

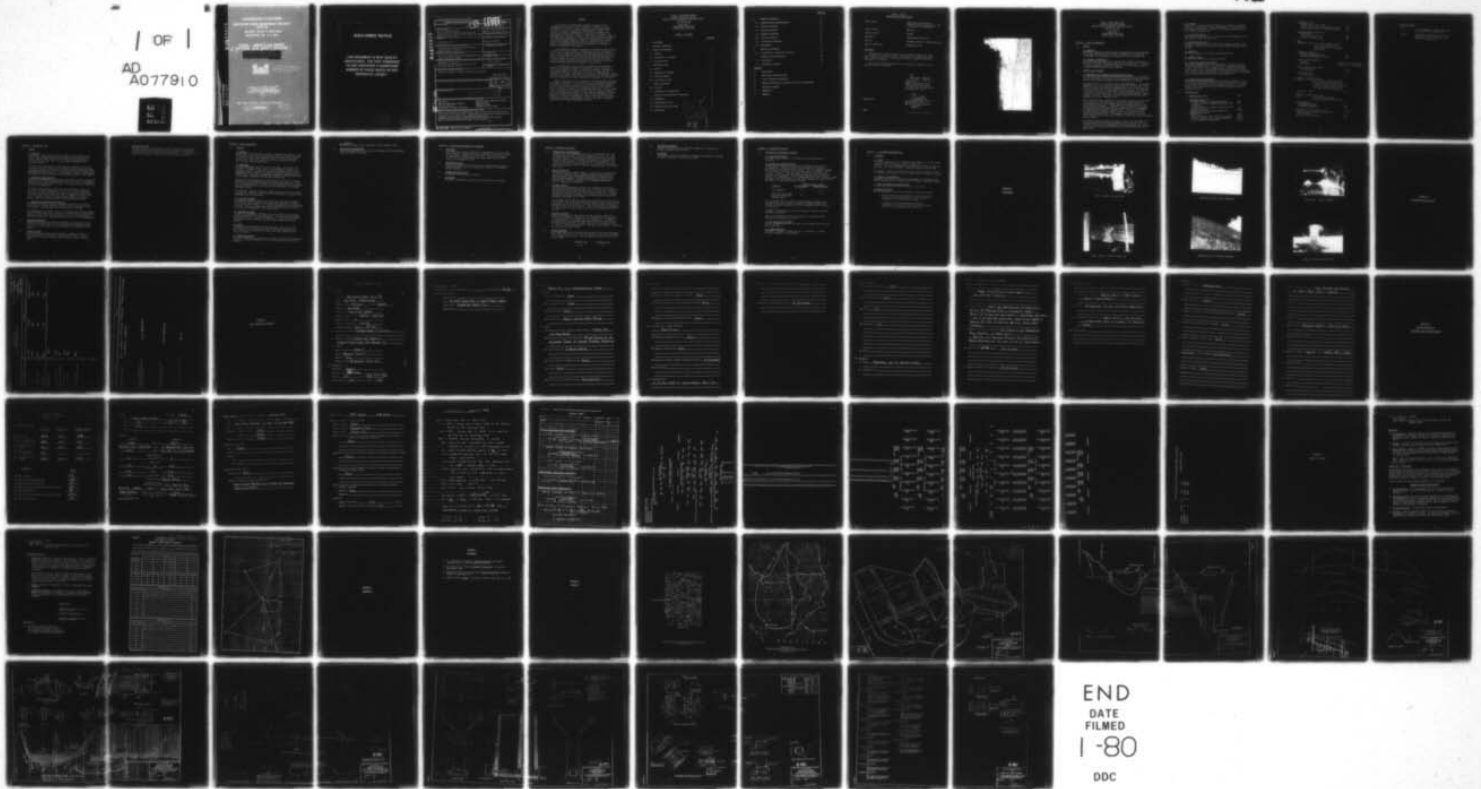
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NEW YORK STATE DEPT OF ENVIRONMENTAL CONSERVATION ALBANY F/G 13/13
NATIONAL DAM SAFETY PROGRAM, SUSQUEHANNA RIVER BASIN, INVENTORY--ETC(U)
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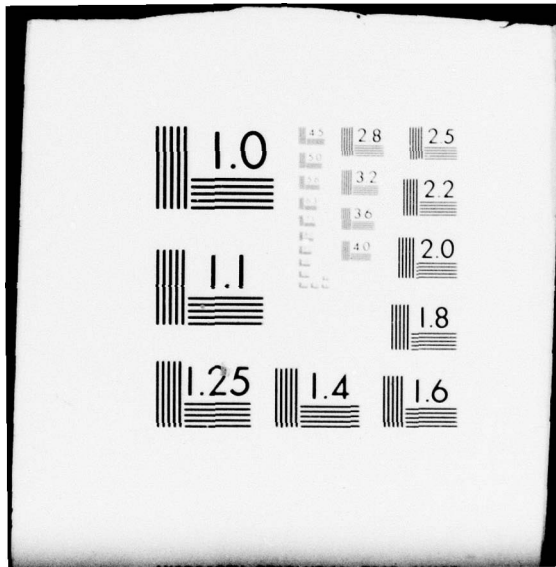
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Susquehanna River Basin, Inventory
Number NY-575. Nanticoke Creek Watershed
Project Site 9E. Broome County, New York.
Phase I Inspection Report.



10 George

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7. AUTHOR(s) George Koch, P.E.		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS New York State Department of Environmental Conservation/ 50 Wolf Road Albany, New York 12233		8. CONTRACT OR GRANT NUMBER(s) DACW-51-79-C-0001
11. CONTROLLING OFFICE NAME AND ADDRESS New York State Department of Environmental Con- servation/ 50 Wolf Road Albany, New York 12233		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
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Dam Safety	Nanticoke Creek Watershed Project
National Dam Safety Program	Broome County
Visual Inspection	Nanticoke Creek
Hydrology, Structural Stability	Susquehanna River Basin

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)
This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. Nanticoke Creek Watershed Protection Project Dam Site 9E was found to have no conditions which would render the dam unsafe.

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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 "Probably Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

PHASE 1 INSPECTION REPORT
 NATIONAL DAM SAFETY PROGRAM
 NANTICOKE CREEK WATERSHED PROTECTION PROJECT
 DAM SITE No. 9E
 I.D. No. NY 575
 (#85D-3646)
 SUSQUEHANNA RIVER BASIN
 BROOME COUNTY, NEW YORK

TABLE OF CONTENTS

	<u>PAGE NO.</u>
- ASSESSMENT	
- OVERVIEW PHOTOGRAPH	
1 PROJECT INFORMATION	1
1.1 GENERAL	1
1.2 DESCRIPTION OF PROJECT	1
1.3 PERTINENT DATA	2
2 ENGINEERING DATA	5
2.1 DESIGN	5
2.2 CONSTRUCTION RECORDS	5
2.3 OPERATION RECORD	5
2.4 EVALUATION OF DATA	6
3 VISUAL INSPECTION	7
3.1 FINDINGS	7
3.2 EVALUATION OF OBSERVATIONS	8
4 OPERATION AND MAINTENANCE PROCEDURES	9
4.1 PROCEDURE	9
4.2 MAINTENANCE OF DAM	9
4.3 WARNING SYSTEM IN EFFECT	9
4.4 EVALUATION	9

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PAGE NO.

5	HYDROLOGIC/HYDRAULIC	10
5.1	DRAINAGE AREA CHARACTERISTICS	10
5.2	ANALYSIS CRITERIA	10
5.3	SPELLWAY CAPACITY	10
5.4	RESERVOIR CAPACITY	10
5.5	FLOODS OF RECORD	10
5.6	OVERTOPPING POTENTIAL	11
5.7	EVALUATION	11
6	STRUCTURAL STABILITY	12
6.1	EVALUATION OF STRUCTURAL STABILITY	12
7	ASSESSMENT/RECOMMENDATIONS	13
7.1	ASSESSMENT	13
7.2	RECOMMENDED MEASURES	13

APPENDIX

A.	PHOTOGRAPHS	
B.	ENGINEERING DATA CHECKLIST	
C.	VISUAL INSPECTION CHECKLIST	
D.	HYDROLOGIC/HYDRAULIC ENGINEERING DATA AND COMPUTATIONS	
E.	STABILITY ANALYSES	
F.	REFERENCES	
G.	DRAWINGS	

PHASE 1 REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam: Nanticoke Creek Watershed
Protection Project Dam Site No. 9E
I.D. No. NY 575 (#85D-3646)

State Located: New York

County Located: Broome

Watershed: Susquehanna River Basin

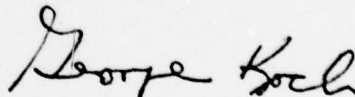
Stream: Unnamed tributary of Nanticoke Creek

Date of Inspection: November 8, 1978

ASSESSMENT


The Nanticoke Creek Watershed Protection Project, Dam Site No. 9E, is a floodwater retarding structure. Examination of available documents and a visual inspection of the dam did not reveal conditions which are considered to be unsafe.

The total discharge capability of the spillway is adequate for the Probable Maximum Flood (PMF).



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

Approved By:



Col. Clark H. Benn
New York District Engineer
17 Dec 77

Date:



NANTICOKE CREEK SITE No. 9E
OVERVIEW

PHASE 1 INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
NANTICOKE CREEK WATERSHED PROTECTION PROJECT
DAM SITE No. 9E
I.D. No. NY 575
(#85D-3646)
SUSQUEHANNA RIVER BASIN
BROOME COUNTY, NEW YORK

SECTION 1: PROJECT INFORMATION

1.1 GENERAL

a. Authority

The Phase 1 Inspection reported herein was authorized by the Department of the Army, New York District, Corps of Engineers, to fulfill the requirements of the National Dam Inspection Act, Public Law 92-367.

b. Purpose of Inspection

This inspection was conducted to evaluate the existing conditions of the dam, to identify deficiencies and hazardous conditions, to determine if these deficiencies constitute hazards to life and property, and to recommend remedial measures where required.

1.2 DESCRIPTION OF PROJECT

a. Description of the Dam and Appurtenant Structures

The Nanticoke Creek Watershed Protection Project Dam No. 9E consists of an earth dam with a principal spillway pipe passing through the embankment and two emergency spillways on the southern end of the dam.

The dam consists of two compacted earth, zoned embankments. The northern embankment is 42 feet high, has a crest length of 520 feet and a crest width of 15 feet. The southern embankment section is 15 feet high, has a crest length of 295 feet and a crest width of 15 feet. The upstream slopes are 1 vertical on 3 horizontal and the downstream slopes are 1 vertical on 2 1/2 horizontal. The crest and exposed slopes are grass covered. An earth cutoff trench of varying depth and width keys both embankments into the foundation soils.

The principal spillway consists of a two stage reinforced concrete drop inlet structure, a 36 inch diameter reinforced concrete pipe with anti-seepage collars, and an impact basin to dissipate energy at the outlet end of the conduit. A reservoir drain consisting of a 12 inch corrugated metal pipe extends from the upstream toe of the embankment to the base of the principal spillway riser. A vertical slide gate mechanism mounted along the inside of the riser controls the flow through the reservoir drain. The emergency spillways are two grass lined channels each 150 feet wide, located in earth cuts on the southeastern end of the dam.

An internal drainage system consisting of a gravel and sand drain fill with perforated 8 inch diameter corrugated metal collector pipes is located at the base of the embankment near the downstream toe. Seepage is collected and conducted through this drain and outleted into the impact basin.

b. Location

Dam No. 9E of the Nanticoke Creek Project is located on an unnamed tributary of the Nanticoke Creek, approximately 1.5 miles north of the Village of Nanticoke. The site is off Cadwell Hill Road in the Town of Nanticoke, New York.

c. Size Classification

This dam is 42 feet high and is classified as an "intermediate" size dam (between 40 and 100 feet high).

d. Hazard Classification

The dam is classified in the "high" hazard category because of the presence of several homes and the Village of Nanticoke downstream of the dam.

e. Ownership

This dam is owned by the County of Broome, New York.

f. Purpose of Dam

This dam is a floodwater retarding structure.

g. Design and Construction History

This dam was designed by the U.S. Department of Agriculture, Soil Conservation Service (SCS). Construction of the dam was completed in 1967. The SCS Office for Broome County, located at the Broome County Airport, has a design folder containing hydrologic, hydraulic, and structural design information, and the as-built plans and documents. These as-built plans were included in the Appendix G.

h. Normal Operating Procedures

Normal flows are discharged through the principle spillway. This structure has sufficient capacity to store and discharge a 100 year flood without flow occurring in the emergency spillway. For storms greater than the 100 year flood, flow will discharge through the emergency spillway.

1.3 PERTINENT DATA

a. <u>Drainage Area</u> (acres)	1827
b. <u>Discharge at Dam</u> (cfs)	
Principle Spillway at Maximum High Water	165
Principle Spillway at Emergency Spillway Crest	156
Elevation	
Reservoir Drain at Principle Spillway Crest El.	14
Maximum Known Flood	152
Emergency Spillway at Maximum High Water	11754
c. <u>Elevation</u> (USGS datum)	
Top of Dam	1191.8
Emergency Spillway Crest (Auziliary Spillway)	1186.7
Principle Spillway Crest (Service Spillway)	1176.7
Invert of Reservoir Drain Inlet	1153.0

d.	<u>Reservoir (acres)</u>	
	Surface area at Top of Dam	41.0
	Surface area at Crest of Emergency Spillway	32.2
	Surface area at Crest of Principle Spillway	16.2
e.	<u>Storage Capacity (acre-feet)</u>	
	Top of Dam	538
	Emergency Spillway Crest	353
	Principle Spillway Crest	120
f.	<u>Dam</u>	
	Embarkment Type: A two zoned compacted earth fill in two sections with an earth keyed cutoff trench under each section	
	Embarkment Length (ft.)	
	Northern Embankment Section	520
	Southeastern Embankment Section	295
	Slopes: Both Embankments	
	Upstream	1 vertical on 3 horizontal
	Downstream	1 vertical on 2.5 horizontal
	Crest Elevation (USGS datum)	
	Both Embankments	1191.8
	Crest Width (ft.)	
	Both Embankments	15
g.	<u>Principal Spillway (Service)</u>	
	Type: Uncontrolled, reinforced concrete two stage drop inlet (3x9 ft.) rising 26.2 feet; 36 inch reinforced concrete pressure conduit 207.58 feet long; concrete impact basin	
	Length (ft.) Weir	18
	Emergency Spillway (Auxiliary)	
	Type: Two grass-lined channels having trapezoidal cross sections.	
	Bottom Width(ft.)	
	Northwestern Channel	150
	Southeastern Channel	150
	Side Slopes: Both Channels (V : H)	1 on 3
	Length of level section (in profile) (ft.)	
	Both Channels	30
	Exit Slope: Both Channels	.028

h. Reservoir Drain

Type: 12 inch diameter corrugated metal pipe
with a reinforced concrete inlet.

Control: Mechanically operated vertical slide
gate mounted along the inside of the
principal spillway riser.

SECTION 2: ENGINEERING DATA

2.1 DESIGN

a. Geology

The Nanticoke Creek Watershed Project Dam No. 9E is located in the "Glaciated Allegheny Plateau" physiographic province of New York State. Bedrock underlying the site is mapped as Cashaqua Shale of the Upper Devonian Age. This rock was formed approximately 400 million years ago.

Glacial ice was instrumental in smoothing the topography of the area. The present surficial deposits have resulted primarily from glaciations during the Cenozoic Era, the last of which was the Wisconsin glaciation, approximately 11,000 years ago. Glacial deposits such as outwash plains and eskers are major features of the landscape in parts of this region.

b. Subsurface Investigations

A subsurface investigation program was conducted by the Soil Conservation Service in 1965. This program consisted of 17 test pits. The maximum depth of the explorations was 12 feet. Applicable subsurface information is included in Appendix G.

In general, the subsurface conditions on both abutments consist of a thin layer of topsoil underlain by glacial till. In the floodplain, the topsoil layer is underlain by a layer of relatively clean gravel, four to six feet thick. The glacial till is beneath this layer. The cutoff trench was designed to impede seepage through this layer of gravel. Bedrock was not encountered in the exploration program.

c. Embankment and Appurtenant Structures

The dam was designed by the Soil Conservation Service who prepared a design report. Fifteen drawings, several of which have been included in Appendix G, were prepared for the construction of the dam.

The embankment has two zones. Zone 1 is a longitudinal drainage blanket under the downstream slope of the dam, constructed using the clean gravel removed from the cutoff trench excavation. Zone 2 is the relatively impervious glacial till which forms the major portion of both embankments.

2.2 CONSTRUCTION RECORDS

Complete as-built contract plans and documents are available from the SCS Office in Broome County. No major construction changes were made on this job. The as-built plans are included in the Appendix of this report.

2.3 OPERATION RECORD

Since the dam is an uncontrolled, floodwater retarding structure, no operating records are maintained regarding water levels. However, during periods of heavy rainfall, SCS personnel do monitor reservoir levels.

2.4

EVALUATION OF DATA

The data presented in this report has been compiled from information obtained from the Soil Conservation Service as well as the New York State Department of Environmental Conservation files. It appears to be adequate and reliable for the purpose of the Phase I Inspection.

SECTION 3: VISUAL INSPECTION

3.1 FINDINGS

a. General

Visual inspection of Dam Site No. 9E was conducted on November 8, 1978. The weather was clear the the temperature was around 50°F. The water surface was several inches above the invert of the low stage inlet on the riser. There was a small flow from the principal spillway pipe spilling into the impact basin.

b. Embankment

The earth embankment showed no signs of distress. The vertical and horizontal alignment of the crest of both embankments appeared to be satisfactory, with no visible surface cracks appearing on the crest or embankment slopes. There were no areas of serious sloughing or subsidence noted. Some minor sloughing was observed on the upstream slope in the range of fluctuation of the water surface level.

Inspection of the downstream face did not reveal any signs of seepage. The collection pipes from the internal drainage system were dry. There were rock lined trenches to collect surface runoff along the intersection of the downstream toe of the slope with each abutment on the northern embankment section.

No undesirable vegetative growth of animal penetrations into the slopes were observed. However, on the date of the inspection, the grass on the embankments had not been mowed.

c. Principal Spillway

The principal spillway consists of the vertical drop inlet structure, a reinforced concrete pressure pipe through the embankment, an impact basin and an outlet channel. All of these components were in satisfactory condition. There was a small gap around the principal spillway pipe at its joint with the headwall of the impact basin.

d. Emergency Spillway

Two grass lined emergency spillways in earth cut sections are located beyond the southern end of the embankment. The spillway had been mowed and appeared to be in satisfactory condition. A small portion had not been mowed because of several logs which had been deposited in the channel.

e. Drain

The reservoir drain conduit and slide gate may be used to lower the reservoir when the pool level is below the principal spillway crest. The slide gate is located within a pipe sleeve which extends to the top of the riser.

f. Downstream Channel

The outlet channel beyond the end of the impact basin was in satisfactory condition. No severe side-slope erosion or debris obstructions were in evidence.

g. Reservoir

There were no signs of soil instability in the reservoir area.

3.2

EVALUATION OF OBSERVATIONS

Visual observations did not reveal any problems which would adversely affect the safety of the dam.

SECTION 4: OPERATION AND MAINTENANCE PROCEDURES

4.1 PROCEDURES

The normal water surface elevation is approximately at the low stage inlet elevation. Downstream flows are limited by the capacity of the 36 inch diameter reinforced concrete pipe. The reservoir provides 328 acre feet of storage between the normal water level and the crest of the emergency spillway.

4.2 MAINTENANCE OF DAM

The dam is maintained by the owner and is in satisfactory condition. Normal maintenance consists of mowing the bottom of the emergency spillway channels.

4.3 WARNING SYSTEM IN EFFECT

No apparent warning system is present

4.4 EVALUATION

The dam and appurtenant structures are satisfactorily maintained.

SECTION 5: HYDROLOGIC/HYDRAULIC

5.1 DRAINAGE AREA CHARACTERISTICS

Delineation of the watershed draining into the reservoir pool area was made using the USGS 7.5 minute quadrangle for Lisle, N.Y. The watershed consists of woodlands and lightly forested area situated in a rural section. Relief ranges from moderate to steep with the steeper slopes occurring on the western side of the watershed. The slopes on the western side range from 10 to 15%, and on the eastern side they range from 5 to 10%. The oval shaped drainage area is about 1827 acres.

5.2 ANALYSIS CRITERIA

The analysis of the spillway capacity of the dam was performed using the Corps of Engineer's HEC-1 computer program, incorporating the "Snyder Synthetic Unit Hydrograph" method and the "Modified Puls" flood routing procedure. The spillway design flood selected for analysis was the PMF in accordance with recommended guidelines of the U.S. Army Corps of Engineers.

5.3 SPILLWAY CAPACITY

The principal and emergency spillways are uncontrolled structures. The principal spillway operates under weir or orifice flow conditions depending upon the floodwater inflow to the reservoir pool. During orifice flow operation, pressure flow develops in the 36 inch conduit. The emergency spillway was analyzed as a broad-crested weir having a discharge coefficient (C) of 3.087.

The spillways have sufficient capacity for discharging the peak outflow from the PMF. Due to the limited storage capacity, there will be little attenuation of the storm flows. For this storm, the peak inflow and the peak outflow, are both 4905 cfs. When the spillways are discharging the peak outflow, the water surface will be 2.2 feet below the top of the dam.

5.4 RESERVOIR CAPACITY

Normal flood control storage capacity of the reservoir between the principal and emergency spillways is 233 acre-feet which is equivalent to a runoff depth of 1.5 inches over the drainage area. Surge storage capacity to the maximum high water elevation is an additional 185 acre-feet; equivalent to a runoff depth over the drainage area of 1.2 inches. Total storage capacity of the dam is 538 acre-feet; equivalent to 3.5 inches of direct runoff.

5.5 FLOODS OF RECORD

The maximum known flood occurred during Hurricane Eloise during September, 1975. The pool level at this time was reported to be about 8' feet above the principal spillway crest. The calculated discharge for this flood is as follows:

<u>Elevation (ft)</u>	<u>Discharge (cfs)</u>
1184.7	152

5.6

OVERTOPPING POTENTIAL

Analysis indicates the total discharge capability is sufficient to prevent overtopping from the PMF.

5.7

EVALUATION

This dam has sufficient capability to impound and adequately discharge floodwaters expected to result from the PMF.

SECTION 6: STRUCTURAL STABILTY

6.1 EVALUATION OF STRUCTURAL STABILTY

a. Visual Observations

No signs of major distress of the dam were observed during the inspection.

b. Design and Construction Data

Design data was obtained from the Soil Conservation Service Office in Binghamton. Stability analyses were performed by SCS using a modification of the Swedish Circle Method. The soil parameters assumed for the stability analyses were a friction angle of 31 degrees and a cohesion of 500 pcf. These parameters appear to be appropriate for the type of soil involved. The stability analyses were performed assuming 1 on 3 upstream and 1 on 2.5 downstream slopes with no berms (a berm was used in the final design, but this would increase the safety factor). The results of the analyses are as follows:

<u>CONDITION</u>	<u>MINIMUM FACTOR OF SAFETY</u>	
	<u>UPSTREAM SLOPE</u>	<u>DOWNSTREAM SLOPE</u>
Full Drawdown	2.3	_____
Long Term Steady State Seepage from Emergency Spillway Crest	_____	2.2

The calculated factors of safety for this dam are in excess of the minimum factors in the Corps of Engineers recommended guidelines. The dam is therefore considered to have an adequate factor of safety for stability.

A summary of the analyses and sections showing the failure arcs are included in Appendix E.

Based on discussions with SCS representatives, the dam was built essentially according to the plans.

c. Post Construction Changes

The SCS representatives were not aware of any changes which have been made on the dam.

d. Seismic Stability

This dam is located in Seismic Zone No. 1. Therefore, a seismic stability analysis is not warranted.

SECTION 7: ASSESSMENT/RECOMMENDATIONS

7.1 ASSESSMENT

a. Safety

The Phase 1 Inspection of the Nanticoke Creek Dam No. 9E did not reveal conditions which constitute a hazard to human life or property. The earth embankment is considered to be stable structurally, and capable of safely retarding floodwaters resulting from the PMF.

The design of this dam includes an internal drainage system to control the phreatic surface and to provide a safe outlet for foundation seepage.

b. Adequacy of Information

Information concerning the design and performance of this dam is considered adequate for the purpose required for Phase 1 Inspection Reports.

c. Need for Additional Investigations

No additional investigations are necessary at this time.

7.2 RECOMMENDED MEASURES

The following tasks should be undertaken by maintenance forces:

- a. Periodic operation and lubrication of the mechanically operated slide gate mechanism to insure the ease of operation of the reservoir drain conduit.
- b. A schedule for periodic maintenance should be established which would include items such as mowing the grass on the embankment slopes and crest.

APPENDIX A

PHOTOGRAPHS



RISER - PRINCIPAL SPILLWAY INLET



RISER - NOTE LOG LODGED IN TRASH RACK



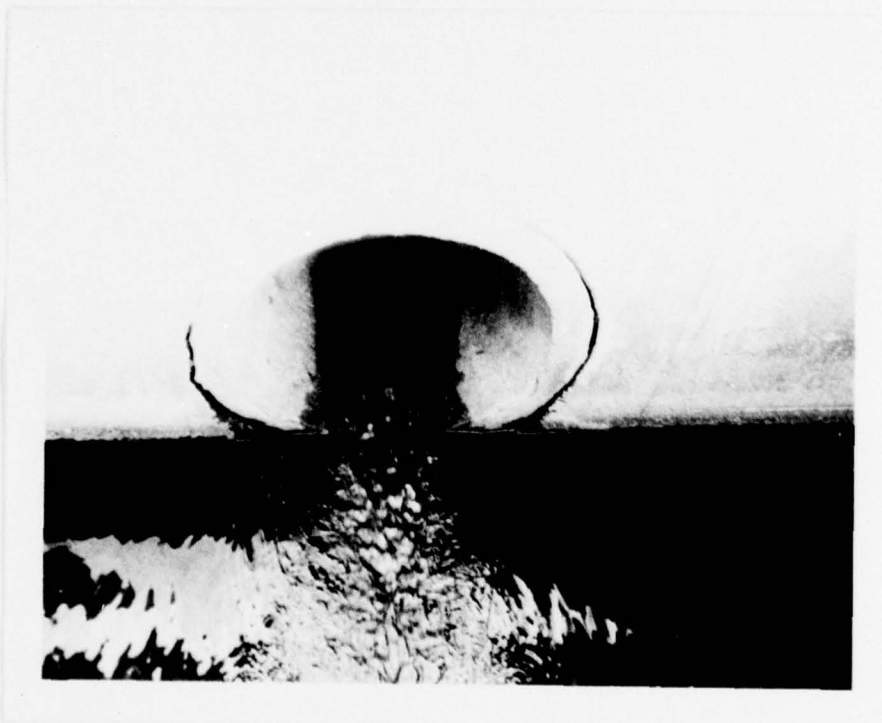
EMERGENCY SPILLWAY LOOKING DOWNSTREAM



DOWNSTREAM SLOPE OF NORTHERN EMBANKMENT



IMPACT BASIN - LOOKING UPSTREAM



OUTLET TO PRINCIPAL SPILLWAY PIPE

APPENDIX B

ENGINEERING DATA CHECKLIST

Item	Remarks		
	Plans	Details	Typical Sections
Dam	YES	YES	YES
Spillway(s)	YES	YES	YES
Outlet(s)	YES	YES	YES
Design Reports	YES		
Design Computations	YES		
Discharge Rating Curves	YES		
Dam Stability	YES		
Seepage Studies	YES		
Subsurface and Materials Investigations	YES		

Item

Remarks

Construction History

ONLY INFORMATION AVAILABLE OBTAINED THROUGH DISCUSSIONS
WITH PROJECT INSPECTOR

Surveys, Modifications,
Post-Construction Engineering
Studies and Reports

NONE REPORTED

Accidents or Failure of Dam
Description, Reports

NONE REPORTED

Operation and Maintenance Records
Operation Manual

NONE

APPENDIX C

VISUAL INSPECTION CHECKLIST

VISUAL INSPECTION CHECKLIST

1) Basic Data

a. General

Name of Dam NANTICOKE CREEK SITE 9E

I.D. # N.Y. 575 (#85D-3446)

Location: Town NANTICOKE County BROOME

Stream Name UNNAMED

Tributary of NANTICOKE CREEK

Longitude (W), Latitude (N) W76°3.1' N42°17.5'

Hazard Category C

Date(s) of Inspection 11/8/78

Weather Conditions SUNNY 45°-50°

b. Inspection Personnel R. WARRENDER; W. LYNICK

c. Persons Contacted H. HIRTH, SCS SYRACUSE

G. PAGE & D. KOLESAR, SCS BROOME Co.

d. History:

Date Constructed 1966-67

Owner BROOME COUNTY

Designer SCS

Constructed by Mc DOUGALL CONST. Co.

2) Technical Data

Type of Dam EARTH

Drainage Area ~~1827~~ 1827 ACRES

Height 42 Length NORTH SECTION 520'
SOUTH " 295'

Upstream Slope 1 ON 3 Downstream Slope 1 ON 2.5

2) Technical Data (Cont'd.)

External Drains: on Downstream Face _____ @ Downstream Toe RIP RAP

Internal Components:

Impervious Core _____

Drains 8" CMP DRAIN PIPE IN SAND & GRAVEL DRAIN

Cutoff Type COMPACTED EARTH FILL

Grout Curtain _____

3) Embankment

EARTH FILL WITH GOOD VEGETATIVE COVER

a. Crest

- (1) Vertical Alignment OKAY
- (2) Horizontal Alignment OKAY
- (3) Surface Cracks NONE
- (4) Miscellaneous CREST HAD NOT BEEN MOWED

b. Slopes

- (1) Undesirable Growth or Debris, Animal Burrows SLOPES HAD NOT BEEN MOWED
- (2) Sloughing, Subsidence or Depressions MINOR SLOUGHING ON UPSTREAM SLOPE AT WATER SURFACE ELEVATION
- (3) Slope Protection UNMOWED GRASS
- (4) Surface Cracks or Movement at Toe NONE
- (5) Seepage NONE
- (6) Condition Around Outlet Structure SATISFACTORY

c. Abutments

(1) Erosion at Embankment and Abutment Contact NONE

(2) Seepage along Contact of Embankment and Abutment NONE

(3) Seepage at toe or along downstream face NONE

d. Downstream Area - below embankment

FARM FIELDS

(1) Subsidence, Depressions, etc. NONE

(2) Seepage, unusual growth NONE

(3) Evidence of surface movement beyond embankment toe NO EVIDENCE

(4) Miscellaneous _____

e. Drainage System

2 - 8" D.I.A. CMP IN SAND & GRAVEL DRAIN FILL

(1) Condition of relief wells, drains, etc. _____

(2) Discharge from Drainage System NO DISCHARGE

4) Instrumentation

(1) Monumentation/Surveys N/A

(2) Observation Wells N/A

(3) Weirs N/A

(4) Piezometers N/A

(5) Other _____

5) Reservoir

a. Slopes FORESTED UP TO WATER'S EDGE

b. Sedimentation _____

s) Spillway(s) (including tail race channel)

a. General RISER, OUTLET PIPE & IMPACT BASIN IN
SATISFACTORY CONDITION

b. Principle Spillway 26.2' HIGH RECTANGULAR RC DROP INLET;
36" DIA RC PRESSURE PIPE ; CONCRETE IMPACT
BASIN - A 10" DIA. LOG WAS LODGED IN THE RISER'S TRASH RACK.
ALL IN SATISFACTORY CONDITION - VERY SLIGHT SEPARATION
AROUND RC PIPE AT JUNCTION WITH IMPACT BASIN
HEADWALL -

c. Emergency or Auxiliary Spillway TWO GRASS LINED TRAPEZOIDAL
OPEN CHANNELS IN EARTH CUT.
BOTTOM OF CHANNELS MOWED - ONE SECTION NOT
MOWED BECAUSE OF A LOG LYING IN THE CHANNEL.

d. Condition of ~~tail race~~ ^{OUTLET} channel SATISFACTORY

e. Stability of Channel side/slopes SATISFACTORY

7) Downstream Channel

a. Condition (debris, etc.) NORMAL GROWTH - TREE LINED
- ABOVE STREAM BANKS

b. Slopes SATISFACTORY - OUTLET INTO WIDE FARM FIELD

c. Approximate number of homes ABOUT 12-15 IN THE VILLAGE
OF NANTICOKE PLUS A CHURCH W/ MEETING
HOUSE,

8) Miscellaneous

9) Structural

a. Concrete Surfaces SATISFACTORY

b. Structural Cracking NONE

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

d. Junctions with Abutments or Embankments N/A

e. Drains - Foundation, Joint, Face N/A

f. ~~Water passages, conduits, sluices~~ SATISFACTORY

g. Seepage or Leakage NONE

h. Joints - Construction, etc. SOME MORTAR WAS MISSING
AT IMPACT BASIN - CONDUIT GASKET.

i. Foundation _____

j. Abutments _____

k. Control Gates RESERVOIR DRAIN HAS SLIDE GATE

l. Approach & Outlet Channels _____

m. Energy Dissipators (plunge pool, etc.) IMPACT BASIN - OKAY

n. Intake Structures _____

o. Stability _____

p. Miscellaneous _____

APPENDIX D

HYDROLOGIC/HYDRAULIC

ENGINEERING DATA AND COMPUTATIONS

CHECK LIST FOR DAMS
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

1

AREA-CAPACITY DATA:

	<u>Elevation</u> (ft.)	<u>Surface Area</u> (acres)	<u>Storage Capacity</u> (acre-ft.)
1) Top of Dam	<u>1191.8</u>	<u>41.0</u>	<u>538</u>
2) Design High Water (Max. Design Pool)	<u>1189.4</u>	<u>37.0</u>	<u>446</u>
3) Auxiliary Spillway Crest	<u>1186.7</u>	<u>32.2</u>	<u>353</u>
4) Pool Level with Flashboards	<u>N/A</u>	<u> </u>	<u> </u>
5) Service Spillway Crest	<u>1176.7</u>	<u>16.2</u>	<u>120</u>

DISCHARGES

	<u>Volume</u> (cfs)
1) Average Daily	<u>N/A</u>
2) Spillway @ Maximum High Water	<u>165</u>
3) Spillway @ Design High Water	<u>161</u>
4) Spillway @ Auxiliary Spillway Crest Elevation	<u>156</u>
5) Low Level Outlet	<u>14</u>
6) Total (of all facilities) @ Maximum High Water	<u>11920</u>
7) Maximum Known Flood	<u>152</u>

CREST:

ELEVATION: 1191.8

Type: LEVEL; GRASSED EARTH

Width: 15 Length: NORTH SECTION 520
SOUTH 295

Spillover N/A

Location _____

SPILLWAY:

PRINCIPAL

EMERGENCY

1176.7 Elevation 1186.7

RC DROP INLET W/TRASH RACK Type 2 TRAPEZOIDAL CHANNELS

3'x9' Width EACH 150' WITH 1 ON 3 SLOPES

Type of Control

✓ Uncontrolled ✓

Controlled:

N/A Type N/A
(Flashboards; gate)

N/A Number N/A

N/A Size/Length N/A

Invert Material MOWED GRASS

Anticipated Length of operating service < 1 PER 100 YRS

36" DIA RC 208 ft ~~channel~~ Length NORTH 450' SOUTH 750'

SHARP CRESTED Height Between Spillway Crest N/A

L/b = 1.0 & Approach Channel Invert BROAD CRESTED WEIR
(Weir Flow)

WEIR LENGTH = 12'

~~OUTLET STRUCTURES~~/EMERGENCY DRAWDOWN FACILITIES:- RESERVOIR DRAIN

Type: Gate ✓ Sluice _____ Conduit ✓ Penstock _____

Shape : GATE - FLAT CIRCULAR CONDUIT - ROUND CAST IRON

Size: _____

Elevations: Entrance Invert 1153.0

Exit Invert 1144.5

Tailrace Channel: Elevation 1144.5

HYDROMETEROLOGICAL GAGES:

Type : NONE

Location: _____

Records: _____

Date - _____

Max. Reading - _____

FLOOD WATER CONTROL SYSTEM:

Warning System: NONE

Method of Controlled Releases (mechanisms):

NONE EXCEPT FOR MANUALLY OPERATED RESERVOIR DRAIN SLIDE GATE

DRAINAGE AREA: 1827 ACRES 2.86 SQ MI

DRAINAGE BASIN RUNOFF CHARACTERISTICS:

Land Use - Type: FOREST

Terrain - Relief: MODERATE - STEEP

Surface - Soil: GLACIAL TILL

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

NONE

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

NONE

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: _____

Reservoir:

Length @ Maximum Pool N/A (Miles)

Length of Shoreline (@ Spillway Crest) N/A (Miles)

NANTICOKE

DAM SITE #9E

D.A. = Drainage area in square miles

L = River mileage from the given station to the upstream limits of the drainage area

LCA = River mileage from the station to the center of gravity of the drainage area

PMP = Probable Maximum Precipitation in inches

t_p = Lag time from mid-point of unit rainfall duration, t_r , to peak of unit hydrograph, in hours.

t_r = Unit rainfall duration, equal to $\frac{t_p}{5.5}$, in hours.

C_t = Coefficient depending upon units and drainage basin characteristics

t_R = Unit rainfall duration other than standard unit; t_r adopted in specific study, in hours.

t_{pR} = Lag time from mid-point of unit rainfall duration, t_R , to peak of unit hydrograph, in hours

1827 acres

D.A. = 2.86 square miles, L = 3.07 miles, LCA = 1.40 miles

PMP = 20.5 inches $C_t = 2.0$

$C_p = 0.625$ from average 640 $C_p = 400$

$$t_p = C_t (L \cdot LCA)^{0.3} = 2.0 [(3.33)(1.32)]^{0.3} = 3.10 \text{ hours}$$

$$t_r = \frac{t_p}{5.5} = \frac{3.10}{5.5} = .56 \text{ hours (Use 1 hr. hydrograph)}$$

$$t_{pR} = t_p + 0.25(t_R - t_r) = 3.10 + .25(1 - .56) = 3.21 \text{ hrs.}$$

From HMR 33 - Figure 2, Deple - Area - Duration

6 hour % III = , 12 hour % = 133
24 hour % 122 = , 48 hour % = 142

PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
NANTICOCKE CREEK SITE 9E	1		
SUBJECT	COMPUTED BY	DATE	
HYDROLOGY & HYDRAULIC COMPUTATIONS	RLW	2/6/79	
<u>PRINCIPLE SPILLWAY CAPACITY</u>			
WATER SURFACE AT AUXILIARY SPILLWAY CREST			
$q = AV \sqrt{\frac{2gH}{1 + K_e + K_b + K_f L}} = 7.06 \sqrt{\frac{2(32.2)(40.7)}{1 + .5 + (.45) + (.0165)(2076)}} = 155.90 \text{ cfs}$			
WATER SURFACE AT DESIGN HIGH WATER			
$q = 7.06 \sqrt{\frac{2(32.2)(43.4)}{1 + .5 + .45 + .0165(2076)}} = 160.98 \text{ cfs}$			
WATER SURFACE AT TOP OF DAM			
$q = 7.06 \sqrt{\frac{2(32.2)(45.8)}{1 + .5 + .45 + .0165(2076)}} = 165.38 \text{ cfs}$			
<u>EMERGENCY SPILLWAY CAPACITY</u>			
WATER SURFACE AT TOP OF DAM			
$q = CLH^{3/2} = 3.087(330.6)(5.1)^{3/2} = 11,754.2 \text{ cfs}$			
<u>RESERVOIR DRAIN CAPACITY</u>			
WATER SURFACE AT PRINCIPLE SPILLWAY CREST			
$q = .78 \sqrt{\frac{2(32.2)(23.7)}{1 + .5 + 0 + .116(26)}} = 14.34 \text{ cfs}$			
DEPTH OF FLOW IN EMERGENCY SPILLWAY DURING PMAF			
$Q = CLH^{3/2} \Rightarrow H^{3/2} = \frac{Q}{CL} = \frac{4749}{(3.087)(318)} \Rightarrow H = 2.86'$			
$Q = 4905 - 156 = 4749$			
$L = 2[150 + 1.5(3)(2)] = 318$			

 HEC-1 VERSION DATED JAN 1973
 UPDATED AUG 74
 CHANGE NO. 01

HAITICOCKE CREEK WATERSHED PROJECT SITE NO 9)
 PMF WITH RATIOS
 DATE

JOB SPECIFICATION
 HQ NHR MNIN IDAY IHR IMIN METRC IPLT IPRT NSTAN.
 100 1 0 0 0 0 0 0 0 0 0 0
 JOPER 5 NWT 0

MULTI-PLAN ANALYSES TO BE PERFORMED
 NPLAN= 1 NRTIO= 2 LRTIO= 1

RTIOS= 0.50 1.00

 SUB-AREA RUNOFF COMPUTATION
 ISTAQ ICOMP IRECON ITAPE JPLT JPRT INAME
 1 0 0 0 0 0 0 0

HYDROGRAPH DATA
 IHYDG IUHG TAREA SNAP TRSDA TRSPC RATIO ISNDW ISAME LOCAL
 1 1 2.86 0. 2.86 0. 0. 0 0 0 0 0

PRECIP DATA
 SPFE PMS R6 R12 R24 R48 R72 R96
 0. 20.50 111.00 122.00 133.00 142.00 0. 0.

TRSPC COMPUTED BY THE PROGRAM IS 0.750

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

UNIT HYDROGRAPH DATA
 TP= 3.00 CP=0.63 NTA= 0

RECESSION DATA
 STRTQ= 4.00 ORCSN= 4.00 RTIOR= 1.00
 APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SHYDER CP AND TP ARE TC= 3.71 AND R= 2.44 INTERVALS

UNIT HYDROGRAPH 15 END-OF-PERIOD ORDINATES, LAG= 2.98 HOURS, CP= 0.63 VOL= 1.00
 62. 216. 357. 284. 188. 124. 82. 54. 36.
 15. 10. 7. 4.

END-OF-PERIOD FLOW
 TIME RAIN EXCS COMP 0
 1 0.01 0. 4.
 2 0.01 0. 4.
 3 0.01 0. 4.
 4 0.01 0. 4.
 5 0.01 0. 4.
 6 0.01 0. 4.
 7 0.02 0. 4.

9	0.02	0.	4.
10	0.02	0.	4.
11	0.02	0.	4.
12	0.02	0.	4.
13	0.12	0.	4.
14	0.14	0.	4.
15	0.17	0.	4.
16	0.44	0.02	5.
17	0.16	0.06	12.
18	0.13	0.03	26.
19	0.01	0.	40.
20	0.01	0.	43.
21	0.01	0.	36.
22	0.01	0.	26.
23	0.01	0.	18.
24	0.01	0.	14.
25	0.11	0.01	11.
26	0.11	0.01	12.
27	0.11	0.01	15.
28	0.11	0.01	19.
29	0.11	0.01	22.
30	0.11	0.01	24.
31	0.23	0.18	35.
32	0.28	0.18	73.
33	0.28	0.18	134.
34	0.28	0.18	197.
35	0.28	0.18	246.
36	0.28	0.18	278.
37	1.71	1.61	387.
38	2.05	1.95	730.
39	2.56	2.46	1353.
40	6.49	6.39	2368.
41	2.39	2.29	3681.
42	1.83	1.78	4725.
43	0.17	0.07	4905.
44	0.17	0.07	4192.
45	0.17	0.07	3131.
46	0.17	0.07	2174.
47	0.17	0.07	1479.
48	0.17	0.07	1020.
49	0.	0.	713.
50	0.	0.	498.
51	0.	0.	342.
52	0.	0.	225.
53	0.	0.	144.
54	0.	0.	89.
55	0.	0.	41.
56	0.	0.	22.
57	0.	0.	11.
58	0.	0.	8.
59	0.	0.	7.
60	0.	0.	5.
61	0.	0.	5.
62	0.	0.	4.
63	0.	0.	4.
64	0.	0.	4.
65	0.	0.	4.
66	0.	0.	4.
67	0.	0.	4.
68	0.	0.	4.
69	0.	0.	4.
70	0.	0.	4.
71	0.	0.	4.
72	0.	0.	4.
73	0.	0.	4.

140.	143.	150.	162.	178.	196.	218.	254.	334.	387.
403.	423.	428.	419.	403.	387.	376.	368.	363.	359.
356.	354.	353.	350.	343.	333.	323.	313.	303.	294.
285.	276.	268.	261.	253.	246.	240.	234.	228.	223.
217.	212.	208.	203.	199.	195.	192.	188.	185.	182.
179.	176.	173.	171.	168.	166.	164.	162.	160.	158.
156.	155.	153.	152.	150.	149.	148.	147.	145.	144.

PEAK
 4917.
 CFS
 INCHES
 AC-FT

6-HOUR
 3819.
 12.42
 1895.

24-HOUR
 1304.
 16.96
 2587.

72-HOUR
 463.
 18.07
 2757.

TOTAL VOLUME
 33468.
 18.14
 2767.

PEAK FLOW SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS

RATIOS APPLIED TO FLOWS

OPERATION	STATION	PLAN	0.50	1.00
HYDROGRAPH AT	1	1	2452.	4905.
		2	0.	0.
ROUTED TO	1	1	2527.	4917.
		2	0.	0.

APPENDIX E
STABILITY ANALYSES

2 -- W. S. Atkinson -- 5/25/65

Rey S. Decker

Subj: ENG 22-5, New York WP-08, Nanticoke Creek, Site No. 9-E
(Broome County)

EMBANKMENT

- A. Classification: Embankment samples are classified GM and GC based on the gradation that includes 20% plus 3-in. material. Actually, the laboratory samples, 65W2924 and 65W2925, contained slightly over 50% fines.
- B. Density: Standard moisture-density tests were made in the minus 3/4-in. fraction. Maximum density ranges from 124.5 to 126.5 p.c.f.
- C. Shear Strength: Sample No. 65W2925 was tested, using the minus 3/4-in. fraction. One hundred percent of standard density was selected because previously tested similar material had relatively low shear strength at lower densities.

Shear values from this CU test are $\phi = 31^\circ$, $c = 500$ p.s.f. Effective stress parameters are $\bar{\phi} = 32.5^\circ$, $\bar{c} = 550$ p.s.f., correcting for measured pore pressure.

SLOPE STABILITY ANALYSIS

An embankment only analysis using laboratory charts based on a modification of the Swedish circle method and using shear values of $\phi = 31^\circ$, $c = 500$ p.s.f. indicates that the factor of safety of a 3:1 upstream slope and 2 1/2:1 downstream slope is in the range of 2.0. Drawdown to the base is assumed and the phreatic surface is assumed to emerge on the downstream slope.

It is concluded that more detailed analysis is not justified.

CONCLUSIONS AND RECOMMENDATIONS

- A. Site Preparation: It is recommended that the soft surface silts be removed. Most of this soil will be taken out in normal stripping operations.
- B. Centerline Cutoff: Cutoff of disturbed surface soil is recommended for the abutments. Cutoff of the alluvial gravels into till is recommended for the floodplain area. A 25-foot bottom width is recommended for this cutoff to reduce the exit gradient into the alluvial gravels. The GC material is satisfactory for backfill.
- C. Principal Spillway: No particular problems are anticipated.
- D. Drainage: With the proposed cutoff, the alluvial gravels downstream are expected to function as a drain. You may wish to consider a pick-up trench drain or a small rock toe to outlet this natural drain.

3 -- W. S. Atkinson - 5/25/65
Rey S. Decker
Subj: ENG 22-5, New York WP-08, Nanticoke Creek, Site No. 9-E
(Broome County)

E. Embankment Design:

1. Selection of Material. Material like sample Nos. 65W2924 and 65W2925, GC and GM, can be used anywhere in the embankment. It is suggested that consideration be given to placing the coarser gravel with low-plastic fines, 65W2926 - GM, in the downstream base section provided it is practical to separate it from the other soils. Permeability of this material is expected to be somewhat higher than that of the others.

The recommended density control is 100% of standard based on the minus 3/4-in. fraction. Shear strength at this density is ample based on the test for Sample No. 65W2925. Notify us if you prefer a lower control than 100% of standard and another shear test and slope stability analysis will be made.

2. Slopes. Proposed 3:1 upstream and 2 1/2:1 downstream slopes are adequate.
3. Settlement Allowance. An allowance of 1.0 ft. is suggested to compensate for residual settlement in embankment and foundation; 0.8 ft., 2% average, for the embankment and 0.2 ft. for the foundation.

Prepared by:

Robert E. Nelson

Reviewed and Approved by:

Roland B. Phillips

Attachments

cc: B. S. Ellis, Syracuse, New York
Henry W. Davis, Penn Yan, New York
R. J. McClimans, Binghamton, New York
H. M. Kautz, Upper Darby, Pennsylvania

SUMMARY - SLOPE STABILITY ANALYSIS

State NEW YORK Project NANTICQUE CREEK - SITE #9-E
Date 5-18-65 Analysis Made By G.L.M. Checked By A.M.
Method of Analysis SWEDISH CIRCLE

Location of Material					E _{1/2} 95% Sil ML					
Sample No.					15Y/29.25					
γ_d					124.7					
γ_m					137.0					
γ_s					140.5					
γ_b					73.0					
Condition	Opt.	Sat.	Opt.	Sat.	Opt.	Sat.	Opt.	Sat.	Opt.	Sat.
ϕ						31°				
Tan ϕ						0.601				
k										
c						522				

UPSTREAM SLOPE			
Trial	Slope	Conditions	Fs
1	3:1	Full drawdown - No berm - Arc cut from opp. shldr thru emb (31°-50%) only - Sat shear values only	2.3

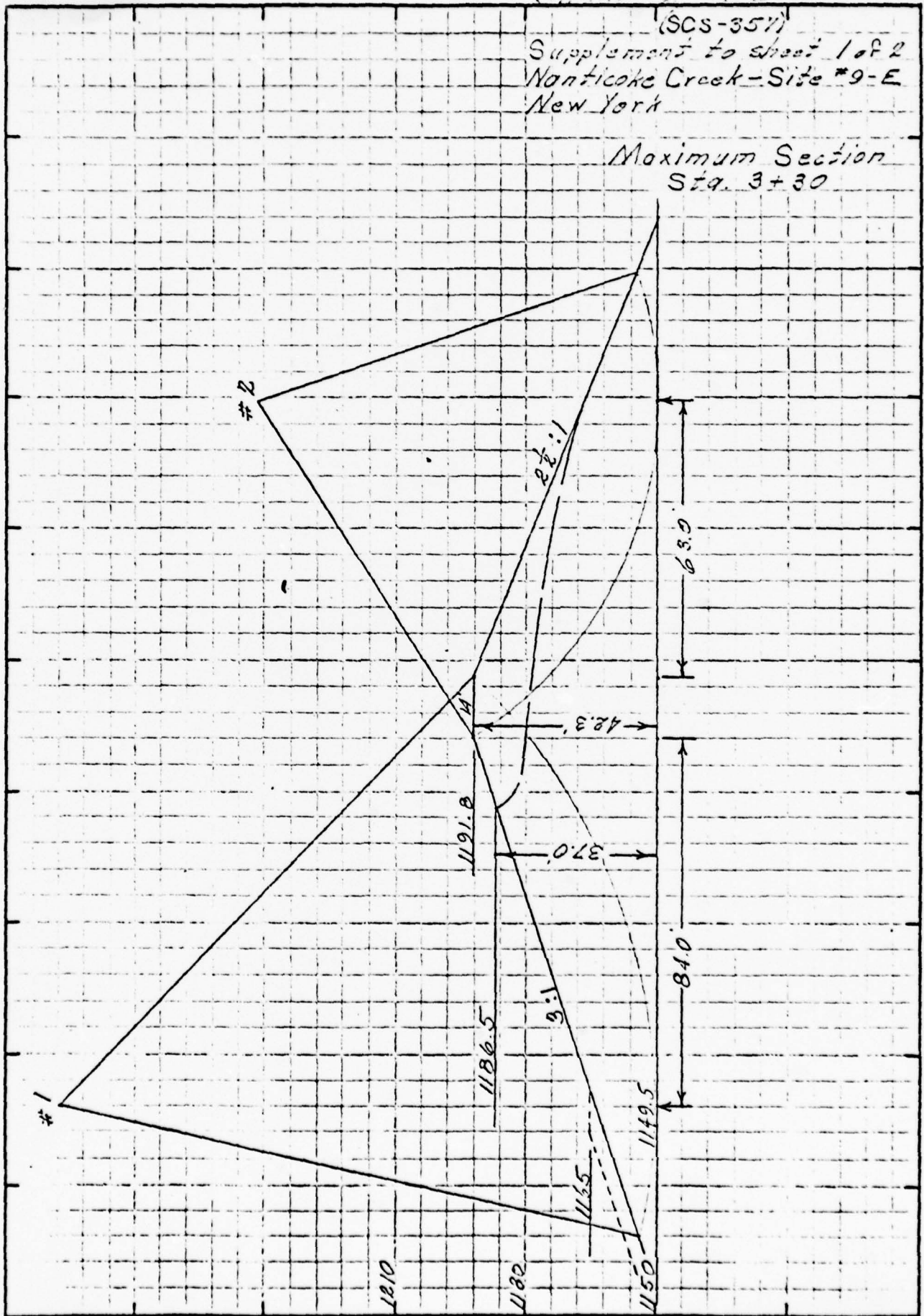
DOWNSTREAM SLOPE			
Trial	Slope	Conditions	Fs
2	2.5:1	No drain - No berm - Arc cut from opp shldr thru emb (31°-50%) only - Sat shear values only	2.2

Sheet 2 of 2

(SCS-357)

Supplement to sheet 1 of 2
Naticoke Creek - Site #9-E
New York

Maximum Section
Sta. 3+30



Scale 1 inch = 20 feet

APPENDIX F

REFERENCES

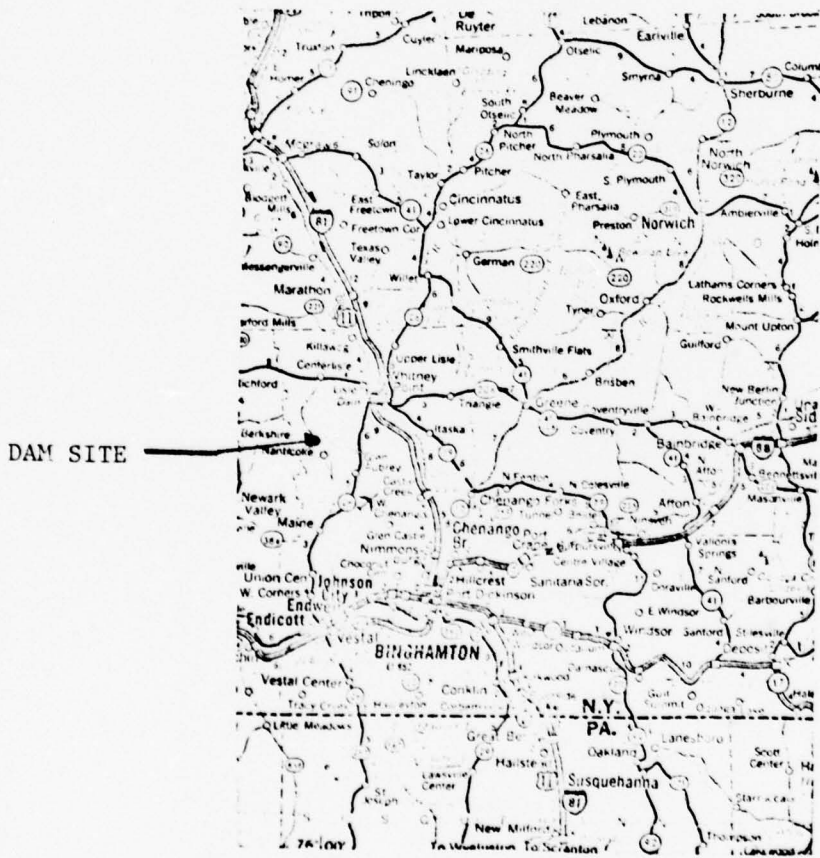
APPENDIX F

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- 1) U.S. Department of Commerce, Technical Paper No. 40, Rainfall Frequency Atlas of the United States, May 1961.
- 2) H.W. King and E.F. Brater, Handbook of Hydraulics, 5th edition, McGraw-Hill, 1963.
- 3) University of the State of New York, Geology of New York, Education Leaflet 20, Reprinted 1973.
- 4) Elwyn E. Seelye, Design, 3rd edition, John Wiley and Sons, Inc., 1960

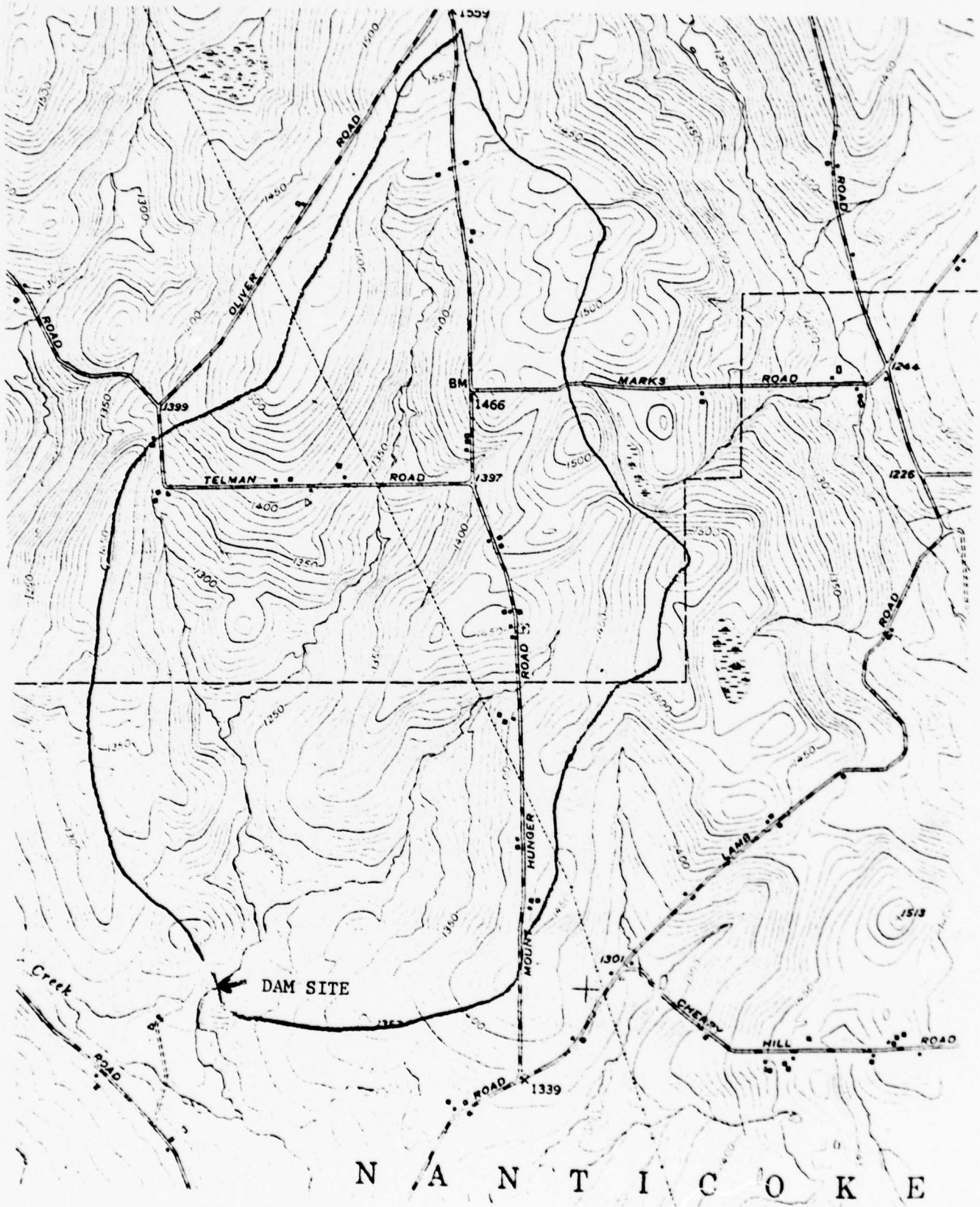
APPENDIX G

DRAWINGS



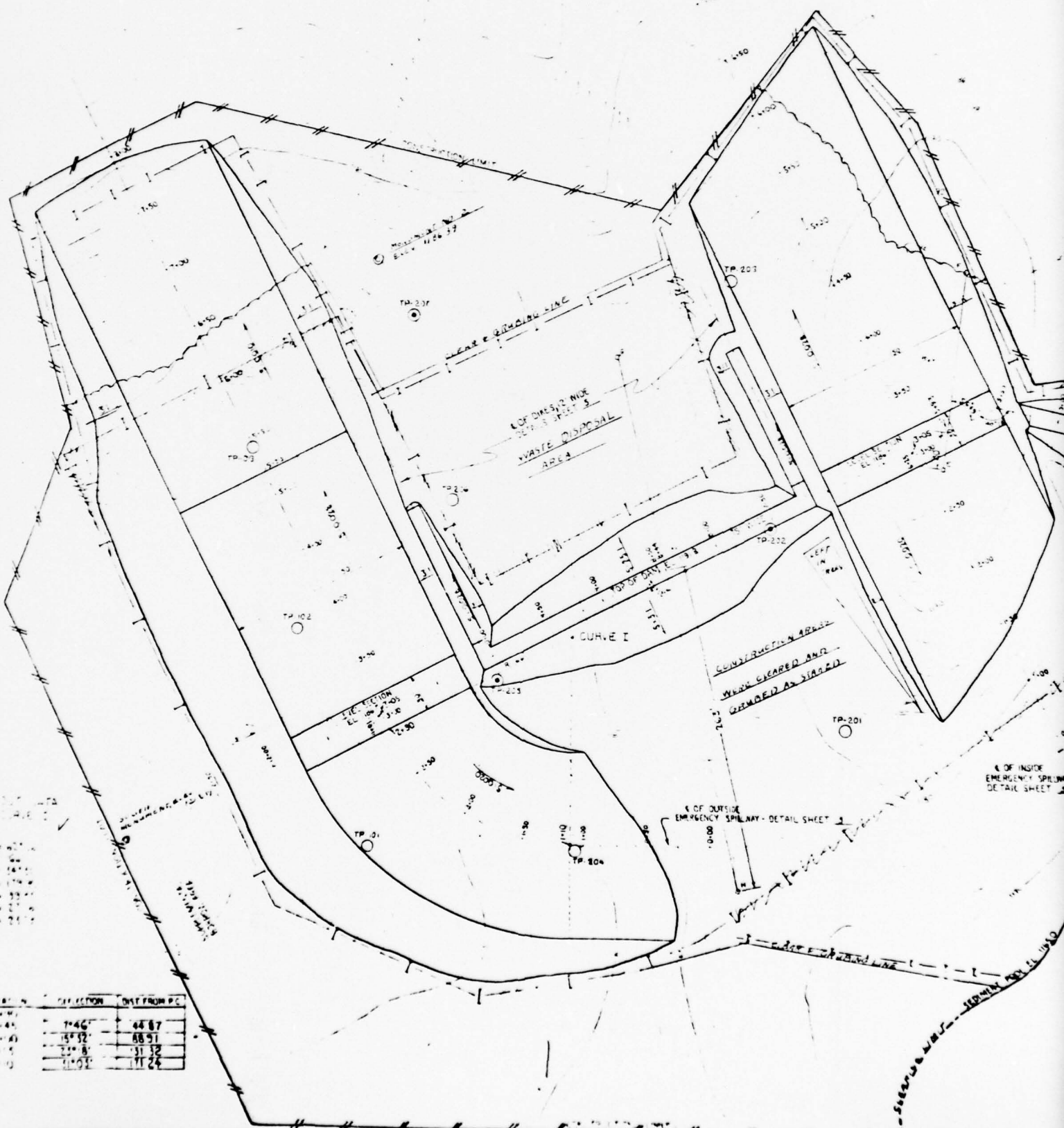
VICINITY MAP

NANTICOKE CREEK WATERSHED PROTECTION PROJECT
 DAM SITE No. 9E

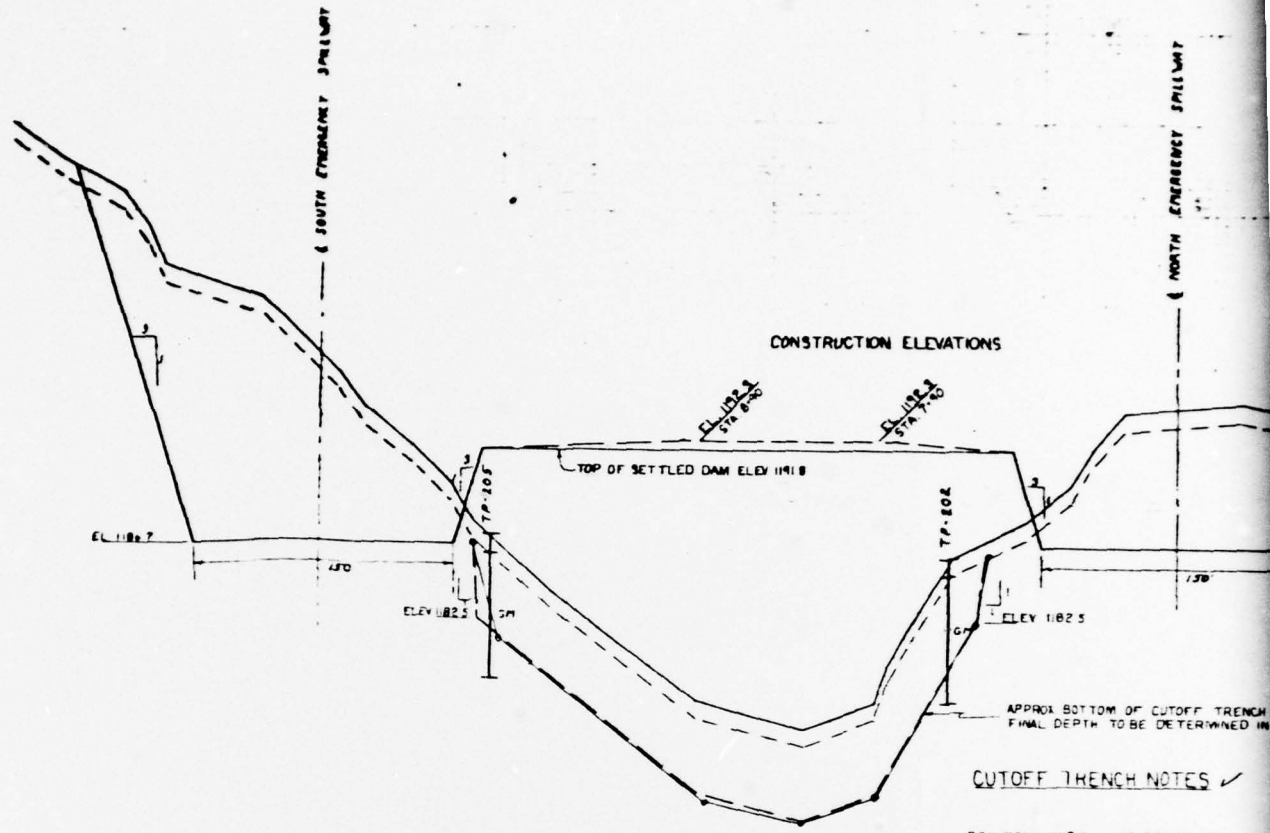


TOPOGRAPHIC MAP
 NANTICOKE CREEK WATERSHED PROTECTION PROJECT
 DAM SITE No. 9E

TBM # 4
 508.14830
 SEE STANDARD MARKER
 14' ABOVE GROUND LINE
 14' 0.5M ELM TREE

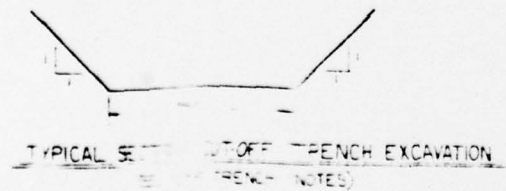


SECTION	OFF FROM PC
1+46	44.87
1+52	88.91
2+08	31.32
2+03	11.24



CUTOFF TRENCH NOTES

1. BOTTOM WIDTH VARIES AS FOLLOWS
 STA 0+55 (APPROX) TO STA 1+25 - E
 STA 1+25 TO 1+55 - TRANSITION
 STA 1+55 TO 3+25 - BOTTOM WIDTH
 STA 3+25 TO 3+55 - TRANSITION
 STA 3+55 TO 4+95 - BOTTOM WIDTH
 STA 7+35 TO 10+12 - BOTTOM WIDTH
2. DEPTH OF CUTOFF TRENCH BELOW
 a. DAM BETWEEN THE TWO EMER
 OF THE MAIN DAM ABOVE ELEV 1
 b. THE ABUTMENTS OF THE MAIN
 c. DEPTH OF CUTOFF TRENCH IN
 THE BOTTOM OF THE GP-GM M
 20 TO 30 FEET
3. CUTOFF TRENCH TO BE BACKFILLED
 FROM 10 TO 30 FEET AND TP 203 FF



**PROFILE ALONG C OF DAM
(LOOKING DOWNSTREAM)**



9+00 8+00 7+00 6+00

NORTH EMERGENCY SPILLWAY

1200
1180
1160
1140

CONSTRUCTION ELEVATIONS

CL 1192.8 STA 3+25
CL 1192.8 STA 1+50

TOP OF SETTLED DAM ELEV 1198.8

ELEV 1182.0

ELEV 1182.0

APPROXIMATE STRIPPED GROUND LINE
ORIGINAL GROUND LINE

CUTOFF TRENCH TO BE DETERMINED IN THE FIELD BY THE ENGINEER.

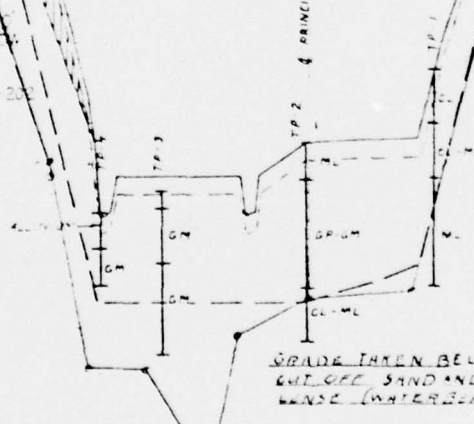
NOTES

- 1) TO STA 1+25 - BOTTOM WIDTH = 12.0'
- 2) TRANSITION
- 3) - BOTTOM WIDTH = 25.0'
- 4) TRANSITION
- 5) - BOTTOM WIDTH = 12.0'
- 6) - BOTTOM WIDTH = 12.0'
- 7) TRENCH BELOW STRIPPED GROUND LINE VARIES AS FOLLOWS IN THE TWO EMERGENCY SPILLWAYS AND THE ABUTMENT DAM ABOVE ELEV 1165.0. MIN. DEPTH = 4.0 FEET. POINTS OF THE MAIN DAM BELOW ELEV 1165.0. MIN. DEPTH OF CUTOFF TRENCH IN VALLEY TO EXTEND A MIN. OF 1.0' BELOW OF THE GP-GM MATERIAL REPRESENTED BY TP-2 FROM LEFT TO BE BACKFILLED WITH MATERIAL REPRESENTED BY TP-203 FROM 1.0 TO 12.0 FEET.

TYPICAL FOUNDATION EXCAVATION ON THE LEFT ABUTMENT TO REMOVE APPROX. 2.0' SLAB IN PLACE FIRM AGAINST

NORMAL WATER SURFACE ELEV 1157

PRINCIPAL SPILLWAY



GRADE TAKEN BELOW TO EXPOSE SAND AND GRAVEL LENSE (WATER BEARING)

AS BUILT

SCALE

4+00 5+00 7+00 3+00 2+00

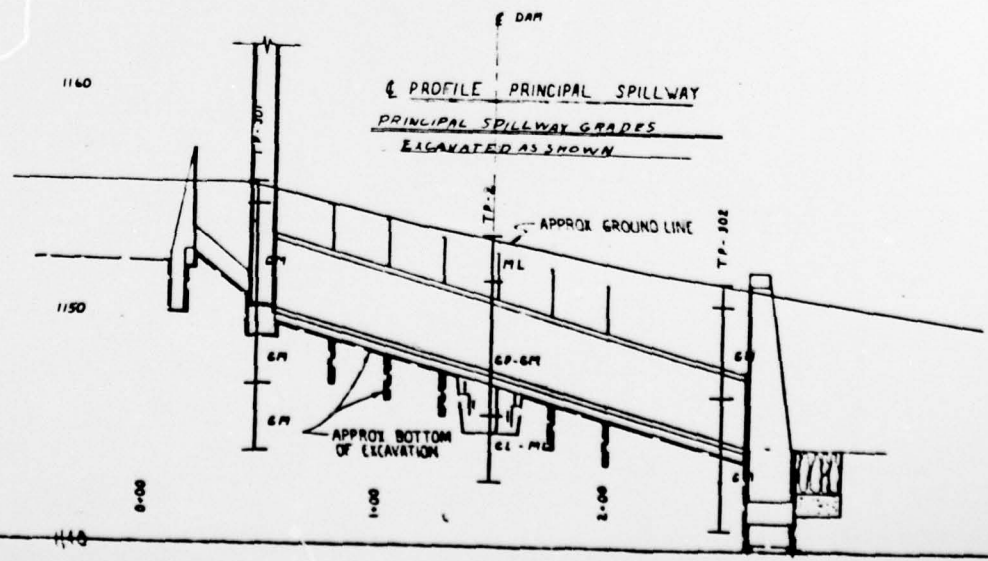
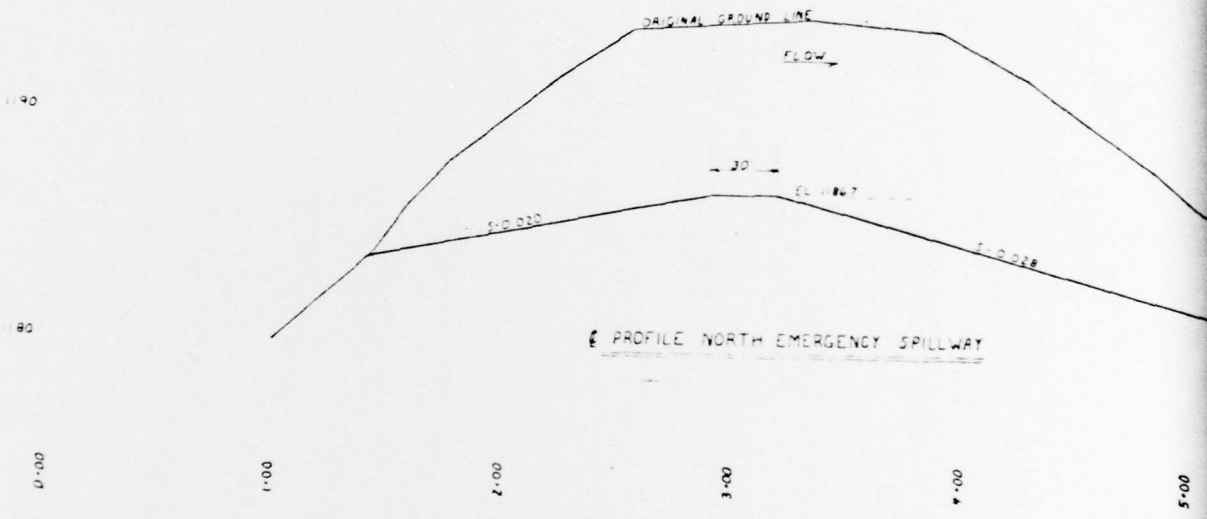
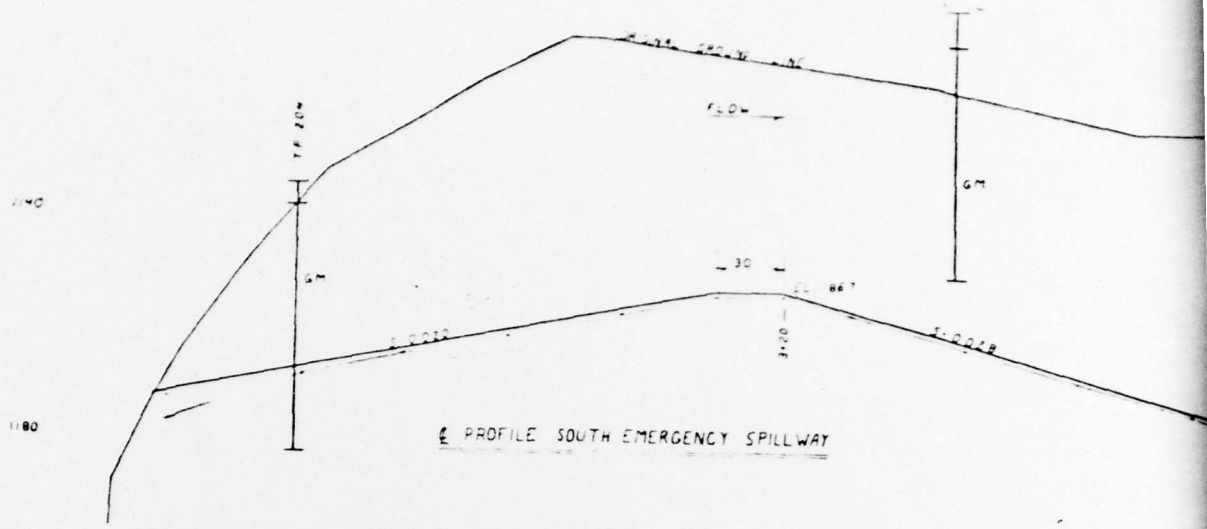
NANTICOKE CREEK WATERSHED PROJECT
SITE 9-E
FLOODWATER RETARDING DAM
BROOME COUNTY, NEW YORK
PROFILES

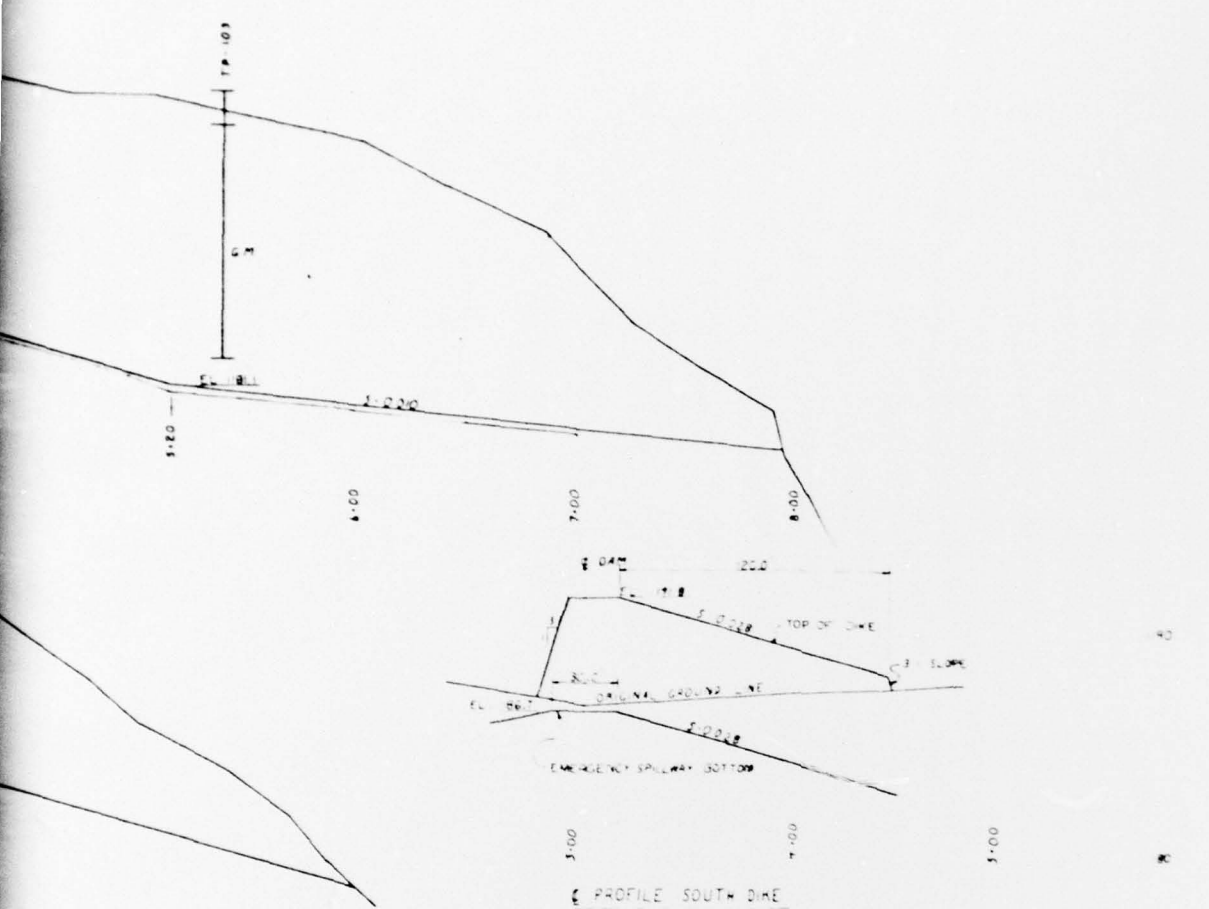
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

L. C. BRITSON	5/65
J. W. HEN	5/65
L. E.	6/65

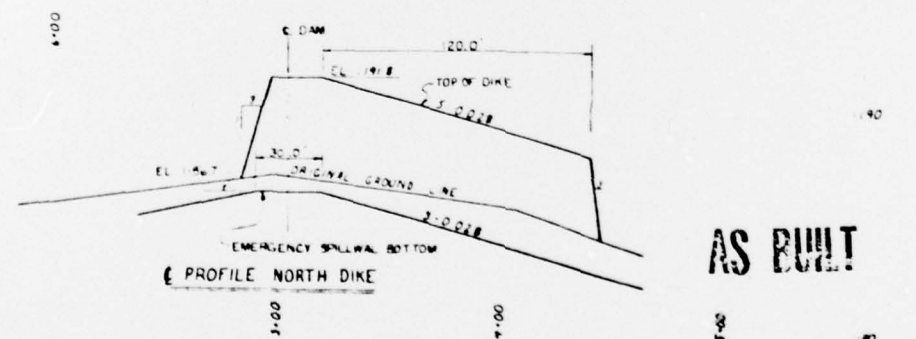
NY-2009-P

2



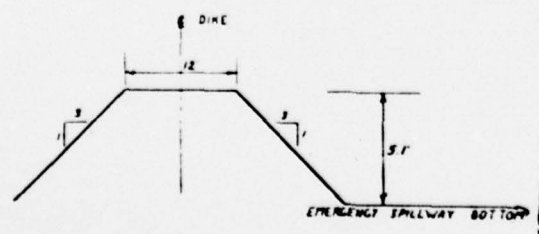


PROFILE SOUTH DIKE



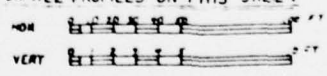
PROFILE NORTH DIKE

AS BUILT



TYPICAL DIKE SECTION

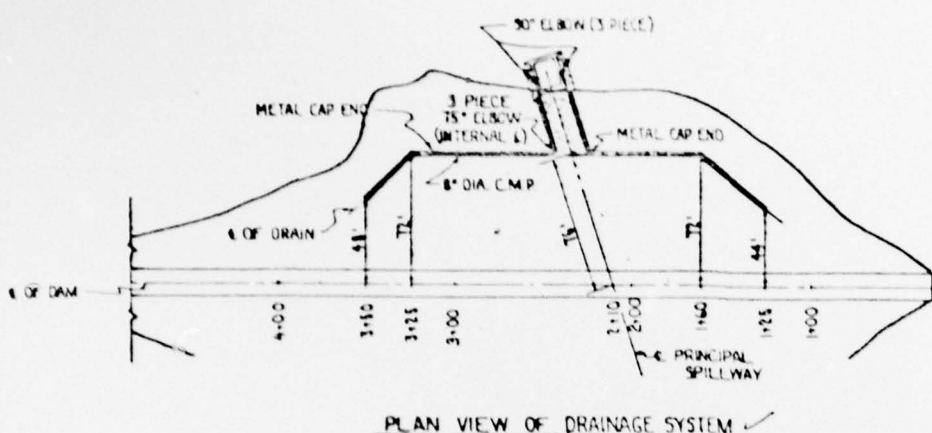
SCALE FOR ALL PROFILES ON THIS SHEET



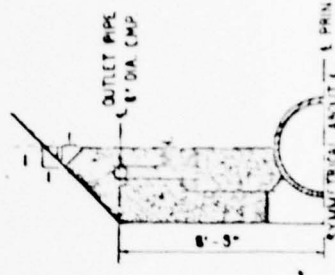
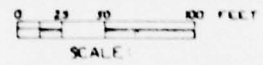
NANTICOKE CREEK WATERSHED PROJECT
 SITE 9-E
 FLOODWATER RETARDING DAM
 BROOME COUNTY, NEW YORK
 PROFILES

DEPARTMENT OF AGRICULTURE
 CONSERVATION SERVICE

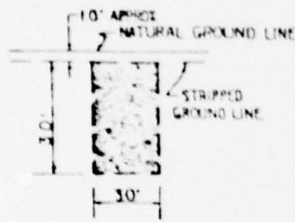
L C MITSON 5/65
 J HUBB 5/65
 L B 6/65 3 15 NY-2009-P



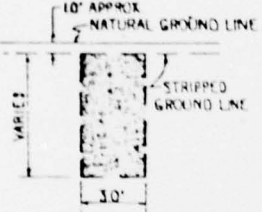
PLAN VIEW OF DRAINAGE SYSTEM



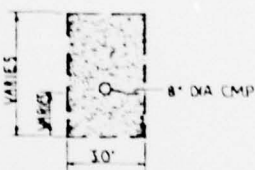
SECTION A-A



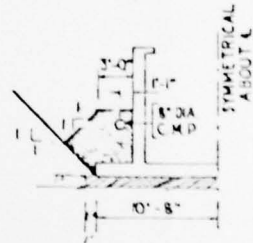
SECTION C-C & F



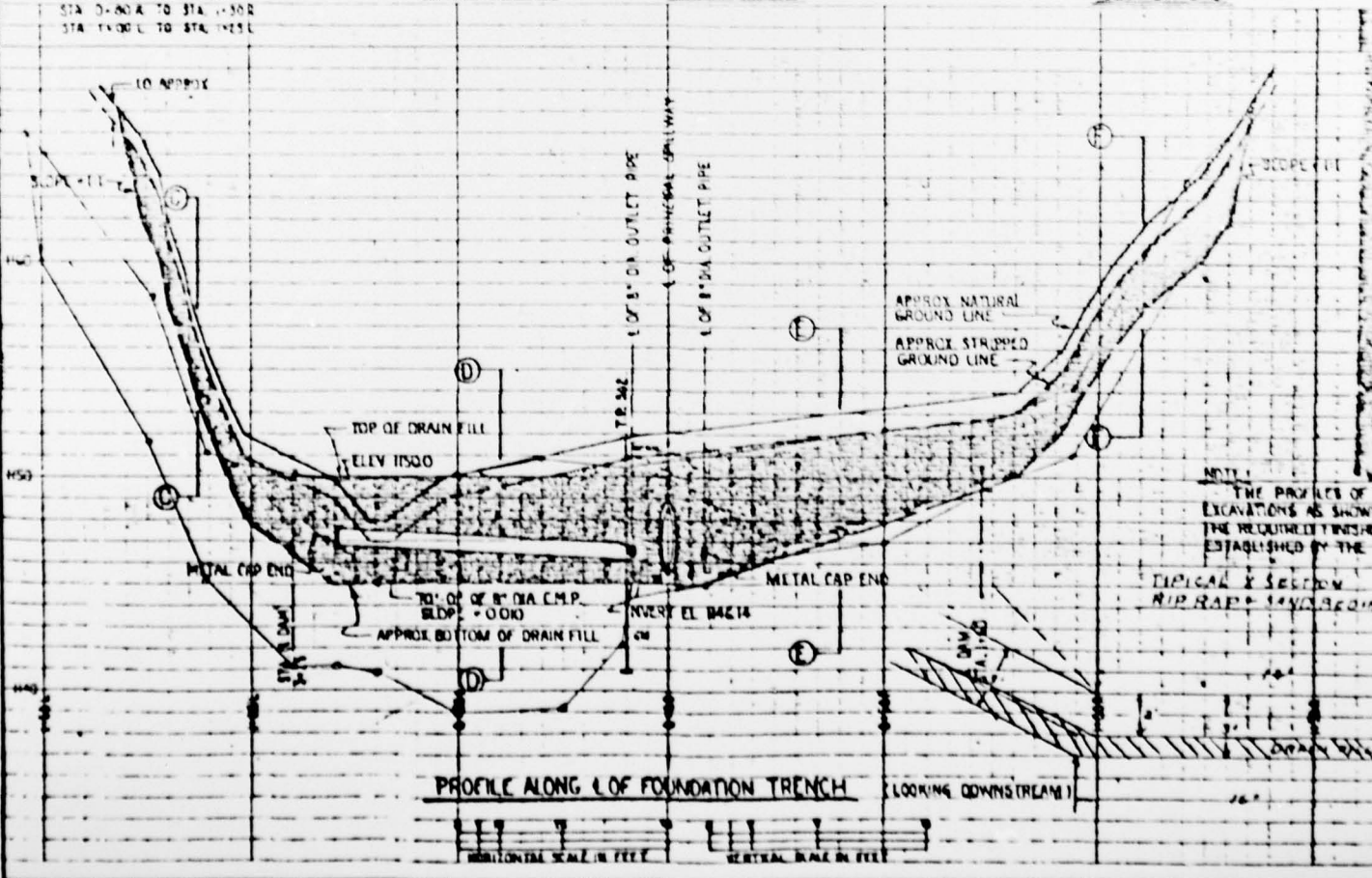
SECTION E-E



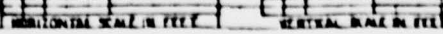
SECTION D-D



SECTION B-B



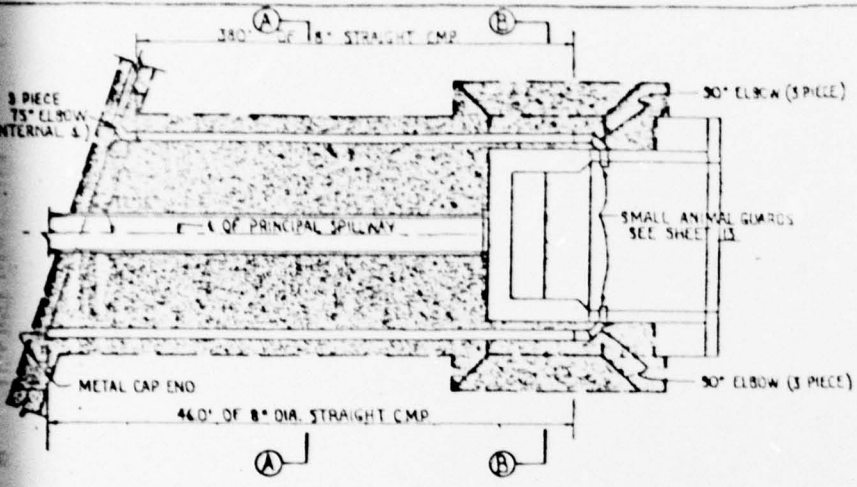
PROFILE ALONG L OF FOUNDATION TRENCH



DESIGN FOR DRAIN	SEVE NO
	3"
	3/4"
	3/8"
	4"
	10"
	20"
	40"
	60"
	100"
	200"

NOTE: THE PROFILES OF THE BOTTOM EXCAVATIONS AS SHOWN ARE ON THE RECONSTRUCTED GROUND ESTABLISHED BY THE ENGINEER.

TYPICAL X SECTION
RIP RAP = 1 1/2" TO 3" DIA



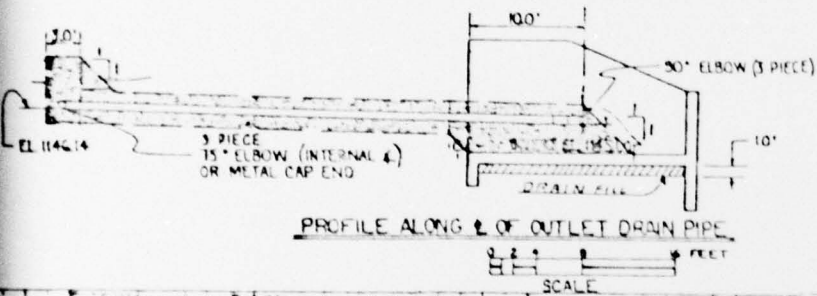
QUANTITY SUMMARY

- 201 - CU YDS OF DRAIN FILL
- 154 - FEET OF 8" DIA. CMP & JOINTS
- 2 - 90° ELBOWS, 3 PIECE
- 1 - 15° ELBOW, INTERNAL &
- 2 - METAL CAP ENDS

NOTE

ALL DRAIN PIPE SHALL CONFORM TO MATERIAL SPEC NO 4 SHALL BE SHAFT I, CLASS II, TYPE A, PERFORATED PIPE. ALL PIPE SHALL BE LAID WITH PERFORATIONS DOWN.

PLAN OF OUTLET DRAIN

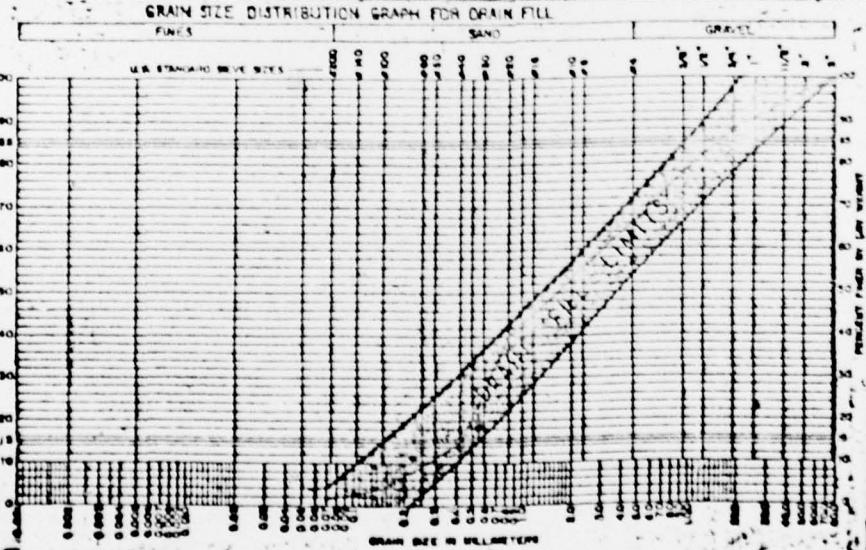


PROFILE ALONG 1/2 OF OUTLET DRAIN PIPE

AS BUILT

DESIGN DATA FOR DRAIN FILL

SEIVE NO. PASSING	PERCENT
3"	100
3/4"	78 - 98
3/8"	66 - 85
4#	54 - 72
10#	38 - 57
20#	22 - 43
40#	11 - 31
60#	2 - 23
100#	0 - 15
200#	0 - 5



GRADES OF THE BOTTOM OF ALL CHANNELS SHOWN ARE ONLY APPROXIMATE. FINISHED GRADES WILL BE DETERMINED BY THE ENGINEER.

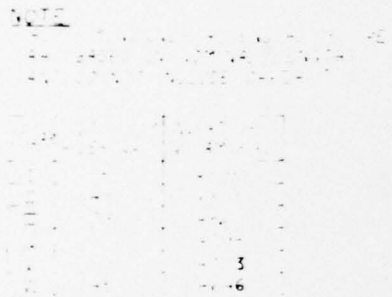
WATKINS CREEK WATERSHED PROJECT
SITE 9-E
FLOODWATER RETARDING DAM
BROOME COUNTY, NEW YORK
DRAINAGE SYSTEM DETAILS
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed by L. C. BRITTON	Date 5/63	Checked by B. ANGELD W. YOLTON	Date 5/63
Drawing No. 2-4		Sheet No. 6 of 18	
Project No. NY-2009-P			

2

STATION	ELEV. AS BUILT	PIPE
20	49.98	1/4"
40	49.46	3/16"
60	48.94	1/8"
80	48.42	1/4"
100	47.90	1/4"
120	47.38	1/4"
140	6.62	1/8"
160	5.98	3/16"
180	5.34	1/4"
19	5.15	1/16"
OUTLET 204 33	1144 51	

S+0.0320



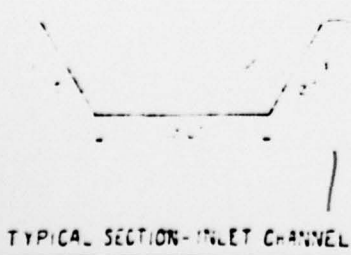
COLLAR BOTTOM ELEV. AS BUILT

STATION	ELEV. AS BUILT
I	471
II	465
III	450
IV	449
V	444

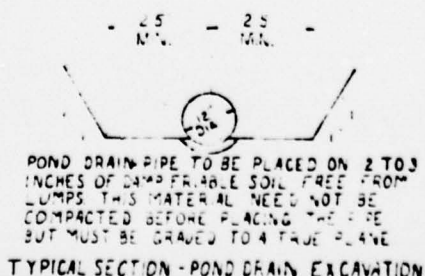


PROFILE ALONG C OF PRINCIPAL SPILLWAY

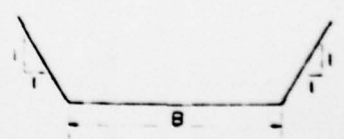
STA. 0+44 TO STA. 0+95 B=10.0
 STA. 0+95 TO STA. 0+95 TRANSITION
 STA. 2+25 TO STA. 2+56 B=17.5
 STA. 2+56 TO STA. 2+61 TRANSITION
 STA. 2+61 TO STA. 2+81 B=21.5



TYPICAL SECTION-INLET CHANNEL

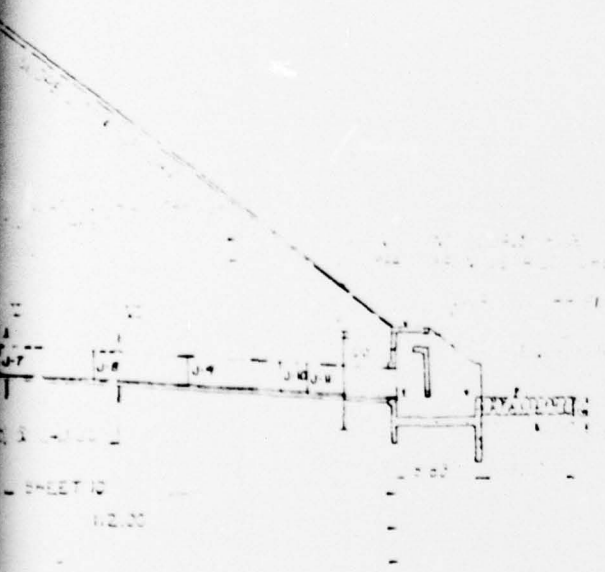


TYPICAL SECTION-POND DRAIN EXCAVATION



TYPICAL SECTION-PRINCIPAL SPILLWAY EXCAVATION

POND DRAIN PIPE TO BE PLACED ON 2 TO 3 INCHES OF DAMP FRABLE SOIL FREE FROM LUMPS THIS MATERIAL NEED NOT BE COMPACTED BEFORE PLACING THE PIPE BUT MUST BE GRADED TO A TRUE PLANE



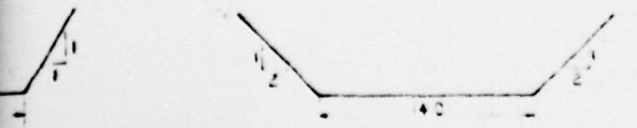
NOTE
 (10) 20'-
 THE SUPPLIER'S NOTE
 EAST OUTSIDE OF SPOT JOINT AND
 WITH CONCRETE OF 20' OF SECTION

SPILLWAY
 SCALE

AS BUILT

USE THIS SHEET FOR PIPE CONDUITS
 FURNISHED IN 20' SECTIONS

B. 100
 B. 175
 B. 215

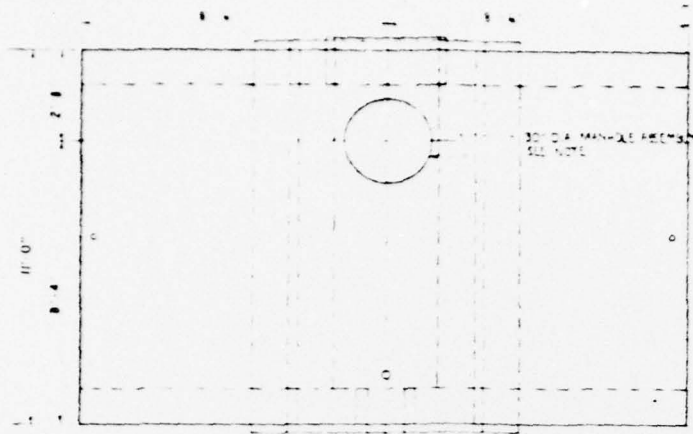


CHANNELWAY EXCAVATION TYPICAL SECTION - OUTLET CHANNEL

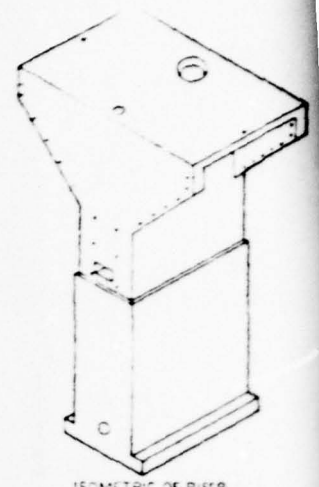
NANTICOKE CREEK WATERSHED PROJECT
 SITE 9-E
 FLOODWATER RETARDING DAM
 BROOME COUNTY, NEW YORK
 PLAN - PROFILE OF PRINCIPAL SPILLWAY
 U.S. DEPARTMENT OF AGRICULTURE
 SOIL CONSERVATION SERVICE

L. C. BRITSON	5/65
J. W. R.	5/65
B.	6/65

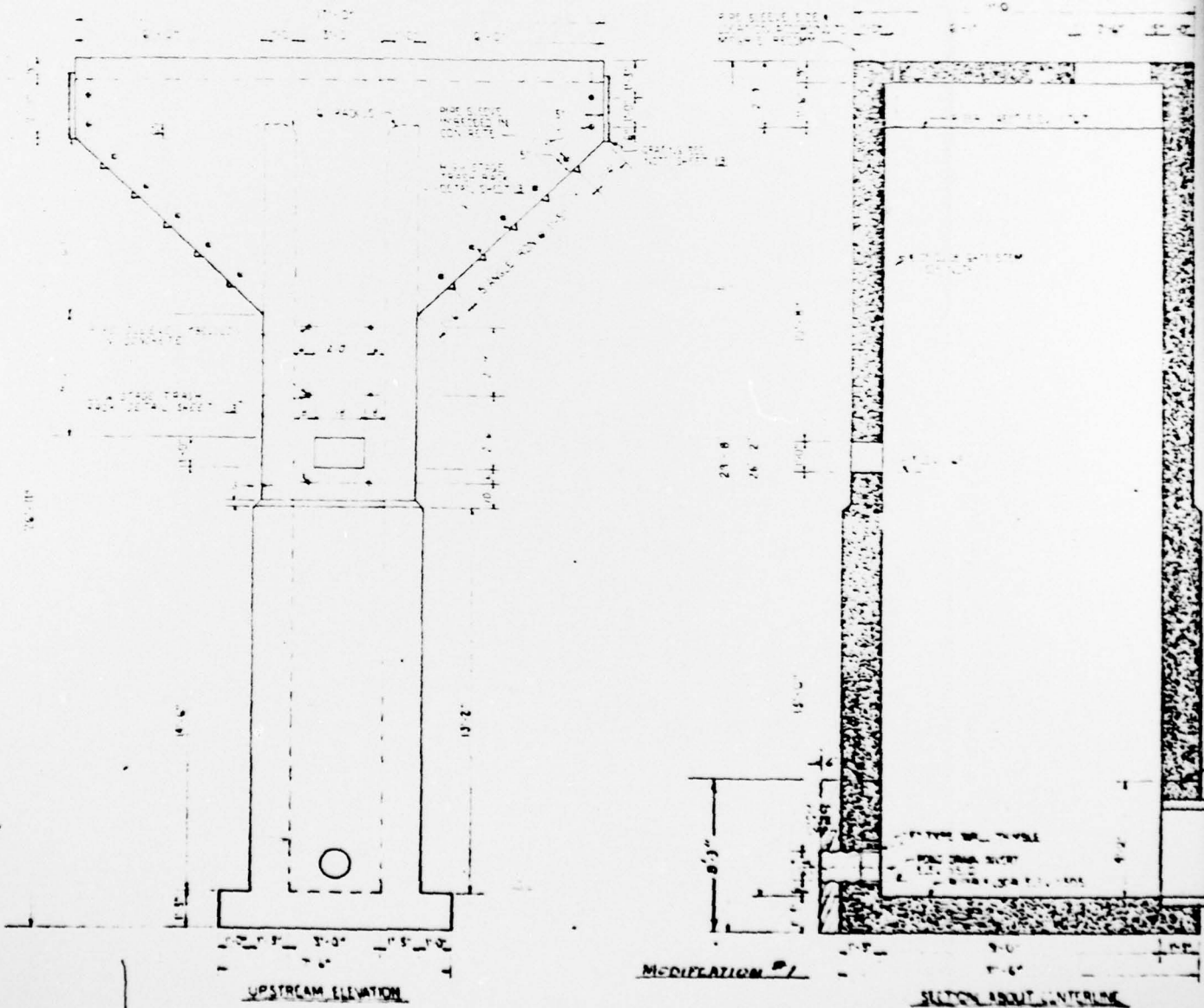
NY-2000-P



PLANVIEW



ISOMETRIC OF RISER NOT TO SCALE



UPSTREAM ELEVATION

MODIFICATION # 1

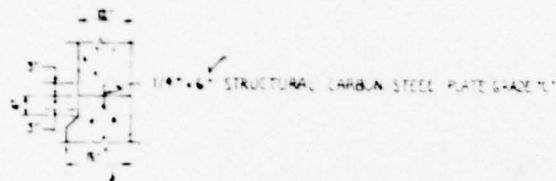
SECTION ABOUT CENTER

MANHOLE RISER NOTES

- ✓ 1. 30" DIA. MANHOLE WITH UNDERSIDE HOOPS AND 4" DIA. MIN. ROUND HOLE LIFTING DEVICE
- 2. PAINT IN ACCORDANCE WITH CONST. SPEC. 22

SLIDE GATE NOTES

- 1. 2" DIA. FLAT FRAME SLIDE GATE
 - 2. WEDGES AND WEDGE SEATS SHALL BE 1/4" WIDE
 - 3. SEATING HEAD = 0"
 - 4. OPERATING HEAD = 22"
 - 5. UNSEATING HEAD = 22"
 - 6. 1" TYPE WALL THIMBLE & DEEP WELDED TO A 2" DIA. STUB OF 3" DIA. 6" GAGE IMP.
 - 7. RISEN STEM THREADED PORTION BRONZE
 - 8. STEM, STEM GUIDES, AND LIFTING DEVICE TO BE AND SPACED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS
 - 9. PAINT IN ACCORDANCE WITH CONST. SPEC. 22
- INSTALLED - RISING HEAD
MODEL 105



NOTE: STEEL PLATE IN WALLS TO BE CONTINUOUS AROUND RISER JOINT TO BE WELDED OR BOLTED.

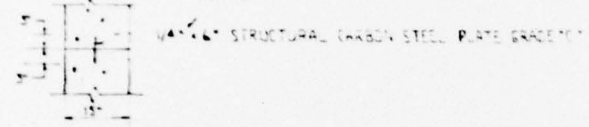
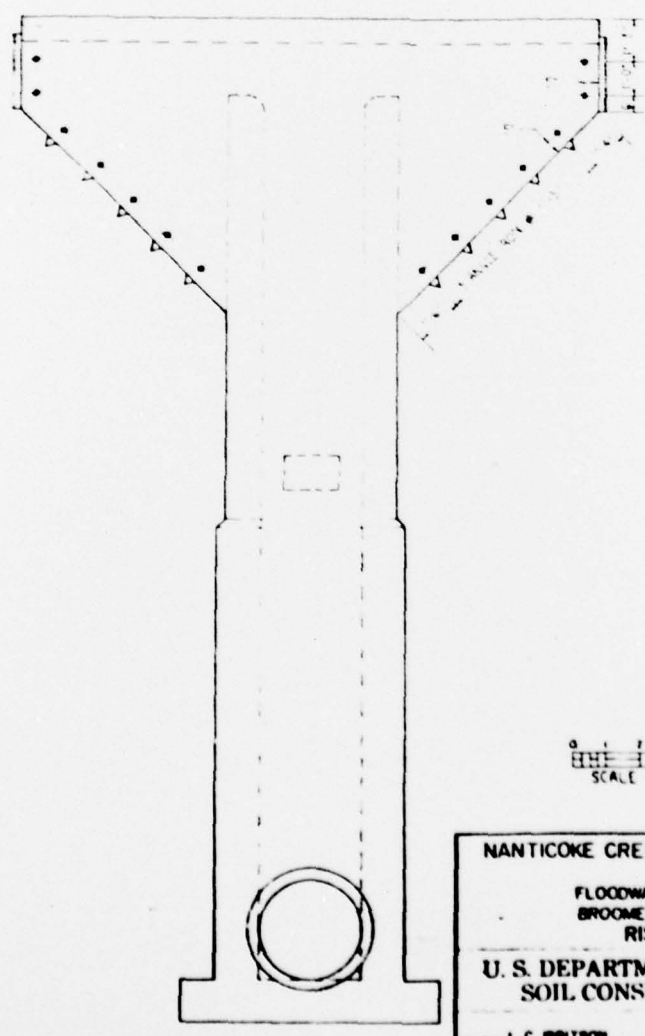


PLATE CONST. JOINT DETAILS ✓



0 1 2 3 4 5 6
SCALE IN FEET

AS BUILT

NANTICOKE CREEK WATERSHED PROJECT
SITE 9-E
FLOODWATER RETARDING DAM
BROOME COUNTY, NEW YORK
RISER DETAILS

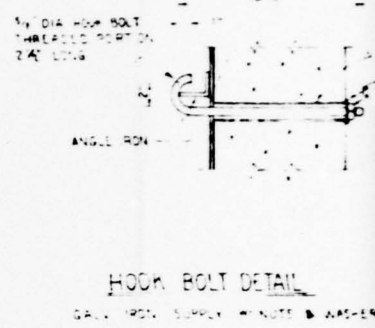
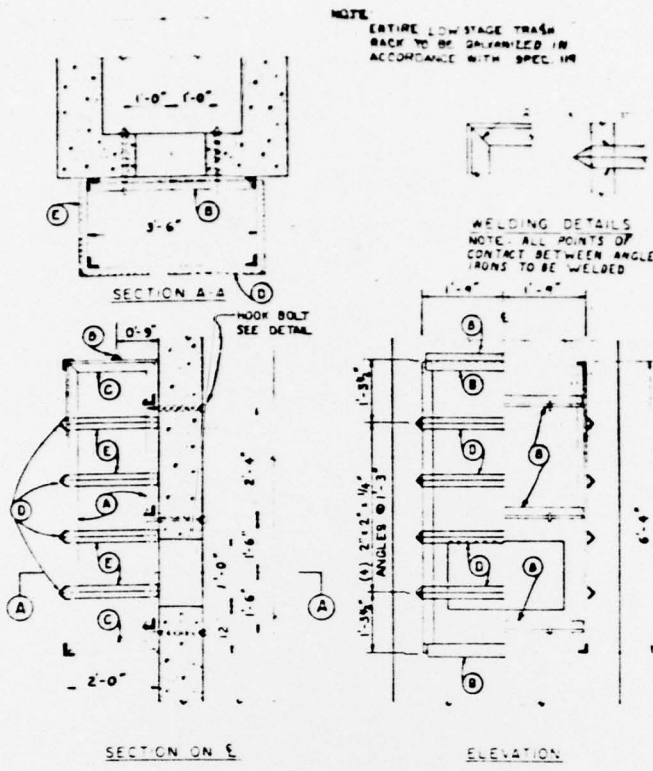
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

L. C. BISHOP	5/65
W. P. YOLTON	5/65
L. B.	6/65

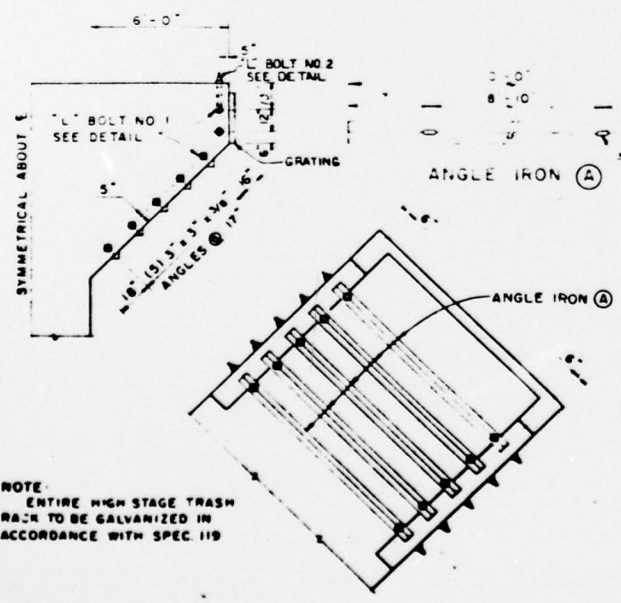
NY-2009-P

DOWNSTREAM ELEVATION

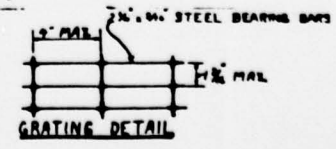
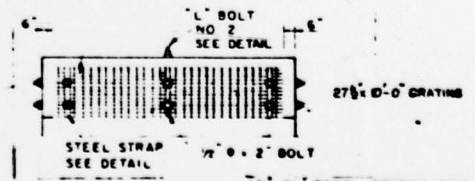
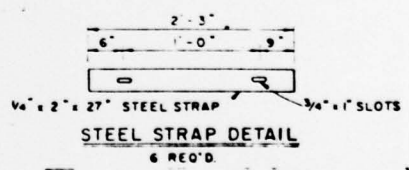
2



LOW STAGE TRASH RACK DETAILS



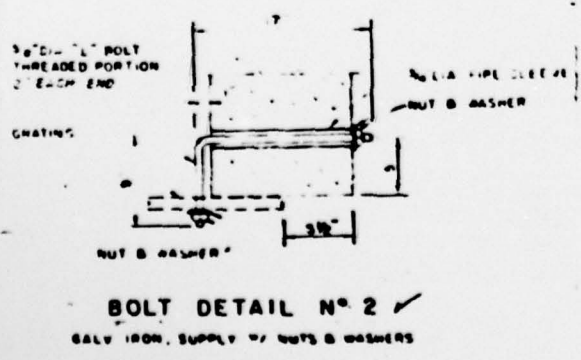
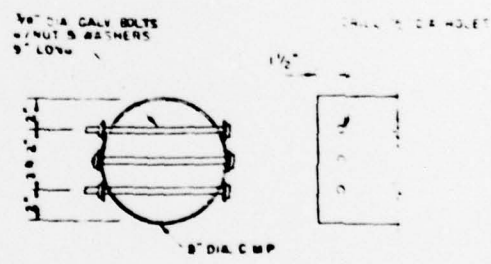
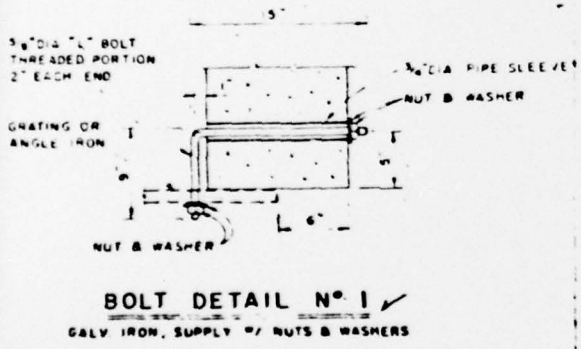
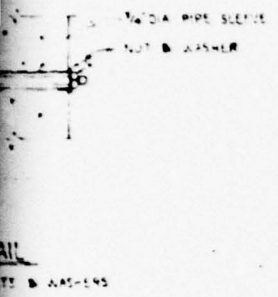
NOTE:
ENTIRE HIGH STAGE TRASH RACK TO BE GALVANIZED IN ACCORDANCE WITH SPEC 119



HIGH STAGE TRASH RACK DETAILS

BILL OF MATERIAL

LOCATION	ITEM	SIZE	LENGTH	QUANTITY
LOW STAGE TRASH RACK	ANGLE IRON	2 1/2" x 2 1/2" x 1/8"	6'-0"	4
	ANGLE IRON	2 1/2" x 2 1/2" x 1/8"	3'-5 1/2"	4
	ANGLE IRON	2 1/2" x 2 1/2" x 1/8"	2'-0"	4
	ANGLE IRON	2 1/2" x 2 1/2" x 1/8"	2'-0"	4
	HOOK BOLT NUTS AND WASHERS	1/2" DIA	2'-0"	4
	PIPE SLEEVE	1/2" DIA	2'-0"	4
HIGH STAGE TRASH RACK	ANGLE IRON	3" x 3" x 3/16"	40'-0"	4
	L BOLT NUTS AND WASHERS	1/2" DIA	40'-5"	20
	L BOLT NUTS AND WASHERS	1/2" DIA	9'-7"	2
	REG HEX BOLT NUTS AND WASHERS	1/2" DIA	0'-2 1/2"	2
	PIPE SLEEVE	1/2" DIA	1'-0"	20
	PIPE SLEEVE	1/2" DIA	0'-8"	2
	STEEL STRAP	2" x 1/4"	2'-8"	4
GRATING	2' x 2'-0"		2	



SMALL ANIMAL GUARD DETAILS

AS BUILT

NANTICOKE CREEK WATERSHED PROJECT
SITE 9-E
FLOODWATER RETARDING DAM
BROOME COUNTY, NEW YORK
TRASH RACKS AND MISC DETAILS

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed by L. C. BRITSON	Date 3/63	Approved by [Signature]
Checked by [Signature]	Date 4/63	Project No. NY-2009-P
Drawn by L. B.	Date 4/63	Scale 1/8" = 1'-0"

2

D. 101, Elev. 1171.0

- 0 1 Topsoil
- 1 8 Gravel, approx. 20% +3" and 40% fines (GM) fairly well graded - brown - moist to wet - slowly permeable - Binghamton drift (glacial till) - very dense. D.S. 101.1
- 1 8 Clay, silty - approx. 10% +200 - brown - moist to wet - very slowly permeable - Binghamton drift (glacial till) - very dense. D.S. 101.1
- 1 12 Silt - approx. 15% +200 - brown - moist to wet - slightly permeable - Binghamton drift (glacial till) - very dense. D.S. 101.1

D. 201, Elev. 1151.0

- 0 2 Topsoil, silt and fine grained Recent alluvium - light brown - moist - slowly permeable - Recent - silt to silty clay.
- 1 8 Gravel, about 10% fines - subangular coarse fraction - brown - wet to sat. - moderately permeable - probably Recent alluvium - dense. D.S. 201.1
- 1 11 Clay, silty - about 40% +200 - grayish brown - wet - very slowly permeable - Binghamton drift (glacial till) - very dense. D.S. 201.1

D. 301, Elev. 1131.2

- 0 1 Topsoil
- 1 4 Gravel, well graded down to about 15% fines (GM) coarse fraction somewhat tabular and subangular - brown - wet to sat. at 3.5' - moderately permeable - probably Recent alluvium - mod. loose (see page at 3.5').
- 4 9 Gravel, approximately 20% +3" and 40% fines (GM) fairly well graded - gray - moist to wet - slowly permeable - Binghamton drift (glacial till) - very dense.

D. 401, Elev. 1110.0

- 0 2 Recent alluvium, stream gravel and fine sand.
- 2 4 Gravel, approximately 20% +3" and 40% fines (GM) fairly well graded - gray - moist to wet - slowly permeable - Binghamton drift (glacial till) - very dense.

NOTE: Grades into brownish glacial till at 3.5' -

D. 501, Elev. 1173.3

- 0 1.5 Topsoil
- 1.5 7 Gravel, approximately 20% +3" and 40% fines (GM) fairly well graded - brown - moist to wet - slowly permeable - Binghamton drift (glacial till) - very dense.

D. 101, Burrow, Elev. 1203.4

- 0 1 Topsoil
- 1 11 Gravel, approximately 20% +3" and 40% fines (GM) a few 6"-10" blocky cobbles - fairly well graded - brown - moist to wet - slowly permeable - Binghamton drift (glacial till) - very dense.

D. 102, Burrow, Elev. 1191.4

- 0 1.5 Topsoil
- 1.5 12 Gravel, approximately 20% +3" and 40% fines (GM) fairly well graded - brown - moist to wet - slowly permeable - Binghamton drift (glacial till) - very dense.

D. 103, Burrow, Elev. 1174.2

- 0 1.5 Topsoil
- 1.5 12 Gravel, approximately 20% +3" and 40% fines (GM) fairly well graded - brown - moist to wet - slowly permeable - Binghamton drift (glacial till) - very dense.

D. 201, Layer, Spill, Elev. 1171.4

- 0 1 Topsoil
- 1 12 Gravel, approximately 20% +3" and 40% fines (GM) fairly well graded - brown - moist to wet - slowly permeable - Binghamton drift (glacial till) - very dense.

D. 202, Layer, Spill, Elev. 1173.0

- 0 1 Topsoil
- 1 8 Gravel, approximately 20% +3" and 40% fines (GM) fairly well graded - brown - moist to wet - slowly permeable - Binghamton drift (glacial till) - very dense. D.S. 202.1

D. 101, Elev. 1171.0

- 0 1 Topsoil
- 1 12 Gravel, approximately 20% +3" and 40% fines (GM) fairly well graded - brown - moist to wet - slowly permeable - Binghamton drift (glacial till) - very dense.

D. 201, Elev. 1151.0

- 0 1 Topsoil
- 1 12 Gravel, approximately 20% +3" and 40% fines (GM) fairly well graded - brown - moist to wet - slowly permeable - Binghamton drift (glacial till) - very dense.

D. 301, Elev. 1131.2

- 0 1 Topsoil
- 1 8 Gravel, approximately 20% +3" and 40% fines (GM) fairly well graded - brown - moist to wet - slowly permeable - Binghamton drift (glacial till) - very dense. D.S. 301.1

D. 401, Elev. 1110.0

- 0 1 Topsoil
- 1 8 Gravel, approximately 20% +3" and 40% fines (GM) fairly well graded - brown - moist to wet - slowly permeable - Binghamton drift (glacial till) - very dense.

D. 501, Elev. 1173.3

- 0 1 Topsoil
- 1 11 Gravel, well graded, with approximately (GM) 20% +3" and occasional 6" cobbles - about GM 40% fines - brown - moist to wet - slowly permeable - Binghamton drift (glacial till) - very dense (a somewhat pure silty sand zone was encountered at the 7' level - probably not extensive). D.S. 501.1

D. 101, Probe, Spill, Elev. 1203.4

- 0 1 Topsoil
- 1 5.5 Gravel, well graded down to about 15% fines - coarse fraction somewhat tabular and subangular - brown - wet to sat. at 3.5' - moderately permeable - probably Recent alluvium - mod. loose (see page at 3.5').
- 5.5 9.0 Gravel - well graded down to 20% fines - (GM) brown - dense (increasing density with depth) - mod. perm. - saturated (stony till).
- 9 12 Gravel, approximately 20% +3" and 40% fines (GM) fairly well graded - grayish brown - moist to wet - slowly permeable - Binghamton drift (glacial till) - very dense. D.S. 101.1

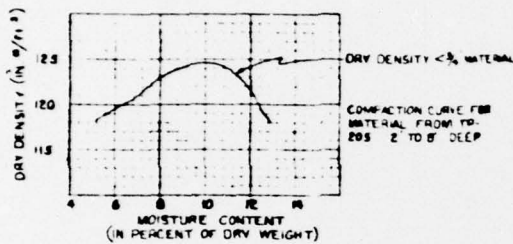
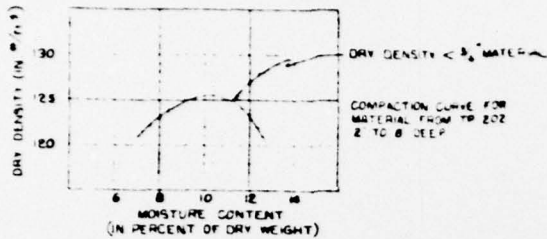
D. 201, Probe, Spill, Elev. 1191.4

- 0 1 Topsoil
- 1 5 Gravel, well graded down to about 15% fines - coarse fraction somewhat tabular and subangular - brown - wet to sat. at 3.5' - moderately permeable - probably Recent alluvium - mod. loose (see page at 3.5'). D.S. 201.1
- 5 11 Gravel, approximately 20% +3" and 40% fines (GM) fairly well graded - gray - moist to wet - slowly permeable - Binghamton drift (glacial till) - very dense.

D. 301, Probe, Spill, Elev. 1173.3

- 0 1.5 Topsoil
- 1.5 7 Gravel, approximately 20% +3" and 40% fines (GM) fairly well graded - brown - moist to wet - slowly permeable - Binghamton drift (glacial till) - very dense.

COMPACTION CURVES



TEST HOLE NUMBERING SYSTEM

Centerline of fur	0000
Bottom width	0001
Emergency No. 1	0002
Centerline of ditch or cut-off	0003
Stream channel	0004
Relief wells	0005

UNIFIED SOIL CLASSIFICATION SYSTEM SYMBOLS

GM	Silty gravel; gravel-sand-silt mixtures
ML	Sluts; silty, v. fine sands; sandy or clayey silts
SM	Sand, silty
GW	Gravel, clean, well graded
CL	Clays - liquid limit of 30 or less
GP	Poorly graded gravels

SAMPLE

D₁ - 2 to 8 deep

All U.S.D.C. descriptive soil classifications were determined by visual examination.

- (1 X) UNIFIED CLASSIFICATION MADE BY VISUAL INSPECTION IN FIELD
- XX - UNIFIED CLASSIFICATION BY LABORATORY

AS BUILT

NANTICOKE CREEK WATERSHED SITE-9E	
LOGS OF TEST HOLES	
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	
LOGGED By: <i>W. F. J. E.</i>	Date 12/24
Drawn By: <i>W. F. J. E.</i>	Approved by <i>[Signature]</i>
Checked By: <i>W. F. J. E.</i>	Checked by <i>[Signature]</i>
Scale 1:1	NY-2009-6

2