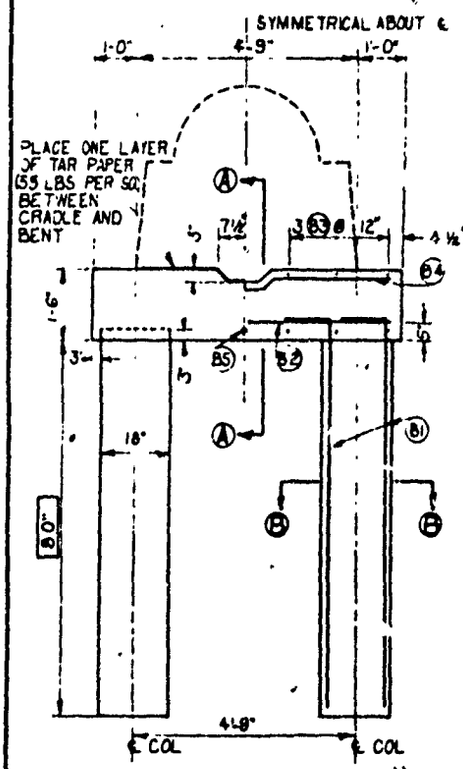


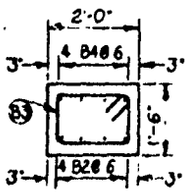


½" PREFORMED JOINT FILLER
TYPE I SPEC 535

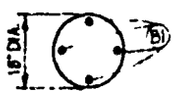
REINFORCED CONCRETE CRADLE DETAILS

0 1 2 4
SCALE IN FEET

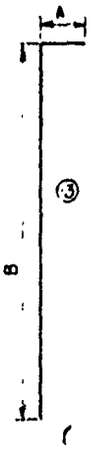


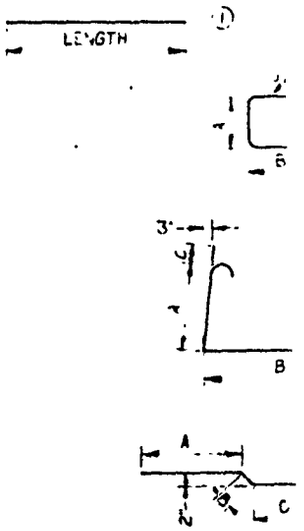


SECTION A-A



SECTION B-B

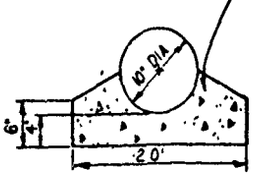




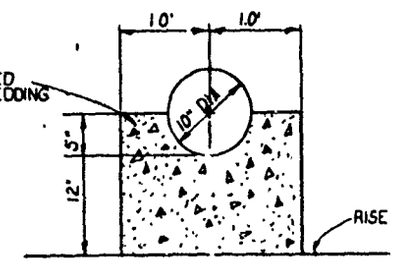
BAR TYPES

REINFORCED CONCRETE BENT DETAILS

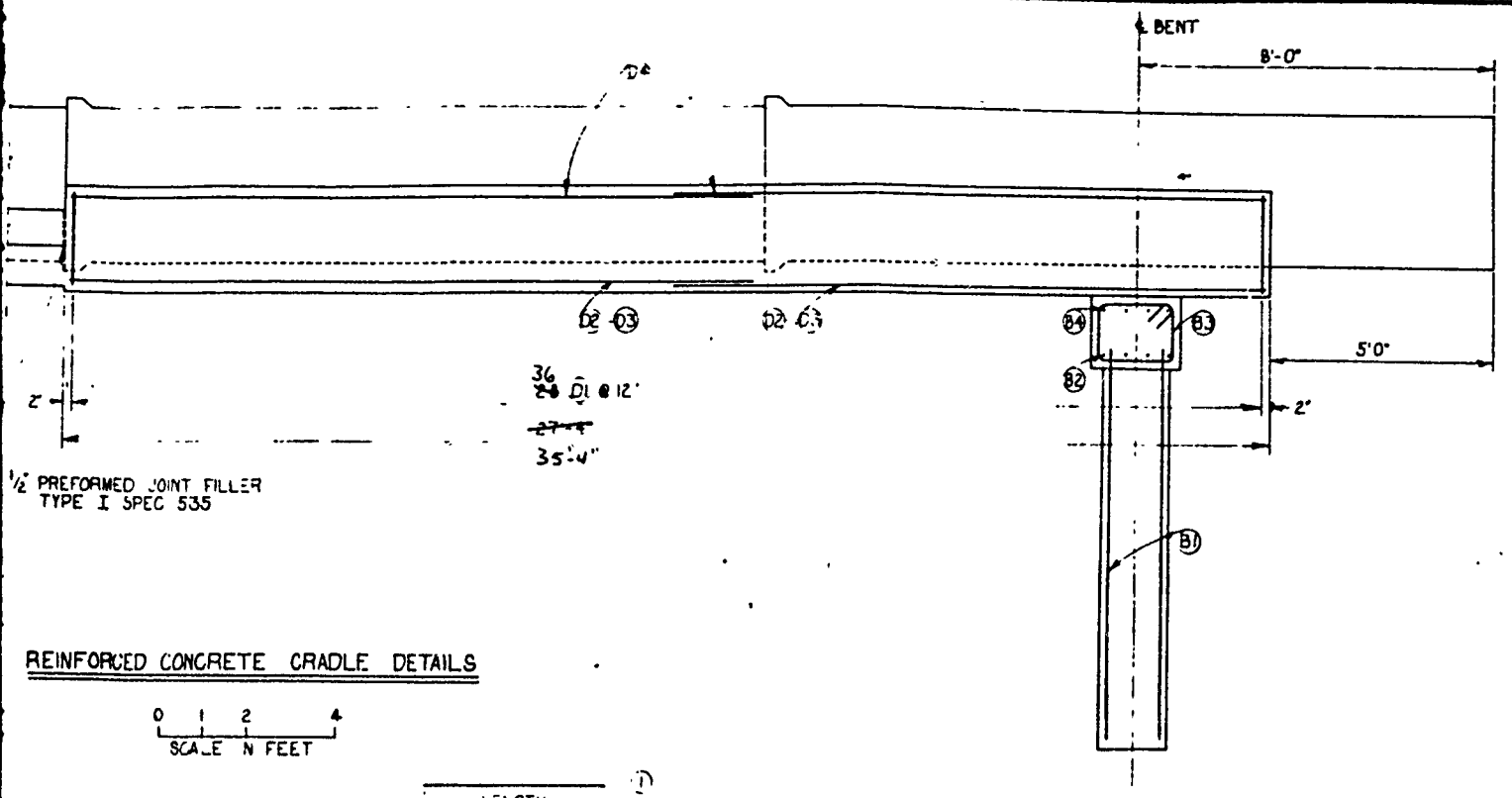
0 1 2 4
SCALE IN FEET
BLOCKED IN DIMENSIONS NOT TO SCALE



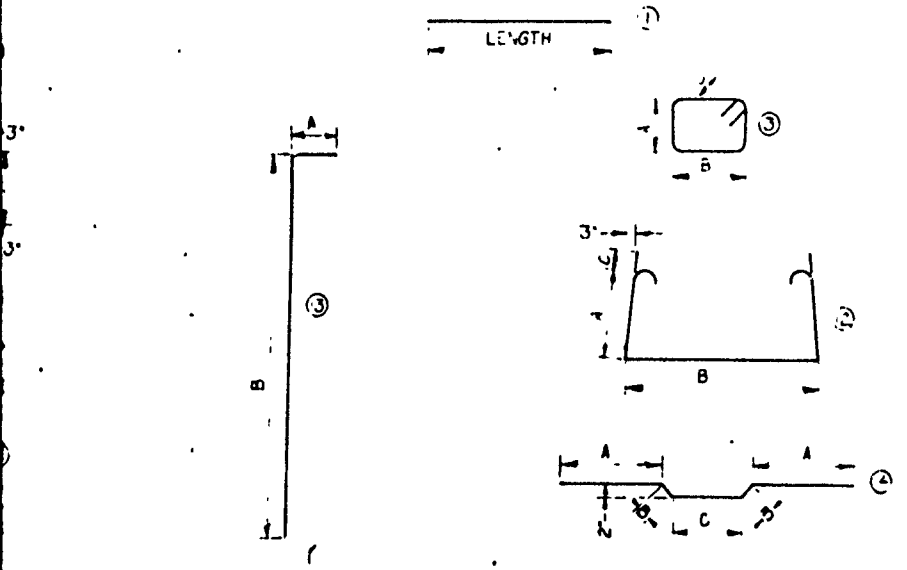
RESERVOIR DRAIN CONCRETE BEDDING
(NOT TO SCALE)



RISER FOOTING CONCRETE BEDDING
(NOT TO SCALE)



REINFORCED CONCRETE CRADLE DETAILS



BAR TYPES

ADDITIONAL STEEL & CONCRETE NECESSARY DUE TO CHANGE FROM 16 FT PIPE LENGTHS TO 20 FT LENGTHS ARC

STEEL SCHEDULE

Mark	Location	Quan.	Size	Length	Type	A	B	C	Total Length	
B-1	Bent	8	5	9-0	13	1-0	8-0		72-0	
B-2		4	8	6-3	1				25-0	
B-3		8	4	6-4	3	1-1	1-7	0-6	38-0	
B-4		4	5	6-8	14	2-3	0-4	1-6	26-8	
B-5		1	4	5-10	3	0-10	1-7	0-6	5-10	
D-1	Cradle	88 36	4	8-5	12	1-8	4-3	0-5	~~836-0~~	= 303
D-2		8 4	8	14-11	1				118-4	= 162
D-3		4 2	4	14-2	1				56-8	= 75
D-4		4 2	7	14-8	1				58-8	= 79

QUANTITIES (THIS SHEET ONLY)

STEEL

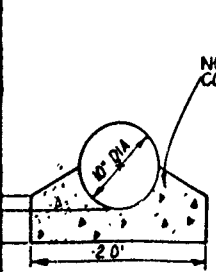
NO. 4 BAR	~~330-0~~ 422-0 FT	282	
NO. 5 BAR	~~98-8~~ FT	103 LBS	
NO. 7 BAR	~~44-0~~ FT	~~156~~ LBS	
NO. 8 BAR	~~25-0~~ FT	67 LBS	
NO. 9 BAR	~~119-7~~ FT	~~536~~ LBS	
TOTAL		~~1201~~ LBS	
		1167	

CONCRETE

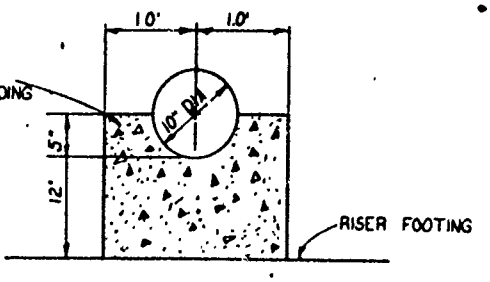
REINFORCED	~~9.8~~ 11.2	CY. YDS.
NON-REINFORCED	~~1.9~~	CY. YDS.

AS BUILT 12/9/74

CONSTRUCTION DETAILS SEE SHT 10



RESERVOIR DRAIN CONCRETE BEDDING
(NOT TO SCALE)



RISER FOOTING CONCRETE BEDDING
(NOT TO SCALE)

CONEWANGO CREEK WATERSHED PROJECT
SITE 33
FLOODWATER RETARDING DAM
CHAUTAUQUA COUNTY, NEW YORK
END BENT AND CRADLE DETAILS

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed	W. A. RIEGEL	3/71
Drawn	D. BURDICK	3/71
Traced		
Checked		
Quantities	S.C.Y.	

16 | NY-2173-P
~~23~~
~~35-32~~

MACAMIC PIT LOGS

TP #1, C/L Dam, 11/20/69, DHC, 1347.7

0.0 - 1.0 Topsoil

1.0 - 2.0 Silt, sandy
Max. size < 3"
Approx. 5% gravel, 20% sand, and 75% non-plastic fines.
Orange-brown; moist, slightly permeable; soft, till; ML

2.0 - 4.0 Sand, silty, gravelly
Max. size 10" - flaggy siltstones
Approx 3% +6", 7% 3-6", 90% matrix (which is approx. 25% gravel, 30% sand, and 45% slightly plastic fines).
Brown; moist, very slightly permeable; very stiff; till; SM.

4.0 - 8.0 Silt & Clay, sandy
Max. size < 3'
Approx. 10% gravel, 20% sand, and 70% moderately plastic fines.
Brown; moist; very slightly permeable, hard; glacio-lacustrine; CL-ML. P.S. 1.1 (CL-ML)

8.0 - 13.0+ Silt, w/sand
Max. size < 3'
Approx. 5% gravel, 10% sand, and 85% non-plastic fines.
Brown; moist; slightly permeable; medium density; inter-bedded; glacio-lacustrine. (ML) P.S. 1.2 (ML)
Note. No seepage observed.

TP #2 Bank, C/L Dam, 11/18/69, DHC, 1477.

0.0 - 0.7 Topsoil

0.7 - 2.0 Clayey silt, sandy, gravelly
Max. size 10" - flaggy siltstone
Approx. 1% +6", 4% 3-6", 95% matrix (which is approx. 20% gravel, 20% sand, and 60% moderately plastic fines).
Light brown; wet, very slightly permeable; very stiff; flat-lying flags; very highly weathered bedrock, "C" horizon, CL-ML

2.0 - 2.0+ Bedrock
Clay shale & siltstone; highly weathered, olive-brown; soft; laminated; highly fractured, filled w/CL-ML; essentially horizontal; Northeast shale; upper Upper Devonian.

Note: Water seeping from practically everywhere.

TP #2 Fl.Pl., C/L Dam, 11/18/69, DHC, 1466.0

0.0 - 1.0 Topsoil

1.0 - 4.0 Gravel, silty, sandy
Max. size 18" - flaggy siltstone
Approx. 10% +6", 15% 3-6", and 75% matrix (which is approx 50% gravel, 30% sand, and 20% slightly-moderately plastic fines).
Brown; moist-wet @ 3.4'; slightly permeable; very stiff-hard; flat-lying flags; alluvial-colluvial; GM.

4.0 - 4.0+ Bedrock
Clay shale & siltstone; highly weathered, olive-brown; soft; laminated; highly fractured, filled w/CL-ML; essentially horizontal; northeast shale; upper Upper Devonian.

Note: Gravel quite silty. Water @ creek level, 3.4'

TP #3, C/L Dam, 11/18/69, DHC, 1466.0

0.0 - 0.5 Topsoil

0.5 - 4.0 Gravel, sandy w/silt
Max. size 19" - flaggy SR siltstones
Approx. 10% +6", 15% 3-6", 75% matrix (which is approx. 60% gravel, 25% sand, and 15% slightly plastic fines).
Brown; moist-wet @ 2.5'; slightly permeable; very stiff; flat-lying flags; alluvial; GM

4.0 - 7.0+ Silt & Clay, gravelly, sandy
Max. size 8" - varies
Approx. 1% +6", 4% 3-6", 95% matrix (which is approx. 25% gravel, 20% sand, and 55% moderately plastic fines).
Gray-brown; wet; very slightly permeable; hard; till; CL-ML

Note: Water @ creek level, 2.5'

TP #4 Bank, C/L Dam, 11/18/69, DHC, 1480

0.0 - 1.0 Topsoil

1.0 - 11.0 Clayey silt, gravelly, sandy
Max. size 9" - flaggy siltstone
Approx 1% +6", 4% 3-6", 95% matrix (which is approx. 25% gravel, 20% sand, and 55% moderately plastic fines).
Light brown; wet; very slightly permeable; very stiff; very highly weathered bedrock, "c" horizon; CL-ML.
P.S. 4.1 (CL-ML)

11.0 - 22.0+ Silt & Clay, gravelly, sandy
Max. size 8" - flaggy SR siltstone
Approx. 1% +6", 4% 3-6", 95% matrix (which is approx. 25% gravel, 20% sand, and 55% moderately plastic fines).
Gray w/brown; wet; very slightly permeable; hard; till; CL-ML

Note: Bed rock is not over till; the side of the pit slopes less steep than the bank. Water seeping @ 1.3'.

TP #4 Fl.Pl., C/L Dam, 11/18/69, DHC, 1466.0

0.0 - 0.5 Topsoil

0.5 - 2.3 Gravel, sandy, silty
Max. size 10" - flaggy siltstones
Approx. 10% +6", 15% 3-6", 75% matrix (which is approx. 50% gravel, 30% sand, and 20% slightly plastic fines).
Gray-brown; moist-wet @ 1.0', slightly permeable, very stiff; road fill, GM.

2.3 - 5.0 Gravel, sandy, silty
Max. size 18" - flaggy siltstones
Approx. 10% +6", 15% 3-6", 75% matrix (which is approx. 60% gravel, 25% sand, and 15% slightly plastic fines).
Brown; wet; slightly permeable; very stiff; flat-lying flags; alluvial; GM

5.0 - 8.0+ Silt & Clay, gravelly, sandy
Max. size 6"
Approx. 5% 3-6", and 95% matrix (which is approx. 25% gravel, 20% sand, and 55% moderately plastic fines).
Gray-brown; wet; very slightly permeable; hard; till; CL-ML

Note: Seeps everywhere. Many old trees, logs, brush, etc. around the 2.3' level. Served as base for road fill.

TP #101, Borrow Area, 12/17/69, DHC.

0.0 - 1.0 Topsoil

1.0 - 4.0 Silt, sandy
Max size 3"
Approx 2% 3-6", 98% matrix (which is approx 10% gravel, 15% sand, and 75% very slightly plastic fines).
Orange-brown; moist; slightly permeable; soft; till; ML

4.0 - 10.0+ Gravel, sandy w/silt
Max. size 15" - mostly siltstone flags, few SR sed. cobbles
Approx. 6% +6", 9% 3-6", 85% matrix (which is approx. 60% gravel, 25% sand, and 15% slightly plastic fines).
Brown; moist; slightly-moderately permeable; medium density; poorly stratified; outwash, GM. P.S. 101.1 (GM-GP)
Note: No seepage

TP #102, Borrow Area, 12/17/69, DHC

0.0 - 1.0 Topsoil

1.0 - 3.0 Silt, sandy
Max. size 4"
Approx. 1% 3-6", 99% matrix (which is approx. 10% gravel, 15% sand, and 75% very slightly plastic fines).
Orange-brown; moist; slightly permeable; soft; till; ML

3.0 - 10.0+ Sand, silty, gravelly
Max. size 8" - flaggy siltstones
Approx. 3% +6", 7% 3-6", 90% matrix (which is approx. 25% gravel, 30% sand, and 45% slightly plastic fines).
Brown; moist; slightly permeable; medium density; till; SM. P.S. 102.1 (SM)

Note: No seepage

TP #103, Borrow Area, 12/17/69, DHC

0.0 - 1.0 Topsoil

1.0 - 3.0 Silt, sandy
Max. size 5"
Approx 2% 3-6", 98% matrix (which is approx. 10% gravel, 15% sand, and 75% very slightly plastic fines)
Orange-brown; moist; slightly permeable; soft; till; ML
P.S. 103.1 (ML)

3.0 - 9.0+ Sand, silty, gravelly
Max. size 8" - flaggy siltstones
Approx. 3% +6", 7% 3-6", 90% matrix (which is approx. 25% gravel, 30% sand, and 45% slightly plastic fines).
Brown; moist; slightly permeable; medium density; till; SM.

Note: No seepage

TP #104, Borrow Area, 12/17/69, DHC

0.0 - 1.0 Topsoil

1.0 - 4.5 Silt, sandy
Max. size 4"
Approx. 1% 3-6", 99% matrix (which is approx. 10% gravel, 15% sand, and 75% very slightly plastic fines).
Orange-brown; moist; slightly permeable; soft; till; ML

4.5 - 10.0+ Silt, w/sand
Max. size < 3"
Approx. 5% gravel, 10% sand, and 85% non-plastic fines.
Brown; moist-wet @ 5'; slightly permeable, medium density; very poorly stratified; glacio-lacustrine, ML
P.S. 104.1 (ML)

Note: Seepage @ 5'

TP #105, Borrow A

0.0 - 1.0

1.0 - 2.5

2.5 - 10.0+

TP #201, Rear, Sh

0.0 - 0.4

0.4 - 2.0

2.0 - 5.0

5.0 - 5.0+

TP #202, Rear, Sh

0.0 - 0.4

0.4 - 1.5

1.5 - 3.8

3.8 - 5.8

5.8 - 8.0

8.0 - 9.0

9.0 - 9.0+

TP #4 Fl.Pl., C/L Dam, 11/18/69, DBC, 1446.9

0.0 - 0.5 Topsoil

0.5 - 2.3 Gravel, sandy, silty
Max. size 10" - flaggy siltstones
Approx. 10% +6", 15% 3-6", 75% matrix (which is approx. 50% gravel, 30% sand, and 20% slightly plastic fines).
Grey-brown, moist-wet @ 1.0', slightly permeable; very stiff; road fill, GM.

2.3 - 5.0 Gravel, sandy, silty
Max. size 16" - flaggy siltstones
Approx. 10% +6", 15% 3-6", 75% matrix (which is approx. 50% gravel, 25% sand, and 15% slightly plastic fines).
Brown; wet; slightly permeable; very stiff; flat-lying flags; alluvial; GM

5.0 - 8.0 + Silt & Clay, gravelly, sandy
Max. size 6"
Approx. 5% 3-6", and 95% matrix (which is approx. 25% gravel, 20% sand, and 55% moderately plastic fines).
Grey-brown; wet; very slightly permeable; hard; till; CL-ML

Note: Seeps everywhere. Many old trees, logs, brush, etc. around the 2.3' level. Served as base for road fill.

TP #101, Borrow Area, 12/17/69, DBC

0.0 - 1.0 Topsoil

1.0 - 4.0 Silt, sandy
Max size 5"
Approx 2% 3-6", 98% matrix (which is approx 10% gravel, 15% sand, and 75% very slightly plastic fines).
Orange-brown; moist; slightly permeable; soft; till; ML

4.0 - 10.0 + Gravel, sandy w/silt
Max. size 15" - mostly siltstone flags, few SR sed. cobbles
Approx. 6% +6", 9% 3-6", 85% matrix (which is approx. 60% gravel, 25% sand, and 15% slightly plastic fines).
Brown; moist, slightly-moderately permeable; medium density; poorly stratified; outwash, GM. P.S. 101.1 (GM-GP)

Note: No seepage

TP #102, Borrow Area, 12/17/69, DBC

0.0 - 1.0 Topsoil

1.0 - 3.0 Silt, sandy
Max. size 4"
Approx. 1% 3-6", 99% matrix (which is approx. 10% gravel, 15% sand, and 75% very slightly plastic fines).
Orange-brown; moist; slightly permeable; soft; till; ML

3.0 - 10.0 + Sand, silty, gravelly
Max. size 8" - flaggy siltstones
Approx. 3% +6", 7% 3-6", 90% matrix (which is approx. 25% gravel, 30% sand, and 45% slightly plastic fines).
Brown; moist; slightly permeable; medium density; till; SM. P.S. 102.1 (SM)

Note: No seepage

TP #103, Borrow Area, 12/17/69, DBC

0.0 - 1.0 Topsoil

1.0 - 3.0 Silt, sandy
Max. size 5"
Approx 2% 3-6", 98% matrix (which is approx. 10% gravel, 15% sand, and 75% very slightly plastic fines)
Orange-brown; moist, slightly permeable; soft; till; ML
P.S. 103.1 (ML)

3.0 - 9.0+ Sand, silty, gravelly
Max. size 8" - flaggy siltstones
Approx. 3% +6", 7% 3-6", 90% matrix (which is approx. 25% gravel, 30% sand, and 45% slightly plastic fines).
Brown; moist; slightly permeable; medium density; till; SM.

Note: No seepage

TP #104, Borrow Area, 12/17/69, DBC

0.0 - 1.0 Topsoil

1.0 - 4.5 Silt, sandy
Max. size 4"
Approx. 1% 3-6", 99% matrix (which is approx. 10% gravel, 15% sand, and 75% very slightly plastic fines).
Orange-brown; moist; slightly permeable; soft, till; ML

4.5 - 10.0 + Silt, w/sand
Max. size < 3"
Approx. 5% gravel, 10% sand, and 85% non-plastic fines.
Brown; moist-wet @ 5'; slightly permeable, medium density; very poorly stratified, glacio-lacustrine, ML
P.S. 104.1 (ML)

Note: Seepage @ 5'

TP #105, Borrow Area, 12/17/69, DBC

0.0 - 1.0 Topsoil

1.0 - 2.5 Silt, sandy
Max. size 5"
Approx. 1% 3-6", 99% matrix, (which is approx. 10% gravel, 15% sand, and 75% very slightly plastic fines).
Orange-brown; moist; slightly permeable; soft; till; ML

2.5 - 10.0 + Gravel, sandy w/silt
Max. size 16" - mostly flaggy siltstones, few SR sed. cobbles
Approx. 5% +6", 10% 3-6", 85% matrix (which is approx. 50% gravel, 35% sand, and 20% slightly plastic fines).
Brown; moist; slightly-moderately permeable; medium density; poorly stratified; outwash, GM

Note: No seepage. More gravel w/depth.

TP #201, Near Spwy., 11/20/69, DBC, 1502.1

0.0 - 0.4 Topsoil

0.4 - 2.0 Silt, sandy
Max. size 5"
Approx. 2% 3-6", 98% matrix (which is approx. 10% gravel, 15% sand, and 75% very slightly plastic fines).
Orange-brown; moist; slightly permeable; medium density; till; ML

2.0 - 5.0 Silt & Clay, gravelly
Max. size 8" - Broken shale and siltstone flags
Approx. 1% +6", 4% 3-6", 95% matrix (which is approx. 30% gravel, 15% sand, and 55% moderately plastic fines).
Brown; wet; very slightly permeable; hard; shows bedding; very highly weathered bedrock, "C" horizon; CL-ML

5.0 - 5.0+ Bedrock
Clay shale & siltstone; highly weathered, olive-brown, soft; laminated; highly fractured, filled w/CL-ML; essentially horizontal; Northeast shale; upper Upper Devonian.

Note: Pit dug from top of bank. No "C" horizon on lower end of pit, just topsoil over poor bedrock. Water seeping @ 1.7'

TP #202, Near Spwy., 11/20/69, DBC, 1533.6

0.0 - 0.4 Topsoil

0.4 - 1.5 Silt, sandy
Max. size < 3"
Approx. 10% gravel, 15% sand, and 75% slightly plastic fines)
Orange-brown; moist; slightly permeable; soft; till; ML

1.5 - 3.8 Silt & Clay, sandy w/gravel
Max. size, 15" - flaggy siltstones
Approx. 3% +6", 7% 3-6", 90% matrix (which is approx. 20% gravel, 25% sand, and 55% slightly-moderately plastic fines).
Lt. olive-gray; moist; very slightly permeable; hard, till; CL-ML

3.8 - 5.8 Gravel, sandy w/silt
Max. size 10" - varies, mostly SR siltstones
Approx. 3% +6", 7% 3-6", 90% matrix (which is approx. 50% gravel, 35% sand, and 15% slightly plastic fines).
Brown; moist; slightly-moderately permeable; medium density; outwash; GM

5.8 - 8.0 Silt, w/sand
Max. size < 3"
Approx. 5% gravel, 10% sand, and 85% non-plastic fines.
Brown; moist; slightly permeable; medium density; glacio-lacustrine, ML.

8.0 - 9.0 Siltstone, flags
Max. size 30"
Approx. 50% +6", 20% 3-6", 30% matrix (which is approx. 15% gravel, 25% sand, and 60% moderately plastic fines)
Lt. brown; moist; very slightly permeable, very dense; bedrock, CL-ML

9.0 - 9.0+ Bedrock
Clay shale & siltstone; moderately weathered, gray-brown; soft to moderately hard; thin bedded, fractured; filled w/CL-ML; essentially horizontal; Northeast shale; upper Upper Devonian

Note: No seepage. Refusal from 8.0-9.0'in bedrock w/fracture fillings, but ripped up w/backhoe in up to 30" flags.

AS BUILT

12/9/74

CONEWANGO CREEK WATERSHED PROJECT
SITE 33
FLOODWATER RETARDING DAM
CHAUTAUQUA COUNTY, NEW YORK
LOGS OF TEST HOLES

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Logged B. Champeon Date 11/12/69 -STATE CONS ENGINEER
Typed B. Champeon 1/14/70

NY-2173-G

TP #202, Boar. Swpy., 11/19/69, DEC. 1512.2

0.0	- 0.6	Topsoil
0.6	- 2.0	Silt, sandy Max. size 6" Approx. 2% 3-6", 98% matrix (which is approx. 10% gravel, 30% sand, and 70% slightly plastic fines) Lt. Brown; moist; slightly permeable; soft; till; ML
2.0	- 5.5	Silt & Clay, sandy Max. size 9" - few SR cobbles Approx. 2% 3-6", 98% matrix (which is approx. 10% gravel, 30% sand, and 60% moderately plastic fines). Lt. brown; moist; very slightly permeable; hard; glacio-lacustrine; CL-ML. B.S. 209.1 (CL-ML)
5.5	— 9.0	Siltstone flags Max. size 48" Approx. 60% +6", 10% 3-6", 30% matrix (which is approx. 15% gravel, 25% sand, and 60% moderately plastic fines). Lt. brown; moist; very slightly permeable; very dense; bedrock; CL-ML
9.0	- 9.0+	Bedrock Clay shale & siltstone; moderately weathered; gray-brown; soft to moderately hard; thin bedded; fractured, filled w/CL-ML; essentially horizontal; Northeast shale, upper Upper Devonian.

Note: No seepage. Zone from 5.5-9.0' is bedrock w/fracture fillings, but ripped out w/backhoe in up to 48" flags.

TP #204, Boar. Swpy., 11/19/69, DEC. 1512.2

0.0	- 0.4	Topsoil
0.4	- 1.3	Silt, sandy Max. size 3" Approx. 1% 3-6", 99% matrix (which is approx. 15% gravel, 30% sand, and 68% slightly plastic fines). Orange-brown; dry; slightly permeable; medium density; till; ML
1.3	- 3.3	Gravel, silty clayey, sandy Max. size 20" - Flaggy siltstones Approx. 15% +6", 3% 3-6", 80% matrix (which is approx. 30% gravel, 25% sand, and 45% slightly-moderately plastic fines) Lt. brown; dry; slightly permeable; hard; till; GC-GM
3.3	- 3.3+	Bedrock Clay shale & siltstone; highly weathered; olive-brown; soft; laminated; highly fractured, filled w/CL-ML; essentially horizontal; Northeast shale; upper Upper Devonian.

Note: No seepage

TP #205, Boar. Swpy., 11/20/69, DEC. 1526.2

0.0	- 0.5	Topsoil
0.5	- 2.0	Silt, sandy Max. size < 3" Approx. 10% gravel, 20% sand, and 70% slightly plastic fines. Lt. brown; moist; slightly permeable; soft; till; ML
2.0	- 4.0	Silt & Clay, sandy, gravelly Max. size 8" - Flaggy siltstones Approx. 1% +6", 4% 3-6", 95% matrix (which is approx. 20% gravel, 25% sand, and 55% slightly-moderately plastic fines). Lt. brown; moist; very slightly permeable; very stiff; till; CL-ML
4.0	- 6.0	Gravel, sandy Max. size 14" - varies - mostly SR siltstone Approx. 3% +6", 7% 3-6", 90% matrix (which is approx. 45% gravel, 40% sand, and 15% slightly plastic fines). Brown; moist; moderately permeable; medium density; very poorly stratified; outwash; GM
6.0	- 8.0	Silt, sandy Max. size < 3" Approx. 10% gravel, 30% sand, and 60% non-plastic fines. Brown; moist; slightly permeable; medium density; Irreg. stratified; glacio-lacustrine; ML
8.0	- 11.0	Silt, sandy gravelly Max. size 10" - Flaggy siltstones Approx. 1% +6", 4% 3-6", 95% matrix (which is approx. 20% gravel, 35% sand, and 45% slightly plastic fines). Brown; moist; slightly permeable; very stiff; till; SM B.S. 209.1 (SC-SM)
11.0	- 12.5	Siltstone Flags Max. size 36" Approx. 50% +6", 20% 3-6", 30% matrix (which is approx. 15% gravel, 25% sand, and 60% moderately plastic fines). Brown; moist; very slightly permeable; very dense; bedrock; CL-ML
12.5	- 12.5+	Bedrock Clay shale & siltstone; moderately weathered; gray-brown; soft to moderately hard; thin bedded; fractured, filled w/CL-ML; essentially horizontal; Northeast shale; upper Upper Devonian.

Note: No seepage. Zone from 11.0-12.5' is bedrock w/fracture fillings, but was ripped up w/backhoe in up to 36" flags.

TP #206, Boar. Swpy., 11/19/69, DEC. 1511.4

0.0	- 0.6	Topsoil
0.6	- 3.5	Silt, sandy Max. size < 3" Approx. 10% gravel, 20% sand, and 70% slightly plastic fines. Lt. brown; moist; slightly permeable; soft; till; ML. B.S. 209.1 (ML)
3.5	- 7.3	Gravel, sandy w/silt Max. size 12" - varies - mostly SR siltstones Approx. 3% +6", 7% 3-6", 90% matrix (which is approx. 45% gravel, 40% sand, and 15% very slightly plastic fines) Brown; moist; slightly-moderately permeable; medium density; very poorly stratified; outwash; GM. B.S. 209.2 (GM-GP)
7.3	- 10.5	Silt & Clay, sandy, gravelly Max. size 14" - Flaggy siltstones Approx. 1% +6", 4% 3-6", 95% matrix (which is approx. 25% gravel, 20% sand, and 55% moderately plastic fines) Lt. olive-gray; moist; very slightly permeable; hard; till; CL-ML. B.S. 209.1 (CL-ML)
10.5	- 13.3	Silt, sandy Max. size < 3" Approx. 10% gravel, 30% sand, and 60% non-plastic fines. Brown; moist; slightly permeable; medium density; irregularly stratified; glacio-lacustrine; ML. B.S. 209.4 (ML)
13.3	- 14.5	Gravel, sandy, silty Max. size 10" - varies - mostly SR siltstones Approx. 3% +6", 7% 3-6", 90% matrix (which is approx. 45% gravel, 35% sand, and 20% very slightly plastic fines). Brown; moist; slightly-moderately permeable; medium density; very poorly stratified, outwash; GM
14.5	- 16.0	Gravel, silty, sandy Max. size 20" - Flaggy siltstones Approx. 5% +6", 10% 3-6", 85% matrix (which is approx. 30% gravel, 25% sand, and 45% moderately plastic fines) Brown; moist; very slightly permeable; hard; till; GM
16.0	- 16.0+	Bedrock Clay shale & siltstone; moderately weathered; gray-brown; soft to moderately hard; thin bedded; fractured, filled w/CL-ML; essentially horizontal; Northeast shale, upper Upper Devonian.

Note: Very slight seep @ 6'

TP #207, Boar. Swpy., 11/19/69, DEC. 1526.3

0.0	- 0.4	Topsoil
0.4	- 3.3	Silt, sandy Max. size 3" Approx. 2% 3-6", 98% matrix (which is approx. 15% gravel, 25% sand, and 60% slightly plastic fines). Lt. Brown; moist; slightly permeable; soft; till; ML
3.3	- 7.0	Gravel, sandy w/silt Max. size 14" - varies - mostly SR siltstone Approx. 3% +6", 7% 3-6", 90% matrix (which is approx. 50% gravel, 35% sand, and 15% very slightly plastic fines). Brown; moist; slightly-moderately permeable; medium density; very poorly stratified; outwash; GM
7.0	— 11.5	Silt, sandy Max. size < 3" Approx. 10% gravel, 30% sand, and 60% non-plastic fines. Brown; moist; slightly permeable, irregularly stratified; glacio-lacustrine; ML
11.5	- 11.5+	Bedrock Clay shale & siltstone; moderately weathered; gray-brown; soft to moderately hard; thin bedded; fractured, filled w/CL-ML; essentially horizontal, Northeast shale, upper Upper Devonian.

Note: No seepage

TP #208, Boar. Swpy., 11/19/69, DEC. 1520.4

0.0	— 0.4	Topsoil
0.4	- 1.8	Silt, sandy Max. size < 3" Approx. 15% gravel, 25% sand, and 60% slightly plastic fines. Orange-brown; moist; slightly permeable, soft; till; ML.
1.8	- 4.0	Gravel, silty, clayey, sandy Max. size 16" - Flaggy siltstones Approx. 10% +6", 5% 3-6", 85% matrix (which is approx. 30% gravel, 25% sand, and 45% slightly-moderately plastic fines). Lt. brown; dry, slightly permeable, hard, till; GC-GM.
4.0	- 4.0+	Bedrock Clay shale & siltstone, highly weathered, olive-brown, soft; laminated, highly fractured, filled w/CL-ML, essentially horizontal, Northeast shale, upper Upper Devonian.

Note: No seepage.

TP #209, Prin.

0.0	- 0.8	
0.8	- 2.0	
2.0	- 6.0	
6.0	- 11.0+	

TP #302 Bank, J

0.0	- 1.0	
1.0	- 10.5	
10.5	- 15.8	
15.8	- 18.0+	

TP #302 Fl.Pl.,

0.0	- 0.6	
0.6	- 3.0	
3.0	- 6.8	
6.8	- 11.8	
11.8	14.2+	

TP #303, Prin. Emer., 11/18/69, DEC. 1473.4

0.0 - 0.8 Topsoil

0.8 - 2.0 Gravel, sandy, silty
Max. size 8" - Flaggy siltstones
Approx. 10% +6", 15% 3-6", 75% matrix (which is approx. 50% gravel, 30% sand, and 20% slightly plastic fines)
Gray-brown; moist; slightly permeable; very stiff; road fill; GM

2.0 - 6.0 Gravel, sandy, silty
Max. size 20" - Flaggy siltstones
Approx. 10% +6", 15% 3-6", 75% matrix (which is approx. 60% gravel, 25% sand, and 15% slightly plastic fines)
Brown; moist-wet @ 3.8'; slightly permeable; very stiff; flat lying flags; alluvial; GM

6.0 - 11.0+ Silt & Clay, gravelly; sandy
Max. size 6"
Approx. 5% 3-6", 95% matrix (which is approx. 25% gravel, 20% sand, and 55% moderately plastic fines)
Gray; wet; very slightly permeable; hard; till; CL-ML

Note: Moderate seepage @ 3.8'. Little brush @ ± 2.0'

TP #302 Bank, Prin. Emer., 11/19/69, DEC. 1477

0.0 - 1.0 Topsoil

1.0 - 10.5 Clayey silt, gravelly, sandy
Max. size 8" - Flaggy siltstone
Approx. 1% +6", 4% 3-6", 95% matrix (which is approx. 25% gravel, 20% sand, and 55% moderately plastic fines).
Lt. brown; wet; very slightly permeable; very stiff; very highly weathered bedrock, "C" horizon; CL-ML

10.5 - 15.8 Silt & Clay, gravelly, sandy
Max. size 7" - Flaggy SR siltstone
Approx. 1% +6", 4% 3-6", 95% matrix (which is approx. 25% gravel, 20% sand, and 55% moderately plastic fines).
Gray w/brown; wet; very slightly permeable; hard; till; CL-ML

15.8 - 18.0+ Bedrock
Clay shale & siltstone, moderately weathered; gray-brown; soft to moderately hard; thin bedded; fractured, filled w/CL-ML; essentially horizontal; Northeast shale; upper Upper Devonian.

Note: Water level @ 16.5'. Difficult digging in 15.8-18' zone.

TP #302 Flood. Prin. Emer., 11/18/69, DEC. 1468.3

0.0 - 0.6 Topsoil

0.6 - 3.0 Gravel, sandy, silty
Max. size 8" - Flaggy siltstones
Approx. 10% +6", 15% 3-6", 75% matrix (which is approx. 50% gravel, 30% sand, and 20% slightly plastic fines)
Gray-brown; moist; slightly permeable; very stiff; road fill; GM

3.0 - 6.8 Gravel, sandy, silty
Max. size 16" - Flaggy siltstones
Approx. 10% +6", 15% 3-6", 75% matrix (which is approx. 60% gravel, 25% sand, and 15% slightly plastic fines)
Brown; moist-wet @ 4 '; slightly permeable; very stiff; flat lying flags; alluvial; GM

6.8 - 11.8 Silt & Clay, gravelly, sandy
Max. size 8" - Flaggy siltstones
Approx. 1% +6", 4% 3-6", 95% matrix (which is approx. 25% gravel, 20% sand, and 55% moderately plastic fines).
Gray; wet; very slightly permeable; hard; till; CL-ML

11.8 - 14.2+ Bedrock
Clay shale & siltstone; moderately weathered, gray-brown; soft to moderately hard, thin bedded; fractured, filled w/CL-ML; essentially horizontal; Northeast shale, upper Upper Devonian

Note: Moderate seepage @ 4.3'. Difficult digging below 12'. Brush & logs @ ± 3'

TP #303, Prin. Emer., 11/18/69, DEC. 1461.8

0.0 - 0.6 Topsoil

0.6 - 2.6 Gravel, sandy, silty
Max. size 12" - Flaggy siltstones
Approx. 10% +6", 15% 3-6", 75% matrix (which is approx. 50% gravel, 30% sand, and 20% slightly plastic fines)
Gray-brown; moist; slightly permeable; very stiff; road fill; GM

2.6 - 4.0 Gravel, sandy, silty
Max. size 18" - Flaggy siltstones
Approx. 10% +6", 15% 3-6", 75% matrix (which is approx. 60% gravel, 25% sand, and 15% slightly plastic fines)
Brown; moist; slightly permeable; very stiff; flat lying flags; alluvial; GM

4.0 - 7.0 Sand, silty, gravelly
Max. size 10" - Flaggy siltstones
Approx. 2% +6", 6% 3-6", 92% matrix (which is approx. 25% gravel, 30% sand, and 45% moderately plastic fines)
Brown; wet; very slightly permeable; hard; till; SC-SM.

7.0 - 10.0+ Bedrock
Clay shale & siltstone; moderately weathered; gray-brown; soft to moderately hard; thin bedded; fractured, filled w/CL-ML; essentially horizontal; Northeast shale, upper Upper Devonian.

Note: Moderate seepage @ 3.8'. This till slightly sandier and less plastic than gray till. Hard digging beyond 8.5'. Many logs and branches in 0.0-2.5'.

TP #401, Stream Channel, 11/18/69, DEC. 1458.1

0.0 - 0.8 Topsoil

0.8 - 5.3 Gravel, sandy, silty
Max. size 15" - Flaggy siltstones
Approx. 10% +6", 15% 3-6", 75% matrix (which is approx. 60% gravel, 25% sand, and 15% slightly plastic fines).
Brown; wet; slightly-moderately permeable; very stiff; flat lying flags; alluvial; GM

5.3 - 8.2 Silt & Clay, gravelly, sandy
Max. size 8" - Flaggy siltstones
Approx. 1% +6", 4% 3-6", 95% matrix (which is approx. 25% gravel, 20% sand, and 55% moderately plastic fines).
Gray-brown; wet; very slightly permeable; hard; till; CL-ML

8.2 - 10.0 Bedrock
Clay shale & siltstone; moderately weathered; gray-brown; soft to moderately hard; thin bedded; fractured, filled w/CL-ML; essentially horizontal; Northeast shale, upper Upper Devonian

Note: Water @ creek level, 0.8'

TP #301, Drain Line, 11/18/69, DEC. 1475

0.0 - 0.7 Topsoil

0.7 - 3.0 Silt & Clay, gravelly, sandy
Max. size 7" - Flaggy shale and siltstone
Approx. 4% +6", 11% 3-6", 85% matrix (which is approx. 30% gravel, 15% sand, and 55% moderately plastic fines)
Light brown; wet; very slightly permeable; very stiff; very highly weathered bedrock, "C" horizon; CL-ML
U.S. 301.1 (CL-ML)

3.0 - 3.0+ Bedrock
Clay [illegible] & siltstone; highly weathered; olive-brown; soft; laminated; highly fractured, filled w/CL-ML; essentially horizontal; Northeast shale, upper Upper Devonian.

Note: Bedrock @ 3' @ top of pit and @ 6' @ bottom of pit. Seepage @ 0.7'

AS BUILT
12/9/74

CONEWANGO CREEK WATERSHED PROJECT
SITE 33
FLOODWATER RETARDING DAM
CHAUTAUQUA COUNTY, NEW YORK
LOGS OF TEST HOLES

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Logged B CHAMPION Date 11-12-69 | Approved by STATE CONS ENGINEER
Typed B CHAMPION 4/4/70 | Sheet 20 of 23 | NY-2173-G

TP #501, Drain Line, 11/18/69, DRC, 1402.3

0.0 - 0.4 Topsoil

0.4 - 6.0 Gravel, sandy, silty
Max. size 18" - Flaggy siltstones
Approx. 10% +6", 15% 3-6", 75% matrix (which is approx. 40% gravel, 15% sand, and 15% slightly plastic fines).
Brown; moist-wet @ 1.5'; slightly permeable; very stiff-hard, flat-lying flags; alluvial; GM. P.S. 300.1 (GM-GW)

6.0 - 6.0+ Bedrock
Clay shale & siltstone; moderately weathered; gray-brown; soft to moderately hard; thin bedded; fractured, filled w/CL-ML; essentially horizontal; Northeast shale, upper Upper Devonian.

Note: Water @ creek level, 1.3'

TP #502 Bank, Drain Line, 11/18/69, DRC, 1404.3

0.0 - 1.0 Topsoil

1.0 - 1.8 Clayey Silt, gravelly, sandy
Max. size 9" - Flaggy siltstone
Approx. 1% +6", 4% 3-6", 95% matrix (which is approx. 25% gravel, 30% sand, and 38% moderately plastic fines).
Light brown; moist-wet @ 1.2'; very slightly permeable; very stiff; very highly weathered bedrock, "C" horizon; CL-ML

1.8 - 1.8+ Bedrock
Clay shale & siltstone; highly weathered; olive-brown; soft; laminated; highly fractured, filled w/CL-ML; essentially horizontal; Northeast shale; upper Upper Devonian.

Note: Bedrock is @ 3.3' in bottom of pit. Seepage @ 1.2'.

TP #503 Ditch, Drain Line, 11/18/69, DRC, 1361

0.0 - 8.5 Silt & Clay, gravelly, sandy
Max. size 8" - Flaggy SS siltstone
Approx. 1% +6", 4% 3-6", 95% matrix (which is approx. 25% gravel, 30% sand, and 38% moderately plastic fines).
Brown-y/gangs; wet; very slightly permeable; hard; till; CL-ML

8.5 - 8.5+ Bedrock
Clay shale & siltstone; highly weathered; olive-brown; soft, laminated, highly fractured, filled w/CL-ML; essentially horizontal; Northeast shale; upper Upper Devonian.

Note: No topsoil. Water in ditch.

TP #504, Bank, Other, 11/18/69, DRC, 1402

0.0 - 0.7 Topsoil

0.7 - 1.6 Clayey Silt, sandy, gravelly
Max. size 9" - Flaggy siltstone
Approx. 1% +6", 4% 3-6", 95% matrix (which is approx. 20% gravel, 10% sand, and 60% moderately plastic fines).
Light brown; wet; very slightly permeable; very stiff; flat-lying flags; very highly weathered bedrock, "C" horizon; CL-ML

1.6 - 1.6+ Bedrock
Clay shale & siltstone; highly weathered; olive-brown; soft; laminated; highly fractured, filled w/CL-ML; essentially horizontal; Northeast shale; upper Upper Devonian.

Note: Water seeping from practically everywhere.

TP #505 Fl. Pl., Other, 11/18/69, DRC, 1470.4

0.0 - 1.0 Topsoil

1.0 - 4.0 Gravel, silty, sandy
Max. size 24" - Flaggy siltstone
Approx. 10% +6", 15% 3-6", 75% matrix (which is approx. 50% gravel, 30% sand, and 20% slightly-moderately plastic fines).
Brown; moist-wet @ 3.4'; slightly permeable; very stiff-hard; flat-lying flags; alluvial-colluvial; GM.

4.0 - 4.0+ Bedrock
Clay shale & siltstone; highly weathered; olive-brown; soft; laminated; highly fractured, filled w/CL-ML; essentially horizontal; Northeast shale; upper Upper Devonian.

Note: Gravel is siltier than usual. Water @ brook level, 3.4'

DRILL HOLE LOGS

CONDEMNATION 33

DH 51 C/L Dam, 12/5-11/69, DRC, 1407.7

2	Topsoil	0.0 – 1.0
11	Silt, sandy Approx. 5% gravel, 20% sand, 75% non-plastic fines Orange-brown; moist; slightly permeable, stiff, N=11; till; ML	1.0 – 2.5
9 24	Sand, silty, gravelly Approx. 25% gravel, 30% sand, 45% slightly-moderately plastic fines Gray-brown; moist; very slightly permeable, stiff- very stiff, N=9-24; till; CL-ML	2.5 – 6.5
153 RR RR 113/.3	Clayey silt, sandy, gravelly Approx. 20% gravel, 20% sand, 60% moderately plastic fines Lt. brown; wet; very slightly permeable; hard, N=153; very highly weathered bedrock, "C" horizon, CL-ML	6.5 – 9.3
MX MX MX	Bedrock - interbedded shale and siltstone w/few fr. lime sandstone zones w/occ. biotite mica; silty clayey texture, occ. sandy, moderately weathered, cc. high down to 14' then essentially non-weathered below 14'; weathered zones are olive green to olive brown, rest is gray except for lighter lime parts, mod. soft to very hard; mostly laminated, few thin beds, occ. m olive shale or lime sandstone; some highly weathered clay and silt seams; highly fractured to ± 13', mod below that; essentially horizontal, regional dip and strike, Northeast shale, upper Upper Devonian.	9.3 – 22.5

Note: ▽ @ 12' on 12/11/69, @ 4' on 12/15/69, @ surface on 12/18/69.
Run 1 9.2-12.8' 100% Rec 0% RQD
2 12.8-16.5' 100% 14%
3 16.5-17.5' 70% 0%
4 17.5-22.5' 100% 50%
Largest whole core piece, 8"

Pressure test results

17.5-22.5	30 psi	4.17 fpd 1/
	20 psi	3.49 fpd 2/
	10 psi	2.37 fpd 3/
12.5-17.5	20 psi	5.52 fpd
	10 psi	2.98 fpd

1/ 1 qt. loss up outer pipe in 27 sec.
2/ " 37 sec.
3/ " 63 sec.

DH 52 C/L Dam, 12/16-17/69, DRC, 1405.9

	Topsoil	0.0 – 0.7
20 24	Gravel, sandy, silty Approx. 50% gravel, 30% sand, 20% slightly plastic fines Brown; moist-wet @ 2.8'; slightly permeable; very stiff, N=20-24; alluvial-colluvial, GM	0.7 – 3.2
28	Silt and clay, gravelly, sandy Approx. 25% gravel, 20% sand, 55% moderately plastic fines Gray; wet; very slightly permeable, very stiff, N=28; till; CL-ML	3.2 – 4.3
58 81 57/.5	Sand, silty gravelly Approx. 25% gravel, 30% sand, 45% moderately plastic fines Brown; wet; very slightly permeable, hard, N=58-81; till; SC-SM	4.3 – 8.5
RR MX	Bedrock - interbedded shale and siltstone, mot limy; silty and clayey texture; moderately weathered; olive green-slate gray; moderately soft-hard, breaks along bedding planes; laminated, few thin beds w/occasional clay and silt seams; fractures into 1/4-1" pieces, some staining; core very fragmental; essentially horizontal; regional strike and dip; Northeast shal upper Upper Devonian.	8.5 – 14.0

Note: ▽ @ 2.8' on 12/18/69
Run 1 9.0-14.0' 58% rec. 0% RQD
Largest whole core piece, 3".

DH 53 C/L Dam, 12/15/69, DRC, 1494.0

10 49 119	Clayey silt, gravelly sandy Approx. 25% gravel, 20% sand, 55% moderately plastic fines Lt. brown; wet; very slightly permeable; stiff-hard, N=10-119; very highly weathered bedrock, "C" horizon; CL-ML	0.0 – 4.5
74/.5 MX MX	Bedrock - interbedded shale and siltstone, w/few fine-gr. limy sandstone zones w/occ. biotite mica; silty clayey texture, occ. sandy; moderately weathered to 8', then essentially non-weathered below 8'; weathered zones are olive green-brown, rest is gray except for lighter limy parts; moderately soft-very hard; mostly laminated, few thin beds, occ. massive, some cross-bedding; mostly tight fractures, some staining on fracture surfaces, only 1 or 2 small CL-ML seams; fracture frequency 0.5" to 3 5", regional strike and dip, essentially horizontal; Northeast shale, upper Upper Devonian.	4.5 – 15.0

Note: ▽ @ 7' on 12/15/69, @ 6' on 12/16/69.
Run 1 5.0-10.0' 62% Rec. 0% RQD
2 10.0-15.0' 100% Rec. 0% RQD

Pressure test results
10.0-15.0

5.0-10.0

4/ Leaking badly around o
5/

Initial encounter w/water

DH 251 Lwr. Salvy., 12/18/69, DRC, 1

	Topsoil
2	Silt, sandy Approx. 10% gravel, 15% s Lt. brown to orange brown N=2, till; ML
40 39	Silt and clay, sandy w/gr Approx. 20% gravel, 25% s fines. Brown-gray; moist; very s till; CL-ML
MX	Bedrock - sandy siltstone, thin poor shale and silt silty texture; moderate-w weathered in lower zone, moderately soft; laminate 8.5'; good rock breaks in horizontal, regional stri Upper Devonian.

Note: No water.
Run 1 5.5-10.5'
Largest whole core
No return water, c

DH 252 Lwr. Salvy., 12/17-18/69, DRC

	Topsoil
6 15	Silt, sandy Approx. 10% gravel, 15% s Lt. brown; moist; slightl till; ML
12 30	Silt, sandy, gravelly Approx. 20% gravel, 25% s Brown, moist; very slight till; ML.
MX MX MX	Bedrock - sandy siltstone uncompetent shale and sil te silty texture; incompe weathering, others essent olive brown; moderately s few thin beds, occ. massi silt seams @ 10-11'; core is fractured into 1/2-2" essentially,horizontal; M

Note: Run 1 8.0-11.0
2 11.0-16.0
3 16.0-18.0
Largest whole core
Lost drilling wate
short to get good

DH 253 Lwr. Salvy., 12/17/69, DRC, 1

	Topsoil
4 20	Silt, sandy Approx. 15% gravel, 20% s Lt. brown-orange brown; s stiff, N=4-20; till; M
95/.8	Gravel, silty, sandy Approx. 20% gravel, 25% s Mottled brown; moist; sl till; GM
MX	Bedrock - clay shale and highly-moderately weathe laminated bedding; many dip and strike, essentia Upper Devonian.

Note: Run 1 5.0-10.0'
Largest whole cor
No water

LOGS

33

0.0

1.0

7% non-plastic fines
y permeable; stiff, N=11;

2.5

, 4% slightly-moderately

htly permeable, stiff- very

6.5

, 6% moderately plastic

y permeable; hard, N=153, very
"C" horizon; CL-ML

9.3

and siltstone w/few r.
biotite mica; silty clayey
ely weathered, occ. high
y non-weathered below 14';
reen to olive brown, rest is
y parts; mod. soft to very
thin beds, occ. massive
ic highly weathered clay
tured to ± 13', good below
, regional dip and strike,
Devonian.

22.5

, @ 4' on 12/15/69, @ surface on

00% Rec 0% RQD
00% 34%
70% 0%
00% 50%
iece, 8"

ei 4.17 fpd 1/
ei 3.49 fpd 2/
ei 2.37 fpd 3/
ei 5.52 fpd
ei 2.96 fpd

er pipe in 27 sec.
37 sec.
83 sec.

0.0

0.7

d, 20% slightly plastic fines
ghtly permeable; very stiff,
al, CH

3.2

ndy
M, 55% moderately plastic fines
rmeable; very stiff, N=28;

4.3

d, 47% moderately plastic fines
rmeable; hard, N=58-81;

8.5

and siltstone, mod lime;
oderately weathered; olive
y soft-hard, breaks along
few thin beds w/occasional
ces into 1/4-3" pieces, some
tal, essentially horisontal;
rtheast shale, upper Upper

14.0

rec. 0% RQD
m, 3".

0.0

d, 55% moderately plastic fines
tly permeable; stiff-hard; N=10-119;
rock, "C" horizon; CL-ML

4.5

and siltstone, w/few fine-gr. limy
ilic mica; silty clayey texture, occ.
d to 8', then essentially non-weathered
re olive green-brown, rest is gray
rts; moderately soft-very hard; mostly
ecc massive, some cross-bedding; mostly
ning on fracture surfaces, only 1 or 2
frequency 0.5" to 3.5"; regional strike
ontal; Northeast shale, upper Upper

15.0

, @ 6' on 12/16/69
2% Rec. 0% RQD
4% Rec. 0% RQD

piece, 3.5"

Pressure test results

10.0-13.0	30 psi	4.13 fpd
	20 psi	4.58 fpd
	10 psi	5.40 fpd
5.0-10.0	20 psi	12.1 fpd 4/
	10 psi	13.2 fpd 5/

4/ Leaking badly around casing
5/

Initial encounter w/water @ 4.5'

DH 251 Lwer. Salvy., 12/18/69, DRC, 1519.0 — 0.0

Topsoil — 1.0

2 — Silt, sandy
Approx. 10% gravel, 15% sand, 75% slightly plastic fines
Lt. brown to orange brown; moist; slightly permeable; soft, N=2; till; ML

2.6

40, 39 — Silt and clay, sandy w/gravel
Approx. 20% gravel, 25% sand, 55% slightly-moderately plastic fines.
Brown-gray; moist; very slightly permeable; hard, N=39-40; till; CL-ML

9.5

XX — Bedrock - sandy siltstone, no lime, w/occ. biotite mica to 8.5', then poor shale and siltstone from 8.5-10.5'; fine-grained to silty texture; moderate-non weathered in upper zone, then highly weathered in lower zone, grayish-tan; very hard to 8.5'; then moderately soft; laminated to thin bedded, mostly CL-ML below 8.5'; good rock breaks in 3/4" to 2" fragments; essentially horisontal, regional strike and dip; Northeast shale, upper Upper Devonian.

10.5

Note: No water.
Run 1 5.5-10.5' 62% Rec. 0% RQD
Largest whole core piece, 2"
No return water, casing loose on bottom.

DH 252 Lwer. Salvy., 12/17-18/69, DRC, 1522.0 — 0.0

Topsoil — 0.8

6, 15 — Silt, sandy
Approx. 10% gravel, 15% sand, 75% slightly plastic fines
Lt. brown; moist; slightly permeable, medium-stiff; N=6-15, till; ML

3.4

12, 36 — Silt, sandy, gravelly
Approx. 20% gravel, 25% sand, 55% slightly plastic fines
Brown; moist; very slightly permeable; stiff-hard; N=12-36; till; ML.

8.0

XX, XX, XX — Bedrock - sandy siltstone, no lime, occ. biotite mica; uncompetent shale and siltstone zone 10-12.5'; fine-grained to silty texture; incompetent beds show high-moderate weathering, others essentially non-weathered; grayish tan to olive brown; moderately soft to very hard; mostly laminated few thin beds, occ. massive; occ. highly weathered clay and silt seams @ 10-11'; core is good 9-10', very poor 10-11'; rest is fractured into 1/2-2" chunks; regional strike and dip, essentially horisontal; Northeast shale, upper Upper Devonian.

18.0

Note: Run 1 8.0-11.0 77% Rec. 35% RQD
2 11.0-16.0 60% Rec. 0% RQD
3 16.0-18.0 100% Rec. 0% RQD

Largest whole core piece, 5"
Lost drilling water at start because casing a bit too short to get good seating.

DH 253 Lwer. Salvy., 12/17/69, DRC, 1519.1 — 0.0

Topsoil — 0.8

4, 20 — Silt, sandy
Approx. 15% gravel, 20% sand, 65% slightly plastic fines
Lt. brown-orange brown; moist; slightly permeable, medium-very stiff, N=4-20; till; ML

3.2

95/.8 — Gravel, silty, sandy
Approx. 20% gravel, 25% sand, 45% slightly plastic fines
Mottled brown; moist; slightly permeable; hard, N=95/.8; till; CH

5.3

XX — Bedrock - clay shale and siltstone; clayey - silty texture, highly-moderately weathered; olive brown; soft-medium soft; laminated bedding; many CL-ML seams; very poor core; regional dip and strike, essentially horisontal; Northeast shale, upper Upper Devonian.

10.0

Note: Run 1 5.0-10.0' 36% rec 0% RQD
Largest whole core piece, 3/4"
No water

DH 254 Lwer. Salvy., 12/18/69, DRC, 1524.0

Topsoil — 0.5

8, 24 — Silt, sandy
Approx. 15% gravel, 20% sand, 65% slightly plastic fines
Lt. brown-orange brown, moist; slightly permeable; stiff-very stiff, N=8-24, till; ML

3.5

29, 17 — Gravel, silty, sandy
Approx. 30% gravel, 25% sand, 45% slightly plastic fines
Mottled brown; moist; slightly permeable; very stiff, N=17-29; till; CH

7.6

19, 18 — Sand, silty
Approx. 5% gravel, 70% sand, 25% non-plastic fines
Brown; moist; moderately permeable; medium density, N=18; poorly stratified outwash; SM

12.3

13, 12, 28 — Silt, sandy
Approx. 5% gravel, 15% sand, 80% non-plastic fines
Brown; moist; slightly permeable; medium density, N=12-28; glacio-lacustrine; ML

17.5

29 — Gravel, silty, sandy
Approx. 30% gravel, 25% sand, 45% slightly plastic fines
Mottled brown; moist; slightly permeable, very stiff; N=29; till; CH

20.0

XX — Bedrock - sandy siltstone, no lime, occ. biotite mica, fine grained to silty texture; essentially non-weathered; grayish tan; very hard; thin bedded, shows some cross-bedding, occ. laminae of darker silts; usually tight fractures on 2-4" spacing; little staining, core fresh looking, not fragmental; regional strike and dip, essentially horisontal; Northeast shale, upper Upper Devonian.

25.0

Note: Run 1, 20.0-25.0', 90% Rec, 8% RQD
Lost water from the start. Driller says 6" void @ 24.0-24.5'. No water table.
Largest whole core piece, 4"

DH 255 Prin. Salvy., 12/11-12/69, DRC, 1409.5 — 0.0

Topsoil — 0.8

40 — Gravel, sandy, silty
Approx. 50% gravel, 30% sand, 20% slightly plastic fines
Gray-brown; moist; slightly permeable; hard, N=40; road fill; GM

2.5

28, 26 — Gravel, sandy, silty
Approx. 60% gravel, 25% sand, 15% slightly plastic fines
Brown; moist-wet @ 3'; slightly permeable, very stiff, N=26-28, alluvial; GM

6.0

34 — Silt and clay, gravelly, sandy
Approx. 25% gravel, 20% sand, 55% moderately plastic fines
Gray; wet; very slightly permeable; hard, N=34; till, CL-ML

8.0

55, 125, 140 — Sand, silty, gravelly
Approx. 25% gravel, 30% sand, 45% slightly plastic fines
Brown; wet; very slightly permeable; very stiff, N=55-140; till; SM

13.5

XX, XX — Bedrock - interbedded shale and siltstone; silty-clayey texture, mostly moderately weathered; olive brown above 18', gray below, moderately soft to very hard; mostly laminated some thin beds; few highly weathered clay and silt seams; fractures into 1/2-2" blocks along bedding planes; regional strike and dip, essentially horisontal; Northeast shale, upper Upper Devonian

23.5

Note: Run 1, 13.5-18.5', 78% Rec., 0% RQD
2, 18.5-23.5, 78% Rec., 0% RQD
Largest whole core piece, 3"
Water @ 4.5', 12/12/69 and @ 3.0', 12/18/69.
Brush at bottom of road fill.

AS BUILT
12/7/74

CONEWANGO CREEK WATERSHED PROJECT
SITE 33
FLOODWATER RETARDING DAM
CHAUTAUQUA COUNTY, NEW YORK
LOGS OF TEST HOLES

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Logged B. CHAMPEON 11-3/65 — Approved STATE CONS ENGINEER
Checked — Date
Typed 3/5/74
Checked B CHAMPEON 3/6/70

SHEET 21 OF 29 SHEETS
NY-2173-G

3832

DH 353 Prin. Explor., 12/10-11/69, RBC, 1464.1 — 0.0

Topsoil — 0.5

24 — Gravel, sandy silty
Approx. 60% gravel, 26% sand, 26% slightly plastic fines
Gray-brown; moist; slightly permeable; very stiff; N=28; road fill; GM — 8.0

21 — Gravel, sandy, silty
Approx. 60% gravel, 25% sand, 15% slightly plastic fines
Brown; moist-wet @ 3'; slightly permeable; very stiff, N=21; alluvial; GM — 9.5

13 — Silt and clay, gravelly, sandy
Approx. 25% gravel, 30% sand, 55% moderately plastic fines
Gray-brown; wet; very slightly permeable; stiff, N=13; till; CL-ML — 16.0

20
26 — Silt and clay, gravelly, sandy
Approx. 25% gravel, 30% sand, 45% moderately plastic fines
Gray; wet; very slightly permeable; very stiff, N=20-26; till; CL-ML — 18.5

MW
MW
MW
MW — Bedrock - interbedded shale and siltstone, light areas of fine grained limy sandstone w/occ. biotite mica; silty and clayey texture, occ. sandy; moderately weathered, occ. high; essentially non-weathered from 13' down; weathered areas olive green, rest is gray except for white limy parts; moderately soft to very hard; mostly laminated, few thin beds, occ. massive, nearly cyclic shales on 8" thick limy beds; occ. highly weathered CL-ML seams; highly fractured in places, much improvement near bottom; regional dip and strike, essentially horizontal; Northeast shale, upper Upper Devonian. — 35.6

Note: Run 1 10.6-15.6 74% Rec. 0% RQD
2 15.6-20.6 94% Rec. 0% RQD
3 20.6-25.6 96% Rec. 40% RQD
Largest whole core piece, 1¾"
Water at 3.0', 12/11/69, and at 2. 0, 12/18/69.
Some brush around 2.0'

Pressure tests

20.0-25.0	40 psi	2.96 fpd
	30 psi	2.54 fpd
	20 psi	1.80 fpd
	10 psi	1.76 fpd
15.0-20.0	30 psi	0.76 fpd
	20 psi	0.72 fpd
	10 psi	0.76 fpd
10.0-15.0	25 psi	2.12 fpd
	15 psi	2.41 fpd

DH 353 Prin. Explor, 12/15/69, RBC, 1460.7 — 0.0

Topsoil — 0.5

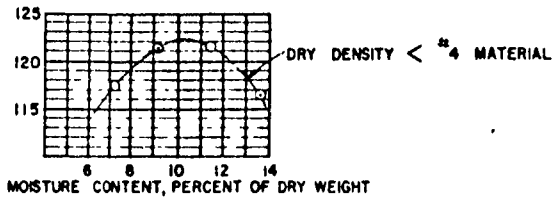
34 — Gravel, sandy silty
Approx. 50% gravel, 30% sand, 20% slightly plastic fines
Gray-brown; moist; slightly permeable; very stiff; N=34; road fill; GM — 8.6

17
20 — Gravel, sandy, silty
Approx. 60% gravel, 25% sand, 15% slightly plastic fines
Brown; moist-wet @ 3'; slightly permeable; very stiff, N=17-20; alluvial; GM — 8.3

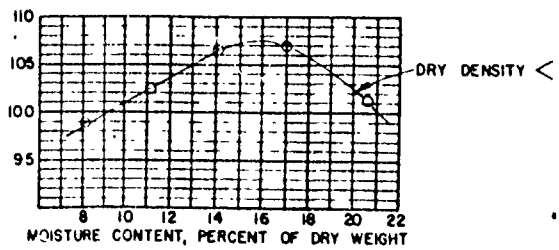
33
52
43 — Sand, silty, gravelly
Approx. 25% gravel, 30% sand, 45% slightly plastic fines
Brown; wet; very slightly permeable; hard, N=43-53; till; SM — 11.5

MW — Bedrock - interbedded shale and siltstone, lighter limy areas in fine-grained sandstone w/occ. biotite mica; silty and clayey texture; moderately weathered; olive brown; moderately soft to hard; mostly laminated, some thin beds; occ. thin highly weathered CL-ML seams; most fractures are 1/4-1½" in spacing, with little filling; regional strike and dip, essentially horizontal; Northeast shale, upper Upper Devonian. — 16.5

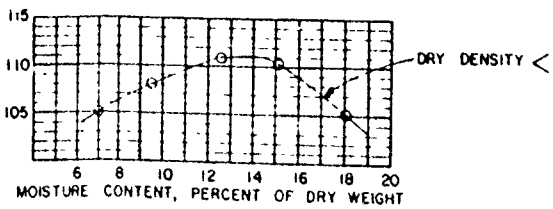
Note: Run 1, 11.5-16.5', 54% Rec., 0% RQD
Largest whole core piece, 1½".
Water @ 5.5', 12/15/69
Small amount of brush at ± 2.6'.



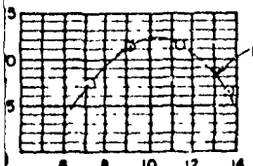
COMPACTION CURVE
FIELD SAMPLE NO 102.1
LABORATORY CLASSIFICATION – GM



COMPACTION CURVE
FIELD SAMPLE NO 103.1
LABORATORY CLASSIFICATION – ML

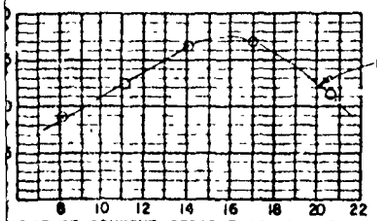


COMPACTION CURVE
FIELD SAMPLE NO 104.1
LABORATORY CLASSIFICATION – ML



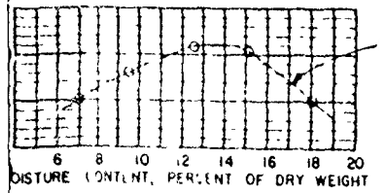
STURE CONTENT, PERCENT OF DRY WEIGHT

COMPACTION CURVE
FIELD SAMPLE NO 102.1
ABORATORY CLASSIFICATION – GM



MOISTURE CONTENT, PERCENT OF DRY WEIGHT

COMPACTION CURVE
FIELD SAMPLE NO 103.1
LABORATORY CLASSIFICATION – ML



OISTURE CONTENT, PERCENT OF DRY WEIGHT

OMPACTION CURVE
ELD SAMPLE NO 104.1
LABORATORY CLASSIFICATION – ML

LEGEND

TEST HOLE NUMBERING SYSTEM

	Test Pit (TP)	Drill Hole (DH)
Centerline of dam	1-49	[illegible]
Borrow Area	101-149	150-199
Emergency Spillway	201-249	250-299
Centerline of Outlet Structure	301-349	350-399
Outlet Channel	401-449	450-499
Drain Line	501-549	[illegible]
Other	601-649	[illegible]

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) SYMBOLS

GW Well graded gravels; gravel-sa[illegible] mixtures
GP Poorly graded gravels
GM Silty gravels; gravel-sa[illegible] mixtures
GC Clayey gravels; gravel-sa[illegible]-clay mixtures
SW Well graded sands; sand-gravel mixtures
SP Poorly graded sands
SM Silty sands; sand-silt mixtures
SC Clayey sands; sand-clay mixtures
ML Silts; [illegible]lty, [illegible] fine sands; sands or clayey [illegible]
CL Clays of low to medium plasticity; silty, sandy or gravelly clays
CH Clays of high plasticity; fat clays
MH Elastic silts; micaceous or diato[illegible]aceous silts
OL Organic silts and organic silty clays of low plasticity
OH Organic clays or silts of medi[illegible] to hi[illegible] plasticity

Note Classifications shown in the logs are based on lab tests of samples representative of that material (ASTM D2487-69T). Significant deviations from normal are noted in the log.

Key to Drill Hole (DH) Logs

N	k	Material (USCS)	Depth (ft)
		[illegible]	
21		[illegible]	
24		[illegible]	
DBS RB		Dry auger with carbide roller bit to advance casing [illegible] wash bore	
64		[illegible]	
AUG		Hole advanced by auger	
NX		Rock core, 2.1875" diameter	
83%	4.21 fpd	Percent rock core recovery for each drill run Permeability test [illegible]	

AS BUILT
12/9/74

CONEWANGO CREEK WATERSHED PROJECT
SITE 33
FLOODWATER RETARDING DAM
CHAUTAUQUA COUNTY, NEW YORK
LOGS OF TEST HOLES

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

		Date	Approved by
Designed	B. Champion	11/12/69	STATE CONS. ENGINEER
Drawn	W. Maxins		
Traced	O. Lindley	3/1/70	
Checked	B. Champion	3/16/70	22 / 24 NY-2173-G

3532 SCS SERIAL FILE NO.

TP #209, Rmar Rmvr. 12/21/70, NC. 1532.8

0.0 - 1.0 Topsoil - average - varies 0.6 - 1.3'.

1.0 - 8.3 Silt, sandy, gravelly
Max. size 10" - SR Sed. Chls
Approx. 1% +6", 1% 3-6", 98% matrix (which is approx. 18% gravel, 30% sand and 68% very slightly plastic fines)
Mottled grey-brown; moist; slightly permeable; medium density; homogeneous; weathered till; ML

8.3 - 14.1 Sand and silt w/gravel
Max. size 12" - SA Flaggy, Sed. Chls
Approx. 1%+6", 15%3-6", 98% matrix (which is approx. 3% gravel, 60% sand and 36% non-plastic fines)
Brown; moist-wet; slightly-moderately permeable; medium density; Interbeds of glacio-lacustrine; SM, SP, coarse ML

14.1 - 14.9+ Silt & Clay, sandy w/gravel
Max. size 4" - SR-SA Sed. Chls
Approx. 1% 3-6", 98% matrix (which is approx. 20% gravel, 20% sand and 78% moderately plastic fines)
Brown and gray; wet; very slightly permeable; hard density; Interbeds of glacio-lacustrine; SM, ML & CL

NOTE: Seeps and pipes in cleaner sands. Occasional till-like layers loosed in sands. Apt to cave at any depth below 8.3'. Pit has fairly smooth sides. Caves in coarser layers. No representative sample of 8.3-14.1 possible.

TP #210, Rmar. Rmvr. 12/21/70, NC. 1531.9

0.0 - 1.5 Topsoil

1.5 - 8.5 Silt, sandy, w/gravel
Max. size 8" - SR Sed. Chls
Approx. 1% 3-6", 99% matrix (which is approx. 10% gravel, 20% sand and 70% slightly plastic fines)
Orange-Brown; moist; slightly permeable; soft density; homogeneous; weathered till; ML

8.5 - 8.0 Sand, silty, gravelly
Max. size 8" - SA flaggy, Sed. Chls
Approx. 1% +6", 1% 3-6", 98% matrix (which is approx. 35% gravel, 45% sand and 40% very slightly plastic fines)
Brown; moist; slightly permeable; medium density; homogeneous; till; SM

8.0 - 14.0+ Gravel, sandy, silty
Max. size 14" - SR Sed. Chls & Eldre
Approx. 2% +6", 4% 3-6", 94% matrix (which is approx. 30% gravel, 30% sand and 20% non-plastic fines)
Brown; moist-wet; slightly-moderately permeable; medium density; loosed; mixed till and glacio-fluvial; GM

NOTE: Seeps slightly nearly everywhere below 5' but no marked seepage zones. Caves in cleaner zones. Extremely mixed-up area. Sides of pit quite rough.

TP #211, Rmar Rmvr. 12/22/70, NC. 1529.7

0.0 - 0.9 Topsoil

0.9 - 8.0 Silt, gravelly, sandy
Max. size 10" - SR Sed. Chls
Approx. 1% +6", 3% 3-6", 96% matrix (which is approx. 30% gravel, 30% sand and 60% slightly plastic fines)
Orange-brown; moist; slightly permeable; soft density; homogeneous; weathered till; ML.

8.0 - 14.8+ Gravel, sandy, silty
Max. size 8" - SR Sed. Chls
Approx. 2% +6", 2% 3-6", 97% matrix (which is approx. 45% gravel, 35% sand and 20% very slightly plastic fines)
Brown; moist-wet @ 11'; moderately permeable; loose-medium density; loosed; glacio-fluvial; GM
P.S. 211.1 @ 12'. (GC-GM)

NOTE: Heavy seepage @ 11' from uphill side. Mirtior in 3-6' zone, est. 40-30-30%. Caves.

TP #212, Rmar. Rmvr. 12/22/70, NC. 1432.9

0.0 - 0.3 Topsoil, very thin and stony.

0.3 - 8.0 Silt, sandy, gravelly
Max. size 10" - SR Sed. Chls
Approx. 2% +6", 4% 3-6", 94% matrix (which is approx. 30% gravel, 30% sand and 40% slightly plastic fines)
Orange-Brown; moist; slightly permeable; soft density; homogeneous; weathered till; ML.

8.0 - 17.9+ Gravel, sandy, silty
Max. size 24" - SR-SA Sed. Chls & Eldre
Approx. 3% +6", 7% 3-6", 90% matrix (which is approx. 50% gravel, 35% sand and 15% very slightly plastic fines)
Brown; moist; moderately permeable; medium density; loosed; glacio-fluvial; GM
P.S. 212.1 @ 9'. (GC-GM)

NOTE: No water. Caves.

TP #214, Rmar Rmvr. 12/21/70, NC. 1536.5

0.0 - 1.0 Topsoil

1.0 - 8.4 Silt, sandy w/gravel
Max. size 9" - SA Sed. Chls
Approx. 2% +6", 4% 3-6", 94% matrix (which is approx. 10% gravel, 20% sand and 70% slightly plastic fines)
Orange-brown; moist; slightly permeable; soft density; homogeneous; weathered till; ML.

8.4 - 18.5+ Gravel, sandy, silty
Max. size 18" - SR-SA Sed. Chls & Eldre
Approx. 2% +6", 3% 3-6", 95% matrix (which is approx. 50% gravel, 35% sand and 15% very slightly plastic fines)
Brown; moist; moderately permeable; medium density; loosed; glacio-fluvial; GM

NOTE: No water. Caves. Fewer +3" than 212.

TP #214, Rmar Rmvr. 12/22/70, NC. 1526.8

0.0 - 1.0 Topsoil.

1.0 - 4.0 Silt, sandy, w/gravel
Max. size 5" - SA Sed. Chls
Approx. 2% 3-6", 98% matrix (which is approx. 10% gravel, 20% sand and 70% slightly plastic fines)
Orange-brown; moist; moderately permeable; soft density; homogeneous; weathered till; ML
P.S. 214.3 @ 3'. (ML)

4.0 - 7.5 Gravel, sandy, silty
Max. size 10" - SR Sed. Chls
Approx. 2% +6", 4% 3-6", 94% matrix (which is approx. 50% gravel, 30% sand and 20% very slightly plastic fines)
Brown; moist; slightly permeable; medium density; very poorly stratified; glacio-fluvial; GM

7.5 - 9.5 Sand, silty w/gravel
Max. size 7" - SR Sed. Chls
Approx. 1% +6", 2% 3-6", 97% matrix (which is approx. 10% gravel, 60% sand and 30% very slightly plastic fines)
Brown; moist-wet @ 8'; slightly permeable; medium density; Interbeds of glacio-lacustrine; SM and ML

9.5 - 16.8+ Silt & Clay, sandy w/gravel
Max. size 4"
Approx. 1% 3-6"; 98% matrix (which is approx. 10% gravel, 13% sand and 77% slightly-moderately plastic fines)
Gray; wet; very slightly permeable; stiff density; interbeds of glacio-lacustrine; CL and ML
P.S. 214.2 @ 12'. (CL-ML)

NOTE: Moderate seepage @ 8'. Sand from 7.5-9.5 pipes readily. Caves a bit, but not too badly.

TP #215, Rmar Rmvr. 12/22/70, NC. 1533.9

0.0 - 1.0 Topsoil

1.0 - 7.0 Sand, silty, gravelly
Max. size 8" - SA-SR sed. Chls
Approx. 1% +6", 2% 3-6", 97% matrix (which is approx. 20% gravel, 35% sand and 45% very slightly plastic fines)
Mottled brown; moist; slightly permeable; medium density; homogeneous; till; SM

7.0 16.5+ Gravel, sandy, silty
Max. size 18" - SR Sed Chls & Eldre
Approx. 3% +6", 7% 3-6", 90% matrix ;(which is approx. 45% gravel, 35% sand and 20% non-plastic fines)
Brown; moist; moderately permeable; medium density; very poorly stratified and interbedded; glacio-fluvial; GM
P.S. 215.1 @ 9'. (SM)

NOTE: No seepage. Caves a bit.

TP #216, Rmar Rmvr. 12/22/70, NC. 1533.8

0.0 - 1.0 Topsoil

1.0 - 2.3 Silt, sandy, gravelly
Max. size 6" - SA Sed. Chls
Approx. 2% 3-6", 98% matrix (which is approx. 20% gravel, 20% sand and 60% slightly plastic fines)
Mottled brown; moist; slightly permeable; soft density; homogeneous; weathered till; ML

2.3 - 3.6 Sand, silty w/gravel
Max. size 2"
Approx. 100% matrix (which is approx. 10% gravel, 65% sand and 25% non-plastic fines)
Brown; moist; moderately permeable; medium density; stratified; glacio-fluvial; SM

3.6 - 16.5+ Gravel, sandy w/silt
Max. size 20" - SR Sed Chls & Eldre
Approx. 2% +6", 7% 3-6", 90% matrix (which is approx 40% gravel, 30% sand and 10% very slightly plastic fines)
Brown; moist; rapidly permeable, medium density; very poorly stratified; glacio-fluvial; GM-GP
P.S. 216.1 @ 9'. (GC-GM-GP)

NOTE: Oversize increases w/depth. Caves. No water.

BH #255, Left Rmar Rmvr. 12/21/70.

	Brown topsoil
8 Aug	Silt, sandy w/gravel - fines; orange-brown; m weathered glacial till;
12 Aug	
41 Aug	Gravel, sandy, silty -
85	plastic fines; brown to
97 Aug	slightly to moderately
51	N=12-128; very poorly s
67	deposits; GM to SM
102 Aug	
128	

BH #256, Left Rmar Rmvr. 12/22-23/7(

	Brown topsoil
5 Aug	Silt, sandy, w/gravel - fines; light brown; mois weathered glacial till;
37 Aug	
20	Gravel, sandy, silty - s
Aug	slightly plastic fines;
43	slightly to moderately p
49	very poorly stratified i
40	GM to SM P.S. 236.4 (GM
66 Aug	
46	
39	Sand, silty - est. 5% gr
47	brown; moist; moderately
	stratified ice-contact g
	P.S. 236.9 (SM)

BH #257, Left Rmar Rmvr. 12/22/70. B

	Brown topsoil
5 Aug	Silt, sandy, w/gravel - s plastic fines; orange-bro N=6; weathered glacial ti
14 Aug	Sand, silty, gravelly - s
10	fines; brown; moist; slig
Aug	contact glacial till; SM
15	▼ @ 0'
20	
30	
63	Gravel, sandy, silty - es
34	plastic fines; brown to g
25	slightly to moderately po
20	ice-contact glaciofluvial
32	

BH #258, Left Rmar Rmvr. 12/21/70, NC.

	Brown topsoil
9 Aug	Silt, sandy w/gravel - est fines; light brown; moist; weathered glacial till; ML
	▼ 2.0'
9 Aug	Sand, silty, gravelly - es
22	plastic fines; brown; mois
Aug	stiff, N=9-22; occasional glacial till; SM
46 Aug	Silt, sandy - est. 5% grav
28	grey, wet, slightly permeab
Aug	very poorly stratified ice- sense SM interbeds; ML P.S.
32 Aug	Sand, silty - est. 5% grav brown; moist; moderately p ice-contact glaciofluvial d

DRILL HOLE LOGS

COMMANDO 33

DH #255, Left Rear Surv. 12/21/70. BC. 1424.1 — 0.0

	Brown topsoil	0.5
8 Aug	Silt, sandy w/gravel - est. 10% gravel, 20% sand, 70% non-plastic fines; orange-brown; moist; slightly permeable; soft, N=6; weathered glacial till; ML	4.9
12 Aug 41 Aug 85 57 Aug 51 67 102 Aug 128	Gravel, sandy, silty - est. 45% gravel, 40% sand, 15% non-plastic fines; brown to gray-brown; moist; drier w/depth; slightly to moderately permeable; medium to very dense, N=42-128; very poorly stratified ice-contact glaciofluvial deposits; GM to SM	28.0

DH #256, Left Rear Surv. 12/22-23/70. BC. 1433.4 — 0.0

	Brown topsoil	0.5
5 Aug	Silt, sandy, w/gravel - est. 10% gravel, 20% sand, 70% non-plastic fines; light brown; moist; slightly permeable; soft, N=6; weathered glacial till; ML	3.8
37 Aug 20 Aug 43 49 40 56 Aug 46	Gravel, sandy, silty - est. 50% gravel, 35% sand, 15% very slightly plastic fines; brown to gray-brown; moist; drier w/depth; slightly to moderately permeable; medium to very dense, N=20-46; very poorly stratified ice-contact glaciofluvial deposits; GM to SM P.S. 256.4 (GM)	26.0
39 47	Sand, silty - est. 5% gravel, 60% sand, 35% nonplastic fines; brown; moist; moderately permeable; dense, N=39-47; poorly stratified ice-contact glaciofluvial deposits; SM P.S. 256.9 (SM)	30.0

DH #257, Left Rear Surv. 12/22/70. BC. 1431.3 — 0.0

	Brown topsoil	0.6
5 Aug	Silt, sandy, w/gravel - est. 10% gravel, 20% sand, 70% non-plastic fines; orange-brown; moist; slightly permeable; soft, N=6; weathered glacial till; ML	2.5
14 Aug 10 Aug 15	Sand, silty, gravelly - est. 20% gravel, 55% sand, 25% non-plastic fines; brown; moist; slightly permeable; stiff, N=10-15; ice-contact glacial till; SM P.S. 257.2 (SM) ▼ 16.0'	17.0
20 30 62 34 25 30 32	Gravel, sandy, silty - est. 45% gravel, 40% sand, 15% non-plastic fines; brown to gray-brown; moist but drier w/depth; slightly to moderately permeable; medium to very dense, N=20-62; ice-contact glaciofluvial deposits; GM P.S. 257.8 (GM)	30.0

DH #258, Left Rear Surv. 12/21/70. BC. 1425.9 — 0.0

	Brown topsoil	0.4
9 Aug	Silt, sandy w/gravel - est. 10% gravel, 20% sand, 70% non-plastic fines; light brown; moist; slightly permeable; stiff, N=9; weathered glacial till; ML ▼ 2.0'	3.0
9 Aug 22 Aug	Sand, silty, gravelly - est. 20% gravel, 55% sand, 25% non-plastic fines; brown; moist; slightly permeable; stiff to very stiff, N=9-22; occasional ML and CL-ML interbeds; ice contact glacial till; SM	13.0
46 Aug 28 Aug	Silt, sandy - est. 5% gravel, 35% sand, 60% non-plastic fines; gray, wet; slightly permeable; very stiff to hard, N=28-46; very poorly stratified ice-contact glaciolacustrine deposits; some SM interbeds; ML P.S. 258.4 (ML)	25.4
32 Aug	Sand, silty - est. 5% gravel, 60% sand, 35% non-plastic fines; brown, moist; moderately permeable; dense, N=32; poorly stratified ice-contact glaciofluvial deposits; SM	30.0

CONT'D

DH #258, Left Rear Surv. 12/21/70. BC. 1425.9 (cont'd)

30 Aug 134	Silt and clay, sandy - est. 10% gravel, 15% sand, 75% slightly to moderately plastic fines; gray; moist; very slight permeability; hard, N=30; stratified ice contact glaciolacustrine deposits; some SM interbeds; CL-ML	38.7
Aug	Bedrock - shale and siltstone - moderately weathered (not cored). (Ah & slot)	57.0

AS BUILT
12/9/74

CONEWANGO CREEK WATERSHED PROJECT
SITE 33
TEST PIT AND DRILL HOLE LOGS

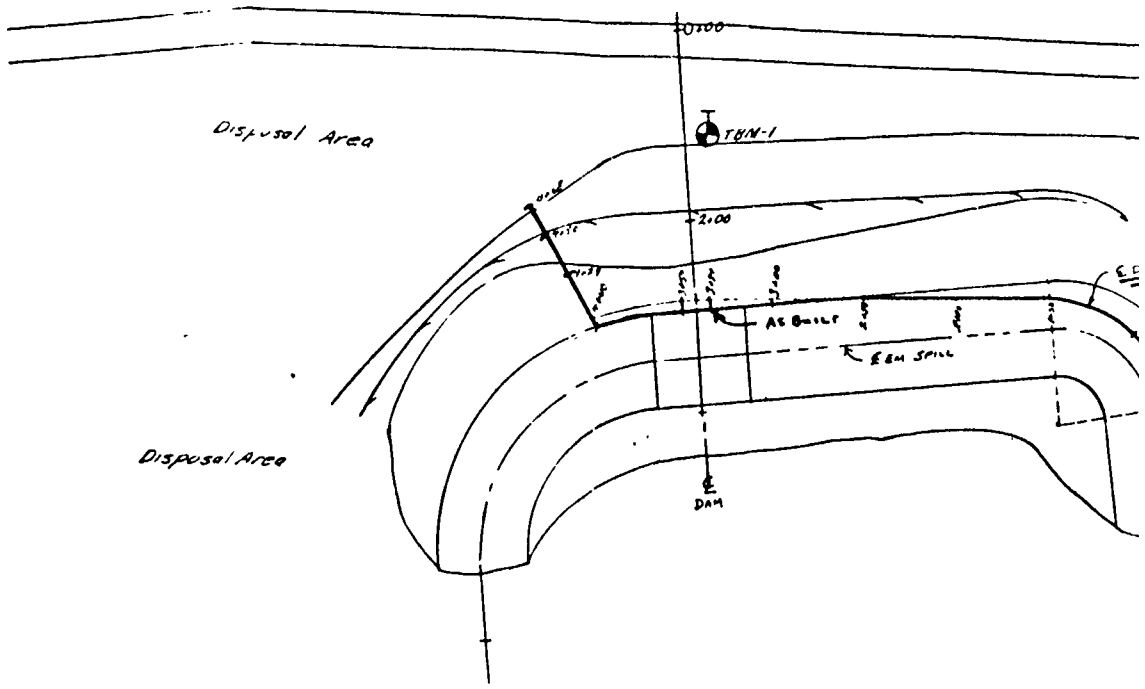
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Logged B Champion 1270
Typed D Kelley 1-71
B Champion 1-71

Asst. Engr. STATE CONS ENGR.

Sheet 23 of 23 Sheets

NY-2173-G



1280

1240

1200

0+00

0+50

1+00

1+50

2+00

2+50

Bottom r

Ground line

Appro. 2.0'

4" HD Perforated plastic tile

2

Notes

20±0 4" corrugated metal pipe

4±0 of 4" HD Perforated plastic p

Trench to be compacted and back

Stripping area to be re-seeded and

Seeding - No lime or fertilizer

Seed per Acre:

6 lb Smooth Brome Grass

10 lb Kentucky 31 Tall Fescue

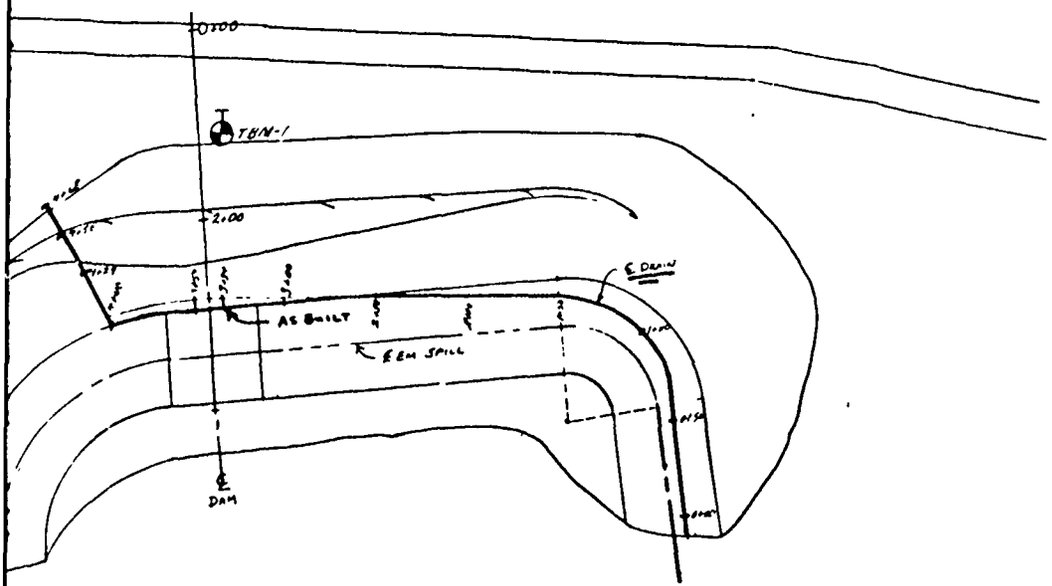
4 lb Redtop

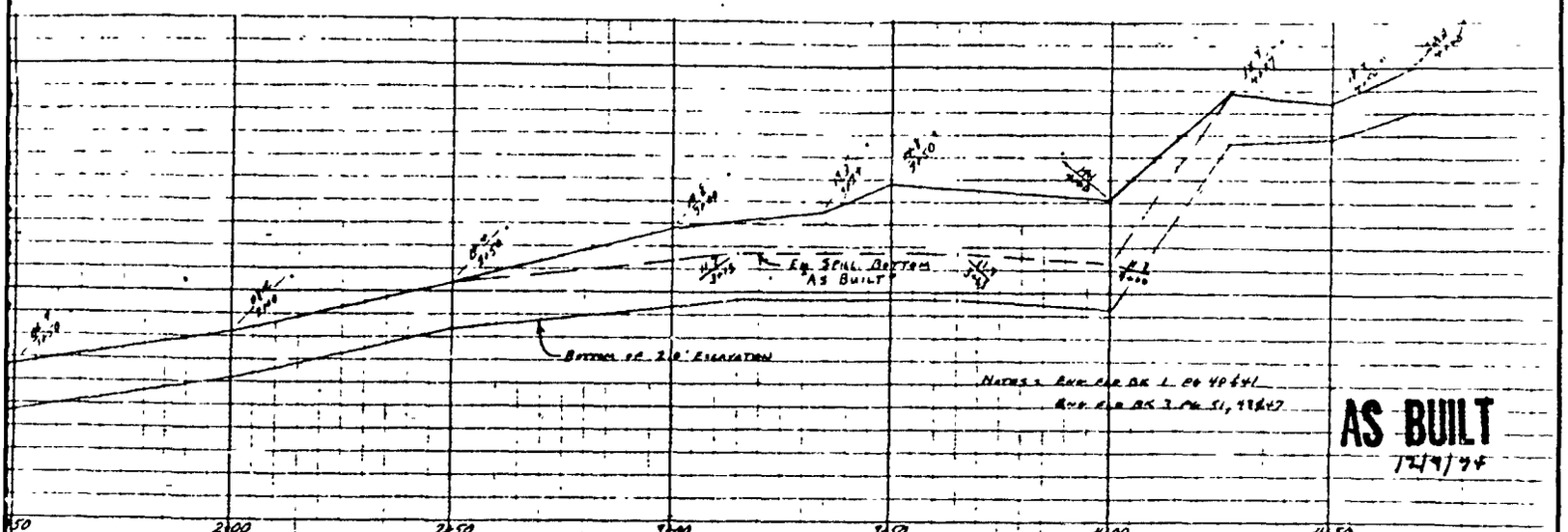
2 lb Reed Canary Grass

3 lb Birdsfoot Trefoil

Mulch per Acre - 2 Ton

Seedbed preparation by





AS BUILT
12/9/94

Scale 1"=50'

Line
HQ Perforated plastic tile

Notes
20± ft corrugated metal pipe
468± ft HQ Perforated plastic pipe
Trench to be compacted and backfilled with #2 stone
Slipping area to be excavated and filled with #2 stone
Seeding - No lime or Fertilizer
Seed per Acre:
6 lbs Smooth Brome Grass
7½ lbs Kentucky 31 Tall Fescue
½ lb Redtop
2 lbs Reed Canary Grass
2 lbs Birdsfoot Trefoil
Mulch per Acre - 2 Tons
Seedbed preparation by backblading

CONEWANGO CREEK WATERSHED
SITE 33
Earthy Spillway Tile Drain

U.S DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed	Date	Approved by
Drawn		Title
Traced		Title
Checked A.R. Cain 11/9/82	Sheet No. 30 of 35	Drawing No. 32

Form SCS 3 7 (November 1955)