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Pittsburgh, PA 15235	
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visual observations did not reveal conditions which constitute a hazard to human life or property.

The spillway capacity was evaluated according to the recommended procedure and was found to pass the required spillway design flood of 100 percent of the Probable Maximum Flood (PMF). Therefore, the spillway capacity is rated as adequate.

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



# PHASE I INSPECTION REPORT NATIONAL DAM SAFETY PROGRAM NEWTOWN-HOFFMAN CREEKS WATERSHED PROJECT -FLOODWATER RETARDING DAM SITE 1 N.Y. 547 DEC I.D. NO. 67A-3974 CHEMUNG RIVER BASIN CHEMUNG COUNTY, NEW YORK

TABLE OF CONTENTS

PAGE NO.

ASSES	SMENT	iv
OVERV	IEW PHOTOGRAPH	vi
SECTI	ON 1: PROJECT INFORMATION	1
1.1	GENERAL	1
1.2	DESCRIPTION OF PROJECT	1
1.3	PERTINENT DATA	2
SECTI	ON 2: ENGINEERING DATA	5
2.1	DATA AVAILABLE	5
2.2	GEOLOGY	5
2.3	SUBSURFACE INVESTIGATION	5
2.4	EMBANKMENT AND APPURTENANT STRUCTURES	6
2.5	CONSTRUCTION RECORDS	6
2.6	OPERATING RECORDS	6
2.7	EVALUATION OF DATA	6
SECTI	ON 3: VISUAL INSPECTION	7
3.1	FINDINGS	7
3.2	EVALUATION	7
SECTI	ON 4: OPERATION AND MAINTENANCE PROCEDURES	8
4.1	PROCEDURES	8

i

- - -

j.

# TABLE OF CONTENTS (Continued)

	PAGE NO.
4.2 MAINTENANCE OF THE DAM	8
4.3 WARNING SYSTEM IN EFFECT	8
4.4 EVALUATION	8
SECTION 5: HYDRAULIC/HYDROLOGY	9
5.1 DRAINAGE AREA CHARACTERISTICS	9
5.2 ANALYSIS CRITERIA	9
5.3 SPILLWAY CAPACITY	9
5.4 RESERVOIR CAPACITY	9
5.5 FLOODS OF RECORD	9
5.6 OVERTOPPING POTENTIAL	9
5.7 EVALUATION	9
SECTION 6: STRUCTURAL STABILITY	10
6.1 EVALUATION OF STRUCTURAL STABILITY	10
SECTION 7: ASSESSMENT/RECOMMENDATIONS	11
7.1 ASSESSMENT	11
7.2 RECOMMENDATION	11 、
4 DDCND T V	

# APPENDIX

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A. PHOTOGRAPHS

- B. VISUAL INSPECTION CHECKLIST
- C. ENGINEERING DATA CHECKLIST
- D. HYDROLOGY AND HYDRAULIC ANALYSES

• • • •

E. PLATES

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F. GEOLOGY MAP

ii

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TABLE OF CONTENTS (Continued)

- G. STABILITY ANALYSES
- H. REFERENCES

\_ 1

1.

iii

# PHASE I INSPECTION REPORT NATIONAL DAM SAFETY PROGRAM

Name of Dam:	Newtown-Hoffman Creeks Watershed Project - Floodwater Retarding Dam Site 1 N.Y. 547		
State Located:	New York		
County Located:	Chemung		
Stream:	Newtown Creek (a tributary of Chemung River)		
Date of Inspection:	June 24, 1981 and July 15, 1981		

#### ASSESSMENT

Based on the evaluation of the existing conditions, the condition of the Newtown-Hoffman Creeks Watershed Project - Floodwater Retarding Dam Site 1 is considered to be good. The examination of documents and visual observations did not reveal conditions which constitute a hazard to human life or property.

The spillway capacity was evaluated according to the recommended procedure and was found to pass the required spillway design flood of 100 percent of the Probable Maximum Flood (PMF). Therefore, the spillway capacity is rated as adequate.

The following recommendation should be implemented within three months from notification to the owner:

1. An emergency action plan should be developed, including a formal warning system to alert the downstream residents in the event of an emergency.

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Assessment - Newtown-Hoffman Creeks Watershed Project - Floodwater Retarding Dam Site 1



Lawrence D. Andersen, P.E. Vice President D'Appolonia Consulting Engineers, Inc. Pittsburgh, Pennsylvania

Approved by:

layo, LR. DEPDE Col. W. M. Smith, Jr. New York District Engineer

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Date:

1 4 SEP 1981



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OVERVIEW

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vi

PHASE I INSPECTION REPORT NATIONAL DAM SAFETY PROGRAM NEWTOWN-HOFFMAN CREEKS WATERSHED PROJECT -FLOODWATER RETARDING DAM SITE 1 N.Y. 547 DEC I.D. NO. 67A-3974 CHEMUNG RIVER BASIN CHEMUNG COUNTY, NEW YORK

## SECTION 1: PROJECT INFORMATION

# 1.1 GENERAL

#### a. Authority

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

# b. Purpose of Inspection

The inspection was to evaluate the existing conditions of the subject dam to identify deficiencies and hazardous conditions, determine if they constitute hazards to life and property, and recommend remedial measures where necessary.

# 1.2 DESCRIPTION OF PROJECT

#### a. Dam and Appurtenances

Newtown-Hoffman Creeks Watershed Project - Floodwater Retarding Dam Site 1 consists of an earth embankment approximately 800 feet long with a maximum height of about 46 feet from the downstream toe. The embankment has a design crest width of 16 feet. The upstream slope of the top 10 feet is 3 horizontal to 1 vertical and is 3.5 horizontal to 1 vertical for the remaining height. A 10-footwide berm is located at normal pool elevation. The downstream slope is 2.5 horizontal to 1 vertical with a 20-foot-wide berm 30 feet below the dam crest.

The spillway facilities for the dam consist of a vegetated earth emergency channel located at the left abutment and a riser-type primary spillway located near the left abutment (looking downstream). The emergency spillway is a trapezoidal channel with a base width of 224 feet. The side slopes of the channel are 3 horizontal to 1 vertical. The control section of the emergency spillway is located in line with the axis of the dam, approximately nine feet below the dam crest level.

The primary spillway structures are comprised of a reinforced concrete intake riser which discharges into a 30-inch-diameter

reinforced concrete pipe, terminating at a plunge pool at the downstream toe. The discharge pipe is equipped with reinforced concrete antiseep collars.

The reservoir drain facilities consist of an 18-inch-diameter reinforced concrete pipe extending from the upstream toe to the primary spillway riser. Flow through the pipe is controlled by a manually operated sluice gate at the primary spillway riser.

#### b. Location

The dam is located on an unnamed tributary of Newtown Creek, which is a tributary of the Chemung River, approximately three-quarters of a mile south of Erin, in Erin Township, Chemung County, New York. Plate 1 illustrates the location of the dam.

#### c. Size Classification

The dam is classified to be of intermediate size based on its 46-foot height and maximum storage capacity of approximately 910 acre-feet.

# d. Hazard Classification

The dam is classified to be in the high hazard category. About one mile downstream, Newtown Creek flows through a rural residential area which is considered to be within the potential floodplain of Newtown Creek.

It is estimated that failure of the dam under maximum pool level would cause loss of more than a few lives and significant property damage in this area.

## e. Ownership

The dam is owned and operated by Chemung County: Mr. Stanley Benjamin, County Executive, J. H. Hazlett Building, 205 Lake Street, Elmira, New York 14901, (607) 739-3009.

#### f. Purpose of Dam

The dam is a floodwater retarding structure.

# g. Design and Construction History

The dam was designed by the U.S. Department of Agriculture, Soil Conservation Service (SCS) in 1970. Construction of the dam was completed in January 1976.

#### h. Normal Operating Procedure

The reservoir is normally maintained at the crest level of the primary spillway riser at Elevation 1300.7. The emergency spillway crest is at Elevation 1321.2.

# 1.3 PERTINENT DATA

Elevations referred to in this section and subsequent sections of the report were obtained from design and as-built drawings.

a. Drainage Area (sq. mi.)	3.5
b. Discharge at Dam (cfs)	
Principal spillway at top of dam	145
Auxiliary spillway at top of dam	20400
Reservoir drain at top of dam	40+
Total spillway capacity at top of dam	20545
cElevation (USGS Datum) (feet)	
Top of dam	1330.5
Auxiliary spillway crest	1321.2
Principal spillway crest	1300.7
Reservoir drain, invert	1289.0
d. Reservoir (acres)	
Surface area at top of dam	56.0
Surface area at crest of auxiliary spillway	38,0
Surface area at crest of principal spillway	6.5
e. Storage Capacity (acre-feet)	
Top of dam	910
Auxiliary spillway crest	610
Principal spillway crest	103
f. Dam	
Туре	Earth embankment
Length	800 feet
Height	46 feet
Top width	16 feet
Side slopes	Downstream: 2.5H:1V
	Upstream: 3H:1V and 3.5H:1V
Zoning	No
Impervious core	No
Cutoff	Yes
Grout curtain	No
g. Primary Spillway	
Type	Drop Inlet
Length	15 feet (weir length)
Crest elevation	1300.7
h. Emergency Spillway	
Туре	Trapezoidal earth
	channe l
Length	224 feet
Crest elevation	1321.2

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# i. Regulating Outlet Type

Length Access

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Regulating facilities

18-inch reinforced concrete pipe
40 feet
Accessible through riser
Sluice gate

#### SECTION 2: ENGINEERING DATA

# 2.1 DATA AVAILABLE

Available information was obtained from New York State Department of Environmental Conservation, Dam Safety Division files, and from the files of the SCS in Syracuse, New York. Available information includes design, as-built drawings, and engineering reports.

#### 2.2 GEOLOGY

The Newtown-Hoffman Creeks Watershed Project - Floodwater Retarding Dam Site 1 is located in the glaciated Allegheny Plateau section of the Appalachian Plateau Province. This section is characterized as a maturely dissected plateau with the features modified by continental glaciation. The modification consists of rounding off of high areas and deposition of glacial till in the valleys.

The dam site is near the axis of a northeast trending syncline (trending approximately north 70 degrees east). The folding is gentle with the maximum dip of the limbs one to two degrees. The dip of the strata are affected locally by the folding; however, regionally, the rock strata dip south to southwest at approximately 50 to 100 feet per mile. The most prominent fracture orientations in the region have a strike of north 30 degrees west with a vertical dip. A secondary fracture trace strikes north 80 degrees east.

The rock strata in the area consist of unconsolidated Pleistocene glacial till (Wisconsin Drift) underlain by strata of the Lower West Falls Group (Upper Devonian Age). The glacial till consists of a mixture of clay and silt with varying quantities of gravel. The glacial till is relatively thin on hilltops and slopes and thicker in the valleys, greater than 45 feet thick. The bedrock consists of a thick sequence of interbedded dark gray to black shale and siltstone which may be up to 2,000 feet thick.

The abutment slopes are relatively gentle and not susceptible to landslide slope movement, except near the base of the slope where minor sloughing of the glacial till may occur.

### 2.3 SUBSURFACE INVESTIGATION

A subsurface investigation was conducted by the SCS in 1970. This program consisted of 12 borings and 25 test pits. Boring and test pit logs are available in SCS files.

The subsurface conditions were described as a thick (36-foot to 45-foot) silty gravel till, overlain by lacustrine silt on the left abutment and floodplain. A thin deposit of alluvial gravel was above the silt and gravel till. Bedrock was not encountered during the investigation.

### 2.4 EMBANKMENT AND APPURTENANT STRUCTURES

Plates 2 and 3 show the plan and the typical cross section of the dam. As shown in Plate 3, the dam consists of a homogeneous embankment incorporating a centrally located cutoff trench and an internal drainage system consisting of a trench drain beneath the downstream slope. Plate 4 shows the layout and the details of the trench drain. Most of the embankment is reported to consist of silty gravelly glacial till. A portion of the upstream slope and a section near the downstream toe of the slope consist of oversize rock fill.

Plate 5 shows the plan and the typical cross section of the primary spillway and reservoir drain facilities. Plates 6, 7, and 8 include selected subsurface investigation boring logs.

The spillway facilities were designed based on hydrologic and hydraulic analyses conducted by the SCS. The design calculations are available in SCS files.

# 2.5 CONSTRUCTION RECORDS

The dam was constructed under the supervision of the SCS. Complete construction records are available in SCS files. No major post-construction changes were instituted.

#### 2.6 OPERATING RECORDS

Because the dam is an ungaged flood-retarding structure, no operating records are maintained for the dam. During severe weather conditions, the dam is monitored by the SCS and Chemung County personnel.

#### 2.7 EVALUATION OF DATA

The information obtained from the state and SCS files is considered to be adequate for Phase I inspection purposes.

# SECTION 3: VISUAL INSPECTION

# 3.1 FINDINGS

#### . General

Visual inspections of the dam were conducted on June 24 and July 15, 1981. On both dates, the pool level was approximately at the primary spillway riser crest.

#### b. Embankment

No signs of distress, seepage, or misalignment were observed. While the crest of the dam is covered with grass, the upstream and downstream faces are covered with crown-vetch. There are two internal drainage pipes, both of which were dry. The top of the dam was surveyed relative to the emergency spillway crest elevation and was found to be in conformance with as-built elevations.

#### c. Primary Spillway

The primary spillway facilities consist of a concrete drop inlet structure discharging into a 30-inch reinforced concrete pipe terminating at a plunge pool at the downstream toe. Components of the primary spillway were in satisfactory condition.

#### d. Emergency Spillway

The emergency spillway is a trapezoidal vegetated earth channel located on the left abutment. The channel is in good condition. The grass cover is well established and adequately maintained. The approach and discharge channel were free of brush and trees or debris which could pose a potential for blockage of the spillway.

#### e. Reservoir Drain

The reservoir drain facilities consist of an 18-inch-diameter reinforced concrete pipe, extending from the upstream toe to the primary spillway riser. Flow through the pipe is controlled by a manually operated sluice gate. The gate system is reported to be operational, although operation was not observed.

#### f. Downstream Channel

The downstream channel below the primary spillway plunge pool is the natural stream bed. The channel appears to be stable in the near vicinity of the dam.

#### g. Reservoir

There are no visible signs of instability or sedimentation problems within the reservoir area.

#### 3.2 EVALUATION

The dam was found to be in good condition. At this time, no conditions were observed that would require remedial action.

# SECTION 4: OPERATION AND MAINTENANCE PROCEDURES

# 4.1 PROCEDURES

The reservoir is normally maintained at the crest level of the primary spillway. The dam is a flood-retarding structure and has no formal operating procedure.

# 4.2 MAINTENANCE OF THE DAM

The dam is maintained by Chemung County Soil and Water Conservation District and the maintenance condition of the dam is considered to be satisfactory.

# 4.3 WARNING SYSTEM IN EFFECT

No formal warning system exists for the dam.

# 4.4 EVALUATION

The maintenance condition of the dam is considered to be good. Development of an emergency action plan is considered to be advisable. It is reported by the SCS, Broome County office, that such a plan is currently being prepared.

#### SECTION 5: HYDRAULIC/HYDROLOGY

# 5.1 DRAINAGE AREA CHARACTERISTICS

Newtown-Hoffman Creeks Watershed Project - Floodwater Retarding Dam Site 1 has a drainage area of 3.5 square miles. The watershed is comprised of woodlands and farmlands. Relief ranges from moderate to steep.

#### 5.2 ANALYSIS CRITERIA

The PMF inflow hydrograph for the reservoir was determined using the Dam Safety Version of the HEC-1 computer program developed by the Hydrologic Engineering Center of the U.S. Army Corps of Engineers. The data used for the computer input are presented in Appendix D.

#### 5.3 SPILLWAY CAPACITY

The spillway facilities for the dam consist of a primary and emergency spillway. The emergency spillway is a trapezoidal earth channel located on the left abutment. The base width of the channel is 224 feet. Based on the available head relative to the dam crest, the combined capacity of the primary and emergency spillways is calculated to be 20,545 cfs.

#### 5.4 RESERVOIR CAPACITY

The dam impounds a reservoir with a storage capacity of 103 acre-feet at the primary spillway crest level (Elevation 1300.7), 468 acre-feet at the emergency spillway crest level (Elevation 1321.2), and 610 acrefeet at the top of the dam (Elevation 1330.5).

#### 5.5 FLOODS OF RECORD

No data available.

# 5.6 OVERTOPPING POTENTIAL

The PMF inflow hydrograph was determined according to the recommended criterion and was found to have a peak flow of 8960 cfs. The hydrograph was routed through the dam using the capacity rating data included in the design files and the dam was found to pass full PMF with the reservoir at Elevation 1327.0, leaving 3.5 feet of freeboard to the design dam crest level.

#### 5.7 EVALUATION

The spillway can pass the recommended spillway design flood of full PMF without overtopping the embankment; therefore, the spillway capacity is classified to be adequate according to the recommended criteria.

# SECTION 6: STRUCTURAL STABILITY

### 6.1 EVALUATION OF STRUCTURAL STABILITY

# a. Visual Observations

As discussed in Section 3, the field observations did not reveal any signs of distress that would significantly affect the stability of the dam at this time. However, it should be understood that because the dam is a flood control facility and was at normal low pool level at the time of inspection, it was not under maximum loading conditions which would occur only during the passage of major floods.

#### b. Design and Construction Data

The dam was designed based on geological and geotechnical studies, which included subsurface investigations, laboratory materials testing and engineering analyses. A SCS memorandum, dated February 4, 1971 and included in Appendix G, summarized the findings and results of the design investigation.

The stability analyses were performed using the Swedish Circle and sliding block methods. The total stress strength parameters used were: internal friction angle, 15 degrees; cohesion, 425 pounds per square foot; saturated and submerged unit weights, 137.5 and 75.0 pounds per cubic foot, respectively.

Factors of safety were reported to be 1.39 for the upstream slope under rapid drawdown conditions, and 1.52 for the downstream slope, under steady state seepage. Available information was reviewed and found to be adequate.

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

c. Postconstruction Changes None reported.

# d. Seismic Stability

The dam is located in Seismic Zone 1. Based on the recommended criteria for evaluation of seismic stability of dams, the structure is presumed to present no hazard from earthquakes.

# SECTION 7: ASSESSMENT/RECOMMENDATIONS

# 7.1 ASSESSMENT

# a. Safety

Visual observations indicate that Newtown-Hoffman Creeks Watershed Project - Floodwater Retarding Dam Site 1 is in good condition. No conditions were observed that would significantly affect the overall performance of the structure at this time. However, as previously noted, the dam was not inspected under its maximum loading condition which would occur when the reservoir is filled during major storms.

The spillway capacity was evaluated according to the recommended procedure and was found to pass the required spillway design flood of full PMF without overflowing the embankment; therefore, the spillway capacity is classified to be adequate.

#### b. Adequacy of Information

Available information, in conjunction with visual observations, is considered to be sufficient to make a Phase I evaluation.

#### c. Need for Additional Investigations

No addepoint investigation is considered to be required at this time.

#### d. Urgency

The ection recommended below should be implemented within three months from notification to the owner.

#### 7.2 RECOMMENDATION

1. An emergency action plan should be developed, including a formal warning system to alert the downstream residents in the event of an emergency.

APPENDIX A

PHOTOGRAPHS



PHOTOGRAPH NO. 1 Downstream Slope (looking west)

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PHOTOGRAPH NO. 2 Dam Crest (background) Emergency Spillway (foreground) (looking east)

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PHOTOGRAPH NO. 3 Primary Spillway Riser



PHOTOGRAPH NO. 4 Primary Spillway Discharge Pipe



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PHOTOGRAPH NO. 5 Rural Residential Area (0.6 mile downstream)



PHOTOGRAPH NO. 6 Rural Residential Area (1.0 mile downstream)

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# APPENDIX B

# VISUAL INSPECTION CHECKLIST

# APPENDIX B VISUAL INSPECTION CHECKLIST

- 1) Basic Data
  - a. General

Newtown-Hoffman Creeks Watershed Project - Name of Dam Floodwater Retarding Dam Site 1
Fed. I.D. # N.Y. 547 DEC Dam No. 67A-3974
River Basin Chemung River Basin
Location: Three-quarter mile south of Erin, Chemung County
Stream Name Tributary of Newtown Creek
Tributary of <u>Chemung River</u>
Latitude (N)42° 10.4'Longitude (W)76° 40.0'
Type of DamEarth
Hazard Category <u>High</u>
Date(s) of InspectionJune 24, 1981 and July 15, 1981
Weather Conditions <u>Sunny, Temp. 60 degrees</u>
Reservoir Level at Time of Inspection <u>El. 1301.0 +</u>

- b. Inspection Personnel Lawrence Andersen, P.E.; James Poellot, P.E.; Bilgin Erel, P.E.; and Michael Bort
- c. Persons Contacted (Including Address & Phone No.) <u>Mr. Stanley Benjamin, Chemung County Executive, J. H. Hazlett</u> <u>Building, 205 Lake Street, Elmira, New York 14901,</u> (607) 739-3009

PAGE B1 OF 9

d. History:

		Date	Constructed Jan. 1976 Date(s) Reconstructed N/A
		Desi	gner USDA Soil Conservation Service
		Conor	trusted by Carl Simone Inc
		cons	
		Ownet	r Chemung County, New York
2)	Emb	ankme	nt
	a.	Char	acteristics
		(1)	Embankment MaterialEarth
		(2)	Cutoff Type Trapezoidal cutoff trench, bottom width varies
			from 12 feet to 20 feet, to varied depths.
		(3)	Impervious Core None
		(4)	Internal Drainage System Trench drain equipped with two
			8-inch-diameter perforated drainage pipes.
		(5)	Miscellaneous
	6	Cres	
		(1)	Vertical Alignment Cood (0, 1, to 0, 7, foot above degice
		(1)	Vertical Alignment Good (0.1 to 0.7 foot above design
			elevation)
		(2)	Horizontal Alignment <u>Good</u>
		(3)	Surface CracksNone
		(4)	Miscellaneous
	c.	Upst	ream Slope
			Top of dam to El. 1321.2. 3H:1V;
	•	(1)	Slope (Estimate)E1. 1321.2 to toe, 3.5H:1V (as designed)
		(2)	Undesirable Growth or Debris, Animal Burrows None
		(3)	Sloughing, Subsidence or Depressions <u>None</u>

PAGE B2 OF 9

	(5) Surface Cracks or Movement at Toe <u>None</u>
d.	Downstream Slope
	(1) Slope (Estimate) 2.5H:lV (as designed and measured)
	(2) Undesirable Growth or Debris, Animal Burrows <u>None</u>
	(3) Sloughing, Subsidence or Depressions <u>None</u>
	(4) Surface Cracks or Movement at Toe <u>None</u>
	(5) Seepage <u>None</u>
	(6) External Drainage System (Ditches, Trenches, Blanket) None
	(7) Condition Around Outlet Structure <u>Good</u>
	(8) Seepage Beyond Toe <u>None</u>
e.	Abutments - Embankment Contact

PAGE B3 OF 9

	(1) Erosion at Contact <u>None</u>
	(2) Seepage Along Contact <u>None</u>
	······································
3)	Drainage System
	a. Description of System <u>A trench drain under the downstrea</u>
	toe of the dam equipped with two 8-inch-diameter perforat
	pipes, one for each side of the dam.
	b. Condition of System <u>Only the downstream end of the pipe</u>
	were visible.
	c. Discharge from Drainage System <u>None</u>
4)	Instrumentation (Monumentation/Surveys, Observation Wells, We Piezometers, etc.)
4)	Instrumentation (Monumentation/Surveys, Observation Wells, We Piezometers, etc.)
4)	Instrumentation (Monumentation/Surveys, Observation Wells, We Piezometers, etc.)
4)	Instrumentation (Monumentation/Surveys, Observation Wells, We Piezometers, etc.)
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4)	Instrumentation (Monumentation/Surveys, Observation Wells, We Piezometers, etc.)
4)	Instrumentation (Monumentation/Surveys, Observation Wells, We Piezometers, etc.) None
4)	Instrumentation (Monumentation/Surveys, Observation Wells, We Piezometers, etc.)
4)	Instrumentation (Monumentation/Surveys, Observation Wells, We

5) Reservoir

а.	Slopes	Moderate s	slopes,	no	problems	observed.

- b. Sedimentation <u>No problems observed.</u>
- c. Unusual Conditions Which Affect Dam None observed.
- 6) Area Downstream of Dam
  - a. Downstream Hazard (No. of Homes, Highways, etc.) <u>Rural</u> residential area (10-15 homes) approximately one mile downstream of the dam.

b. Seepage, Unusual Growth None

c. Evidence of Movement Beyond Toe of Dam \_\_\_\_\_None

d. Condition of Downstream Channel Good

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

a. General Service Spillway: Concrete riser discharging into

a 30-inch-diameter reinforced concrete pipe.

Auxiliary Spillways: 224-foot-wide trapezoidal

vegetated earth channel on left abutment.

b. Condition of Service Spillway Good

PAGE B5 OF 9

с.	Condition of Auxiliary Spillway <u>Good</u>
d.	Condition of Discharge Conveyance Channel <u>Good</u>
Res	ervoir Drain/Outlet
	Type: Pipe X Conduit Other
	Material: Concrete X Metal Other Other
	Size: <u>18-inch-diameter</u> Length <u>40 feet</u>
	Physical Condition (Describe): Not observable.
	Material:
	Structural Integrity:
	Hydraulic Capability:
	Means of Control: Gate X Valve Uncontrolled
	Operation: Operable X InoperableOther
	Present Condition (Describe): The reservoir drain system
	is reported operable.

8)

PAGE B6 OF 9

9) <u>Structural</u>

a.	Concrete Surfaces The concrete riser appears to be in
	good condition.
Ь.	Structural Cracking None observed.
c.	Movement - Horizontal & Vertical Alignment (Settlement)
d.	Junctions with Abutments or Embankments
	Not visible.
e.	Drains - Foundation, Joint, Face
f.	Water Passages, Conduits, Sluices
g.	Seepage or Leakage None observed.
	PAGE B7 OF 9

Joints	- Construction, etc. <u>No problems observed</u> .
Foundat	tionNot visible
Abutmer	ntsN/A
Control	l Gates Reported operable.
Approac	ch & Outlet Channels <u>Good</u>
Energy satis	Dissipators (Plunge Pool, etc.) Plunge pool isfactory condition.
Intake	Structures Good
Stabili	ity N/A

# PAGE B8 OF 9
- 10) Appurtenant Structures (Power House, Lock, Gatehouse, Other)
  - a. Description and Condition \_\_\_\_\_ None\_\_\_\_

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PAGE B9 OF 9

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# APPENDIX C

# ENGINEERING DATA CHECKLIST

### APPENDIX C ENGINEERING DATA CHECKLIST NAME OF DAM: NEWTOWN-HOFFMAN CREEKS WATERSHED PROJECT - FLOODWATER RETARDING DAM SITE 1

## AREA-CAPACITY DATA:

		Elevation (feet)	Surface Area (acres)	Storage Capacity (acre-feet)
1)	Top of Dam	1330.5	56.0	910
2)	Design High Water (Max. Desígn Pool)	1327.0	49.5	610
3)	Auxiliary Spillway Crest	1321.2		468
4)	Service Spillway Crest	1300.7	6.5	103

### DISCHARGES

		Discharge (cfs)
1)	Average Daily	<u> </u>
2)	Auxiliary Spillway at Maximum High Water (Top of Dam)	20400
3)	Auxiliary Spillway at Design High Water (El. 1327.0)	8860
4)	Principal Spillway at Auxiliary Spillway Crest Elevation 1321.2	140
5)	Low Level Outlet	<u> 40 ±</u>
6)	Total of All Facilities at Maximum High Water	20545
7)	Maximum Known Flood	Unknown
8)	At Time of Inspection	15 ±

PAGE C1 OF 4

DAM:	Nev	town-l	loffm	an Cr	eeks W	later	shed P	rojec	t - 1	Floodwa	ter	
	Ret	arding	g Dam	Site	1						·	
CREST	ELEVA	TION:	1	330.5	<u> </u>					. <u></u>		
Typ	pe:	Earth										
Wid	ith:	16	feet				Length	:	80	0 feet		
Spille	over:	Conci	rete	riser	and v	eget	ated e	arth	chan	nel.		
Locati	ion:	Conci	rete	riser	near	the	left a	butme	ent,	earth c	hannel	
		on le	eft a	butmer	nt							<u> </u>
SPILLV	WAY:											
		SERVIO	CE						A	UXILIAR	Y	
	13	300.7				Elev	ation			1321.2		
C	oncret	e dro	p inl	et		Ту	pe <u>3H</u> :	1V tı	apez	oidal e	arth channe	<u>1</u>
1	15-fo	ot wein	r			Wid	th		224	feet		
					Туре	of	Contro	1				
	Uncor	trolle	ed		Unc	ontr	olled		<u> </u>	ncontro	lled	
					Co	ontro	lled					
	N	<u>^A</u>				Тур	e			N/A_		_
					(Flash	boar	ds; Ga	te)				
	<u>N</u>	<u>A</u>				Numb	er			N/A		
	_N,	<u>A</u>			Si	ze/L	ength		4	00 <u>+</u> fee	t	_
					Inve	ert M	lateria	1		N/A		_
				0	Antici f Oper	.pate atin	ed Leng ng Serv	th ice		Unkno	own	
	<u>273+</u>	feet			Chu	ite I	ength			N/A		
	<u>13+</u>	feet		Heigh	t Betw	reen	Spiliw	ay Ci	rest	<u>7+</u> f	eet	
				and	Approa (We	ich ( eir E	Thannel 10w)	Inve	ert			

PAGE C2 OF 4

Hydrometerological Gages:

Type: <u>No</u>	ne
Location: <u>N/</u>	A
Records:	
Date - <u>N</u>	/A
Max. Rea	ding - <u>N/A</u>
FLOODWATER CONT	ROL SYSTEM:
Warning Syst	em: None
Method of Co	ntrolled Releases (Mechanisms):
	None

## PAGE C3 OF 4

DRAINAGE AREA: 3.5 square miles

DRAINAGE BASIN RUNOFF CHARACTERISTICS:

Land Use - Type: Forest and farmland

Terrain - Relief: Moderate to steep slopes

Surface - Soil: Low permeability

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

Moderate to high runoff potential (SCS Hydrological

Curve Number (CN) 75 was used in the original design

calculations).

Potential Sedimentation Problem Areas (natural or man-made; present or future)

None observed.

Potential Backwater Problem Areas for Levels at Maximum Storage Capacity Including Surcharge Storage:

None observed.

Dikes - Floodwalls (overflow and nonoverflow) - Low Reaches Along the Reservoir Perimeter:

Location: None

Elevation:

Reservoir;

Length at Maximum Pool: 2,650<sup>±</sup> feet; at normal pool,

950<u>+</u> feet

Length of Shoreline at Normal Pool: 2,400<sup>+</sup> feet

PAGE C4 OF 4

## APPENDIX D

## HYDROLOGY AND HYDRAULIC ANALYSES

### HYDROLOGY AND HYDRAULIC ANALYSIS DATA BASE

NAME OF DAM: <u>Newtown-Hoffman Creeks Wa</u>tershed Project-Floodwater Retarding Dam Site 1 (NY DEC 67A-3984)

PROBABLE MAXIMUM PRECIPITATION (PMP) = \_\_\_\_\_ INCHES/24 HOURS(1)

STATION	1	2	3	4	5
Station Description	Site l Drainage Area	Site 1 Dam			
Drsinage Area (square miles)	3.5	-			
Cumulative Drainage Area (square miles)	3.5	3.5			
Adjustment of PMP for Drainage Ares (%)					
6 Hours	111	~			
12 Hours	123	~			
24 Hours	132				
48 Hours	142	-		}	
72 Rours		-			
Snyder Hydrograph Parameters					
$c_p/c_e^{(2)}$	0.72/1.7				
L (miles)(3)	1,99	-			
L <sub>ca</sub> (miles)(3)	0.85				
$t_p = C_{E}(L \cdot L_{CE})^{Q \cdot 3} \text{ (hours)}$	2.0				
Spillway Data	ļ				
Grest Length (ft)	- 1	See spillway			
Freeboard (ft)	-	capacity			
Discharge Goefficient	- 1	calculations			
Exponent	-				

(1) <u>Hydrometeorological Report 33</u> (Figure 1), U.S. Army, Corps of Engineers, 1956.
 (2) Snyder's Coefficients (see attached calculations).

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(3) L = Length of longest water course from outlet to besin divide. Lea = Length of water course from outlet to point opposite the centroid of drainage area.

PAGE DI OF 8

COMPUTER INPUT OVERTOPPING ANALYSIS PAGE D2 OF 8

NOTE: Emergency spillway rating curve per design calculations.

SNYDLK UNIT HYDROGRAPH, SPILLVAY AND DAM OVERTOPPING ANALYSES Neutoun-Moffman Site-1 Jam,Eny 67a-3984JCHEMUng CD,NY,PRUJ NU, B<sup>n</sup>-779-10 For 2ux,3dx,4dx,5dx,6dx,7dx,8dx,9cx,9md 10úx probable maximum flocdfpmf) 0 SNYDER INFLOU HYDROGRAPH TO NEUTOUN-HOFF. S-1 DAM.CNY 67A-39843 3.46 1 2740.0 0.0029 1324.0 1.00 1445.0 1 1323.2 ROUTING FLOW THROUGH NEWTOUN-HOFFMAN SITE-1 DAM. (N.Y. 67A-3984) 532.0 0.90 Q 0.05 1322.2 1 -1300.7 -1321.2 1321.2 1331.2 123.0 251.0 22858.0 2091.0 0.60 1.0 a ٠ 0.10 0 142 1320.0 1328.2 128.0 128.0 0.00 o 132 1316.0 1328.0 121.0 11747.0 56.0 0 0.50 123 900.0 1330.5 114.0 9434.0 45.0 0+•0 1312.0 111 2.0 1.5 : 1324.6 1308.0 1326.2 100.0 **68**79.0 38.0 0.30 0.72 a 21.1 2.65 9 CALC. OF 1321.2 JULY 1978 FLOOU MYUNUGNAPH PACKAGE (HLC-1) \* LAST MOULFICATION 11 APR 80 se1300.7 ss1300.7 s01330.5 300 0.20 2.04 a -0.0 ¥41325.2 ¥54683.0 **6.5** 66 ¥41300.7 \$ 2 5 R A N 5 ¥ Ţ, 60 7 DAM SAFETY VERSIUN 

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PEAN FLOW ANU STURAGE (END OF PERIOD) SUMMARY FUR MULIIPLE PLAN-RATIO ECONOMIC COMPUTATIONS Flows in cubic feet per secunu (cubic meters per second) area in square miles (square kilometers)

.:

I

DPERATION		NOI	AREA	PLAN	84110 1 .20	RATIO 2 .30	HATIOS AFI Ratio 5 .40	PLIED TU FI Ratiu 4 .50	-045 	RA11U 6 •76	RATIC 7 . Bu	8 ATTO 6 .90	КАТТ <sup>С</sup> 9 1.00
HYDR UGR AP H	AT	-~	3.40 8.90)	- ~	1791. 50.7310	2667. 16.J916	3583. 101-4616	4479. 126.8211	5374. 152.1916	6270. 177-551	7166.	8062. 228.2836	8957. 253.643
ROUTED TO		~ ~	3.46 8.96)	- "	1105. 31.2916	2446. 69.27)(	3467. 98.1736	4504	5284. 149.63)(	6177. 174-9124	7777. 260.3910	7975. 225-8236	886U. 25fi.893

FLOOD ROUTING ANALYSIS PAGE D3 OF 8 SUMMARY OF DAM SAFETY ANALYSIS

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	TIME OF Failure Hours	00.0	0.00	0.00	0.00	0.00	0.00			00.0	0.00	
0f 044 30.5J 850. 0400.	TIME OF Max outflow Mours	43.25	42.25	42.00	44.60	41.75	41.75			41.75	41.75	
EST TOP 15 2	DURATION Over top Hours	0•00	0.00	0.00	0.00	0.00	0.100		00	00.0	00 0	
SPILLMAY CH 1300,70 0. 0.	MAX 1MUM QUTFL ON CFS	1105.	2446.	3467.	4360-	5284			1011-	7475.		8890.
VALUE .70 0. 0.	MAX INUM S T ORAGE A C - F T	476.	518.	546.	521.			• 1 10	630.	447.		• • • •
130U 130U	MAXIMUM DEPTH Over dar	00*00	0.00	00.0				0.00	0.00	00 0		07-0
ELEVATION Storage Outflou	MAXIMUM Reservoir W.S.Ecev	1 522 . 43		2200221	100 3C2 4		196364	1525.88	1126.24		CD+07C1	1 526.98
	RA120 0f PMF	04.				DC.	.09	.70			06*	1.00
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OVERTOPPING ANALYSIS SUMMARY PAGE D4 OF 8

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By UTC D	ate <u>2/17/8</u>	L Subject _	ENTOWN-HOFF	MANCREEL	173 <u>1</u> She	eet No o
Chkd. By <u>SRF</u> D	ate <u> عن جمنع</u> ate	Spillura	, RATING	<u> </u>	Pro	ы. No. <u>- Э</u> э
-						
Spillw	AY CAP	ACITY PA	TING	<b>D</b>		
REF	ERENCE	: decigi	N OF SM.	ALL DAM,	2" EDITIC	IN. P353
Assuur	TION (1)	SNECIFIC	ENEDEV	$H_{-} = d +$	<u>V</u> <sup>2</sup>	
122011	(2)	CRITICAL	FLOW a	T CONTRO	L SECTION	<b>y</b> .
		d =	dc ; V :	= Vc an	$H_{E} = L$	AKELEVEL
		NO OTHE	R MINOR	LOSSE AD	E CONSIDE	
ERAL PSS	(3)	DIS ELO	PE 15 573	EFER THA	AN CRITICA	1 = <i>3p=</i> .
				<u>↓</u> 2g V		NTROL SECTION
$V_c = 0$	b+2dc b+2zd	deg -	EQ-1	He de Spill	WAY CLEST	
N		6 - 1	$\langle \rangle$	TTTTT	777577	
$H_{E} =$	$d_c + \frac{V_c}{3c} = c$	$d_c + \frac{b+zd}{b+zd}$	+ deg =			5250
	29	(6+250		<u> </u>		ENERGY GEA
=	36+520	le de		'\ Z=3		- ATT
•	26+42	de			<b>b</b> = 22	
				11 - > + + >	SECTIO	AL A-A
d_ =	-(36-4H	EZ)+ N(36-	-4#EZ)2+(4	4EZ)(106)	$- = \pm Q$	N A-A -2
de =	-(3b-4H) Zd-th)	EZ)+ N(36-	-4#EZ) <sup>2</sup> +(4 0 Z	HEZ)(106)	- = EQ	N A-A -2
$d_{c} = -$ $A_{c} = (a_{c})$ $Q_{c} = A_{c}$	-(36-44 Zd2+6) c Ac Vc	$EZ + \sqrt{3b}$	-44EZ) <sup>2</sup> +(4 DZ Q3 Q4	HEZ)(196)	- SECTIO EQ.	N A-A -2
$d_{c} = -$ $A_{c} = ($ $Q_{c} = A$ $Lake$	-(36-44 Zda+6) a Aa Va He	$EZ + \sqrt{3b}$ $I_{c} - E$ $-E$ $d_{c}$	$\frac{44EZ}{2} + (4)$	HEZ)(196) Vc	EQ	N A-A -2 EMERGEN
$d_{c} = -$ $A_{c} = (a)$ $Q_{c} = A$ $Lake$ $ELEVATION$	-(36-44) Zda+6) a <u>Aa Va</u> HE	$EZ + \sqrt{36}$ $I_{c} - E$ $-E$ $d_{c}$ $EQ-2$	$\frac{44EZ}{2} + (4)$	HEZ)(196) Vc EQ-1	$\frac{1}{2} = \frac{1}{2} + \frac{1}{2}$	N A-A -2 ENERGENO
$d_{c} = -$ $A_{c} = ($ $Q_{c} = A$ $Lake$ $ELEVATION$ $Feet$	-(36-44) Zda+6) a Aa Va HE FT	$EZ + \sqrt{36}$ $IC$ $IC$ $IC$ $IC$ $IC$ $IC$ $IC$ $IC$	$4H_{E}Z)^{2} + (4$ $QZ$ $QA$ $A_{c}$ $EQ3$ $FT^{2}$	HEZ)(136) Vc EQ-1 FDS	$G_{c} = \frac{G_{c}}{2G_{c}}$	N A-A -2 ENERGENO Spillina
$d_{c} = -$ $A_{c} = ($ $Q_{c} = A$ $Lake$ $ELEVATION$ $FEET$ $1321.2$ $1321.7$	-(36-4H Zdc+6) c Ac Vc HE FT 0	$EZ + \sqrt{3b}$ $IC$ $-E$ $-E$ $C$ $EQ - 2$ $FT$ $O$	$4H_{E}Z)^{2} + (4$ $QZ$ $QA$ $A_{c}$ $EQ3$ $FT^{2}$ $O$ $Tc +$	HEZ)(136) VC EQ.1 FCC 0	$ \begin{array}{c}                                     $	N A-A -2 EMERGENO Spilling b = 22 +
dc = Ac = ( Qc = / LAKE ELEVATION FEET 1321.2 1321.7 1322.2	-(36-4H Zdc+b) c Ac Vc HE FT 0 0 5 1.0	$EZ + \sqrt{36}$ $IC$ $IC$ $IC$ $IC$ $IC$ $IC$ $IC$ $IC$	$ \begin{array}{c} 4 \#_{E} \overline{z} \right)^{2} + (4) \\                                    $	$H_{EZ}(136)$ $V_{C}$ $EQ.1$ $FCC$ $0$ $3.3$ $4.6$	$ \begin{array}{c}                                     $	N A-A -2 ENERGENO Spilling b = 22 + Z = 3
dc = Ac = ( Qc = / LAKE ELEVATION FEET 1321.2 1321.7 1322.2 1323.2	-(36-4H Zdc+b) c Ac Vc HE FT 0 5 1.0 2.0	$EZ$ )+ $\sqrt{(3b-1)}$ $d_{c} - E$ -E $d_{c}$ EQ-2 FT 0 0.3 0.7 1.3	$ \frac{44}{2} = \frac{2}{2} + \frac{4}{4} $ $ \frac{2}{2} = \frac{2}{2} + $	$H_{EZ}(136)$ $V_{C}$ $EQ.1$ $FC$ $O$ $3.3$ $4.6$ $65$	$G_{c} = G_{c}$ $G_{c}$ $= G_{c}$	N A-A -2 ENERGEN Spilling b = 22 + Z = 3
dc = Ac = ( Qc = / LAKE ELEVATION FEET 1321.2 1321.7 1322.2 1323.2 - 1324.2	-(3b-4H) $Zd_{c}+b) c$ $A_{c} V_{c}$ $H_{E}$ $F_{T}$ 0 5 $1 \cdot 0$ $2 \cdot 0$ $3 \cdot 0$	$EZ + \sqrt{(3b-1)} +$	$ \frac{44EZ}{2} + (4)$ $ \frac{2}{2} + (4)$ $\frac{2}{2} + (4)$	$H_{EZ}(136)$ $V_{C}$ $EQ \cdot 1$ $FC$ $0$ $3 \cdot 3$ $4 \cdot 6$ $6 \cdot 5$ $8 \cdot 0$		N A-A -2 EMERGEN Spillina b = 22 + 2 = 2
dc = - Ac = ( Qc = / LAKE ELEVATION FEET 1321.2 1321.7 1322.2 1323.2 - 1324.2 1325.2	-(3b-4H) $Zd_{c}+b) c$ $A_{c} V_{c}$ $H_{E}$ $F_{T}$ 0 5 $1 \cdot 0$ $2 \cdot 0$ $3 \cdot 0$ $4 \cdot 0$	$EZ + \sqrt{(3b-1)} +$	$ \frac{44EE}{2}^{2} + (4) $ $ \frac{2}{2} = \frac{2}{3} $ $ \frac{2}{4} $ $ \frac{4}{4} $ $ \frac{4}{5} $ $ \frac{5}{5} = \frac{2}{5} $ $ \frac{5}{6} = \frac{1}{6} $ $ \frac{4}{6} = \frac{1}{6} $	$H_{EZ}(136)$ $V_{C}$ $EQ-1$ $FC=$ $0$ $3.3$ $4.6$ $6.5$ $8.0$ $1.2$		N A-A -2 EMERGEN Spillina b = 22 + z = 3
dc = Ac = ( Qc = A LAKE ELEVATION FECT 1321.2 1321.7 1322.2 1323.2 1323.2 1324.2 1325.2 1326.2	-(3b-4H) $Zd_{c}+b) c$ $A_{c} V_{c}$ $H_{E}$ $F_{T}$ 0 5 $1 \cdot 0$ $2 \cdot 0$ $3 \cdot 0$ $4 \cdot 0$ $5 \cdot 0$	$EZ + \sqrt{(36-1)} +$	$ \frac{44}{2} = \frac{2}{2} + \frac{4}{4} $ $ \frac{2}{2} = \frac{2}{2} = \frac{2}{2} + \frac{4}{4} $ $ \frac{2}{2} = \frac{2}{2} = \frac{2}{2} + \frac{4}{4} $ $ \frac{2}{2} = \frac{2}{2} + \frac{4}{4} + \frac{4}{4} $ $ \frac{2}{2} = \frac{2}{2} + \frac{4}{4} + \frac{4}{4} $ $ \frac{2}{2} = \frac{2}{2} + \frac{4}{4} + \frac{4}{4} $ $ \frac{2}{2} = \frac{2}{2} + \frac{4}{4} $	$H_{EZ}(136)$ $V_{C}$ $EQ - 1$ $FC=$ $03.3$ $4.6$ $6.5$ $8.0$ $1.2$ $10.2$ $10.2$		N A-A -2 EMERGEN Spillija b = 22 + Z = 2
$d_{c} = -$ $A_{c} = ($ $Q_{c} = A$ $Lake$ $ELEVATION$ $Fert$ $1321.2$ $1321.7$ $1322.2$ $1323.2$ $1323.2$ $1324.2$ $1325.2$ $1326.2$ $1327.2$ $1327.2$	-(3b-4h) $Zd_{c}+b) c$ $A_{c} V_{c}$ $H_{E}$ $F_{T}$ 0 5 $1 \cdot 0$ $2 \cdot 0$ $3 \cdot 0$ $4 \cdot 0$ $5 \cdot 0$ $6 \cdot 0$	$EZ + \sqrt{(36-1)} +$	$ \frac{44}{2} = \frac{2}{2} + \frac{4}{4} $ $ \frac{2}{2} = $		SECTIO     SECTIO $- EQ.$ $     Gc     EQ. 1     c= 1  $	N A-A -2 EMERGENO $\sum pilling$ b = 22 + 2 = 3
$d_{c} = -$ $A_{c} = ($ $Q_{c} = /$ $Lake$ $ELEVATION$ $Fert$ $1321.2$ $1321.7$ $1322.2$ $1323.2$ $1324.2$ $1325.2$ $1326.2$ $1326.2$ $1327.2$ $1328.2$ $1328.2$ $1328.2$	-(3b-4h) $Zd_{c}+b) d$ $A_{c} V_{c}$ HE FT 0 5 $1 \cdot 0$ $2 \cdot 0$ $3 \cdot 0$ $4 \cdot 0$ $5 \cdot 0$ $6 \cdot 0$ $7 \cdot 0$ $6 \cdot 0$ $7 \cdot 0$	$EZ + \sqrt{(36-1)} +$	$ \begin{array}{c}     -4 H_{\rm E} Z )^2 + (4) \\     Q Z \\     Q 3 \\     Q 4 \\                            $	$H_{EZ}(106)$ $V_{C} = \frac{1}{5}$ $\frac{1}{5}$	$   \begin{array}{c}       SECTIO \\       - EQ       -       -       EQ       -       -       -       EQ       -       -       -       EQ       -       -       -       -       EQ       -       -       -       -       -       $	N A-A -2 EMERGENO Spilling $b = 22 \pm 2 \pm $
$d_{c} = -$ $A_{c} = ($ $Q_{c} = /$ $Lake$ $ELEVATION$ $FEET$ $1321.7$ $1322.2$ $1323.2$ $1323.2$ $1324.2$ $1325.2$ $1326.2$ $1327.2$ $1328.2$ $1329.2$ $139.2$ $139.2$ $139.2$ $139.2$ $139.2$	-(3b-4h) $Zd_{c}+b)$ $A_{c}V_{c}$ $H_{E}$ $F_{T}$ 0 5 $1\cdot0$ $2\cdot0$ $3\cdot0$ $4\cdot0$ $5\cdot0$ $6\cdot0$ $7\cdot0$ $8\cdot0$ $9\cdot0$	$EZ + \sqrt{(36-1)} +$	$ \begin{array}{c}     -4 H_{\rm E} z )^2 + (4) \\                                    $	$H_{EZ}(106)$ $V_{C} = \frac{1}{5}$ $V_{C} = \frac{1}{5}$ $\frac{1}{5}$	$ \begin{array}{c}  SECTIO \\  - EQ. \\  - $	N A-A -2 ENERGEN Epillinab = 22 +Z = 2
dc = - Ac = ( Qc = / LAKE ELEVATION FEET 1321.2 1321.7 1322.2 1323.2 1324.2 1325.2 1326.2 1326.2 1327.2 1328.2 1329.2 1329.2 1329.2 1320.2 1320.2 1320.2	-(3b-4H) $Zd_{2}+b) c$ $A \le V_{c}$ H = FT 0 5 $1 \cdot 0$ $2 \cdot 0$ $3 \cdot 0$ $4 \cdot 0$ $5 \cdot 0$ $6 \cdot 0$ $7 \cdot 0$ $8 \cdot 0$ $7 \cdot 0$ $8 \cdot 0$ $1 \cdot 0$ $7 \cdot 0$ $8 \cdot 0$ $1 \cdot 0$ $7 \cdot 0$ $1 \cdot 0$ $2 \cdot 0$ $3 \cdot 0$ $4 \cdot 0$ $5 \cdot 0$ $1 \cdot 0$ $2 \cdot 0$ $1 \cdot 0$ $5 \cdot 0$ $1 \cdot 0$ $1 \cdot 0$ $2 \cdot 0$ $1 \cdot 0$ $2 \cdot 0$ $1 \cdot 0$ $2 \cdot 0$ $2 \cdot 0$ $1 \cdot 0$ 1	$EZ) + \sqrt{(36-1)} $	$ \frac{44}{2} = \frac{2}{3} + \frac{4}{4} $ $ \frac{2}{3} = \frac{2}{3} $ $ \frac{2}{4} + \frac{4}{4} $ $ \frac{4}{4} + \frac{1}{5} $ $ \frac{5}{1} + \frac{1}{5} + \frac{1}{5} $ $ \frac{1}{3} + \frac{5}{5} $ $ \frac{1}{3} + \frac{1}{3} + \frac{1}{5} $ $ \frac{1}{3} + \frac{1}{5} $ $ \frac{1}{3} + \frac{1}{5} $ $ \frac{1}{5} + $	$H_{EZ}(136)$ $V_{C} = \frac{1}{5}$ $V_{C} = \frac{1}{5}$ $\frac{1}{5}$ $\frac{1}$	$ \begin{array}{c}  SECTIO \\ - EQ. \\ - EQ$	N A-A -2 EMERGEN fillija b = 22 + 2 = 2

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# CONSULTING ENGINEERS, INC. D<sup>°</sup>A

By WTC	Date_8-17-8	Subject NEWTOWN - HOFFMAN SITE 1	Sheet No	<u></u>	4
Chkd. By <u>SRP</u>	Date 26 AUG3	I	Proj. No	<u> 30-7</u>	78

LAKE	PRIM	ARY SPI	W.W.Y	EMERGENCI	COMBINED
LEVEL	Q, cfs	Qzcfs	Qs	Quits	SPILLWAY
ELEVATION	EQ-5	EQ.6	c-fs	EQ-4	C+S
1300.7	0	0	0	0	0
1300 8	1.5	83.3	1.5	► 1	2
13010	79	83.8	7,7		8
1:30/2	17.1	84.2	17.1		17
1301.4	28.3	84.7	28.3		28
1301.6	41.2	85.1	412		41
13018	55.7	85.6	55.7		56
1302.0	71.6	86.0	71.6		72
13022	887	86.5	86.5	{ }	87
1302.4	107.7	86.9	86.9		87
1304		90.4	90.4		90
1308		98.5	985		99
1312		106.0	1060	i	106
1316		113.0	1130		113
1320		119.6	119.6	V	120
1321.2		:	121.5	0	122
1321.7		1	122.3	246	362
1322.2		* 1	23.	698	821
1323.2		•	124.6	1992	2117
13742			1262	3612	3212
1325.2		t.	127.7	5734	5862
13262			129.2	2023	8212
1327.2	}	}	130.6	10718	10849
13782			132.1	13623	13755
1329.2			133.6	16786	16920
1330.2		1	135.0	20201	20336
1331-2			1364	23859	23995
13322	[	1	137.8	27752	27896

## PAGE D7 OF 8



APPENDIX E

PLATES











**F** 1



1. A.A. X.



19 1253 HERCULENE, AAB SMITH CO., PGH., PA LTI530-1078

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A default mail and a default plant of the second provide state of the second provid	13	ALL MAR SHE		Topasil
Image: Solution production producti				Sift, gravally s/same
<pre>And A compared and and and a set of a labely factor from the set of a label of a la</pre>		100. 1/1-14/19. 400. 100.4		Appres. 208 gravel, 156 and, 658 alightly players from (12-03, Fint
Image: Section of the section of th				Notical (groy-brown); moist; whight_permashility; hard consistency (D=40); subseil; CL-40,
1       Trend All of the set of the s		Approx. 25 general, 265 mand, 665 alignely plastic fines.		
Market     Market <td></td> <td>etalistagy (Bef); mteell, G-46,</td> <td>52</td> <td>Silt, growelly u/send Approx. 255 growel, 265 anna, 555 alightly plastic finan</td>		etalistagy (Bef); mteell, G-46,	52	Silt, growelly u/send Approx. 255 growel, 265 anna, 555 alightly plastic finan
<ul> <li>a solution is a solution of the solut</li></ul>	بمسر الم		- <b>1</b>	15-19, 77-6. Genyich brock; moist to wot; alight permeability; v. st:
Image: Another and the set of the set	12	Approved 23 percel, 175 mask, 605 alightly plastic flynt,	<b>1</b>	to hard consistency (0-66 to >100); warved less of lacustrino HL (12-15'); till; HL-CL
Image: State of the state		from to gray; mist to out; slight parametility; stiff to have consistenty (Bald to > 100); till; (L-ML	13	•
Image: State of the state o	1		105	
B       0.0       100				
135     136     137       136     199     199       137     199     199       138     199     199       139     199     199       130     199     199       131     199     199       131     199     199       131     199     199       131     199     199       131     199     199       131     199     199       131     199     199       131     199     199       131     199     199       132     199     199       133     199     199       134     199     199       135     199     199       136     199     199       137     199     199       138     199     199       139     199     199       131     199     199       131     199     199       131     199     199       131     199     199       131     199     199       131     199     199       131     199     199       131     199     199 <td>- HE .</td> <td></td> <td>69</td> <td></td>	- HE .		69	
Image: Solution       Solution       Solution       Solution       Solution         Image: Solution	156		- 202	
10       Topola is intervention in the intervention of the interve		₩ 18.5°, S-14-70	- 134	
1       1.1			- 110	
No.         Description         Description <thdescription< th=""> <thdes< td=""><td></td><td>1.5</td><td>- IN 23</td><td>T. (3.0, 9-20-70</td></thdes<></thdescription<>		1.5	- IN 23	T. (3.0, 9-20-70
Det         Det <thdet< th=""> <thdet< th=""> <thde< th=""></thde<></thdet<></thdet<>	مد	Orevel, silty w/end Appres. 305 gravel, 405 sand, 305 mon-plastic fines	2	Topecil
1.77       A.1       A.1         1.87       A.2       A.2         1.88       A.2       A.2         1.89       A.2       A.2         1.80	30	Brown; saturatel; rapie permentity; isose to madium dam (3-10 to 20); alluvica; CM		1.0
11       1.7       11 <t< td=""><td></td><td>4.5</td><td>- '</td><td>Silt v/grevel and mand Approx. 205 grevel, 205 mand, soll slightly plastic fines</td></t<>		4.5	- '	Silt v/grevel and mand Approx. 205 grevel, 205 mand, soll slightly plastic fines
137       0.0       137       138       1	14	7 Sand, silty w/graval, Syprem. 305 graval, 335 sand, 335 non-plastic fines	62	11-23, Fl=6 Nettled (gray-troum); meist; slight permembility; hard
3     10.1     10.1       4     1.12     1.12     1.12       5     1.13     1.14     1.14       5     1.14     1.14     1.14        5     1.14 <td>37 0.0</td> <td>fid); denne to vary denne (B-36 to &gt; 100); till (make</td> <td>i) · (</td> <td>consistency (M=62); subsell; Ci-4L</td>	37 0.0	fid); denne to vary denne (B-36 to > 100); till (make	i) · (	consistency (M=62); subsell; Ci-4L
a       a       bit v/rom green and name       bit v/rom green and table and, 150 algebry places frame         a       by row and table and, 150 algebry places frame       bit v/rom green and table and, 150 algebry places frame         b       convert and table and, 150 algebry places frame       bit v/rom green and table and, 150 algebry places frame         b       convert and table and, 150 algebry places frame       bit v/rom green and table and, 150 algebry places frame         b       convert and table and, 150 algebry places frame       bit v/rom green and table and table and table algebre places frame         b       convert and table and table algebre places frame       bit v/rom green algebre algebre places frame         b       convert algebre algebre places frame       bit v/rom green algebre algebre places frame         convert algebre algebre places frame       convert algebre algebre places frame       convert algebre algebre places frame         convert algebre algebre places frame       convert algebre algebre places frame       convert algebre algebre places frame         convert algebre algebre places frame       convert algebre algebre places frame       convert algebre algebre places frame         convert algebre algebre places frame       convert algebre places frame       convert algebre places frame         convert algebre algebre places frame       convert algebre places frame       convert algebre places frame         convert al		20.5		Silt, gravally w/mand;
<pre>4</pre>	ž	611t w/some gravel and sand Ameron, 15% gravel, 10% sand, 75% slightly plastic fines,	49	- Approx. 255 grovel; 205 eend; 558 slightly pleatic fines Lin19, Fin6
<pre>(int to St); herestime C44. (int to St)</pre>		iLeg7, Fi-6) Gray: mist to wet; alight permeability; hard consistency		Brown, grayiab brown, gray; meist, slight permeability; hard cansistency (2-43 to 65); till; CL-46.
111       0.3       112       1	i i i	(Bogs to \$3); lacustrins; CL-HL	· ·····	I (1.2', 5-10-70
110       0.8       Greend, sitter winned organization from the series personality (section to green and the '100) trill Green to green and the '100 trill Green trill			- 12	2. m. 5pr. 5/19/70. 848. 1351.4C.0
<pre>12 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1</pre>	110 0.1	Gravel, silty w/sand Approx. 355 gravel, 305 sand, 355 slightly plastic fines		Terest
172       0.0       10.1 (rpl) very decad (re / 100); (111 very decad (re / 100); (111 very decad (re / 100); rest; (112 grant); (12 gran	136	(11-40, P3-6) Oray: mast to wet alight to moderate permembility (in-0.	່ວວ	Silt w/growal and same;
L 30, 5-20-70 H 10, CA Ban, ADE-14/ FG, Bah, L286.1 10, CA Ban, ADE-14/ FG, Bah, SM 10, FG, Bah, SM 10, FL, FF, FG 10, CA FF, FF, FG 10, CA FF, FG, FG, FG, FG, FG, FG, FG, FG, FG,	178 0.0	to 0.21 fpd); very dense (m > 100); till; 00-08	82	Approx. 205 grevel, 205 send, 605 slightly plastic fines 11-23, Pl=6
a       0.0       2.5         a       1.5       2.5         b       1.5       100/3       100/3         a       1.5       100/3       100/3       100/3         a       1.5       100/3       100/3       100/3       100/3         a       1.5       100/3       100/3       100/3       100/3       100/3         a       100/3		₩ 30', 5-20-70		Mottled (gray-brown); moist; slight permesbility; hird consistency (N=62); subsoil; CL-4CL
0       1.5       100/.5       100/.5       100/.5       100/.5         10       100/.5       100/.5       100/.5       100/.5       100/.5         10       100/.5       100/.5       100/.5       100/.5       100/.5         10       100/.5       100/.5       100/.5       100/.5       100/.5         10       100/.5       100/.5       100/.5       100/.5       100/.5         10       100/.5       100/.5       100/.5       100/.5       100/.5         10       100/.5       100/.5       100/.5       100/.5       100/.5         10       100/.5       100/.5       100/.5       100/.5       100/.5         10       100/.5       100/.5       100/.5       100/.5       100/.5       100/.5         10       100/.5       100/.5       100/.5       100/.5       100/.5       100/.5         10       100/.5       100/.5       100/.5       100/.5       100/.5       100/.5         11       100/.5       100/.5       100/.5       100/.5       100/.5       100/.5         11       100/.5       100/.5       100/.5       100/.5       100/.5       100/.5 <t< td=""><td></td><td></td><td>-</td><td>2.5</td></t<>			-	2.5
20 21 22 23 24 25 25 25 25 26 26 26 26 26 26 26 26 26 26 26 26 26	1 •	topeoil	65 140/.5	Salt, gravally w/sand, Apprax, 25% gravel, 20% sand, 55% alightly plastic fines
<pre>approx. 300 proval, 400 mask, 300 mm platetic fines. Brown is Mirret; market presedulity; modum demuty (mode); allwrine: 00 50 50 50 50 50 50 50 50 50</pre>		Gravel.s.lty w/mand	29 - 40 -	Li-10, F1-6 Brown to grey; must to wet; alight permeability; v. sti
allerien; Gi     4.0     36.1       20     Silty v/rems growal and and from 15% growal, 15% singhtly plastic fines, from 2; ine; 15% growallity; r. wiff to hard comis- tery (1017 to 30) warved (throughout); lacustrins; CL-ML     20       21     Gravel, silty v/rems from; 15% growallity; r. wiff to hard comis- tery (1017 to 30) warved (throughout); lacustrins; CL-ML     70 pro:1       22     Gravel, silty v/rems from; 15% growallity; r. wiff to hard comis- tery (1017 to 30); warved (throughout); lacustrins; CL-ML     51 tv/gravel and and lacustring; rehval; 20% sand, 60% slightly plastic fines for val, silty v/rems from 100; to 0.0       23     Gravel, silty v/rems from 100; to 0.0     100; till; GR. (8.5, 55-13-16; GC-GR)       24     Gravel, silty v/rems from 100; to 0.0     100; till; GR. (8.5, 55-13-16; GC-GR)       25     Silt v/gravel and and lacustring; rehval; 25% sand, 35% slightly plastic fines from to gray; moist to we; slight plastic fines from to gray; moist to we; slightly plastic fines from to we; slightly plas	28	appren. 305 gravel, 405 eand, 305 mm plastic fines. Brown: saturated; rapid permeability; medium density (New	63   8); 93	to hard consistency (N=29 to > 100); till; CL-ML
20       Silty w/rems graval, 105 anad, 735 alightly plastic finas, 12,077, 795 (bit is 29); marred (throughout); licustrips; CL-HL Teary (Bit's to 39); marred (throughout); licustrips; CL-HL Teary (Bit's to 39); marred (throughout); licustrips; CL-HL Teary (Bit's to 39); marred (throughout); licustrips; CL-HL Silt v/reval and sand spres, 205 send, 405 alightly plastic finas fapors, 205 send, 535 alightly plastic finas fapors, 205 send, 200 send, 535 alightly plastic finas fapors, 205 send, 200 s		alluvsum; ON	-	<b>2</b> 15.3', 5-19-70
30       Approx. 15% garwal, 10% and, 75% alightly plastic fines, 107, 79%       0.0         30       Uncy, rest, alight paramability; r. wiff to hard consis- tency (mit to 30) worwd (knowghowt). Nikuwatrum: CL-ML       5.12 v/gravel and sand       0.5         30       Silt v/gravel and sand       5.21 v/gravel and sand       100       0.5         40       Dery:n birst alight paramability; r. wiff to hard consis- tence. Mr and the second secon	20	Silty w/some gravel and sand	DH 25	3. 2m. Stury. 5/18/70 Ban 1348 s
17       Gray: must: alight: permathility; v, with to have consist- ser; (Hard to SD); wired (dorughout); lacustring: Claff, 12.0       Silt v/gravel and send served; 205 send; 65 slightly plastic fines Linco, Fred; 12.0         63       Gravel, silty v/and inversion in provint, 305 mask, 355 slightly plastic fines in consistency; missi to we; alight to moderate presentility; moderate (inde to > 100); till; GN. (B.S. 35-13-14, GC-GN)       Silt v/gravel and send inversion in provint, alight permethility; v. stift consistency; missi to we; alight plastic fines is 0.44         100       Gravel, 205 send, 105 send, 355 slightly plastic fines is 0.44       Silt v/gravel and send is 0.44         100       Gravel, 205 send, 105 send, 355 slightly plastic fines is 0.44       Silt v/gravel and send is 0.44         101       Gravel, 205 send, 105 send, 555 slightly plastic fines is 0.44       Silt v/gravel and send is 0.44         101       Gravel, 205 send, 105 send, 155 slightly plastic fines is 0.44       Silt v/gravel and send is 0.44         102       Silt v/gravel and send is 0.45       Silt v/gravel and send is 0.45         103       Silt v/gravel and send is 0.45       Silt v/gravel and send is 0.45         103       Silt v/gravel and send is 0.45       Silt v/gravel and send is 0.45         104       Silt v/gravel and send is 0.45       Silt v/gravel and send is 0.45         105       Silt v/gravel and send is 0.45       Silt v/gravel and send is 0.45         104       Silt v/gravel and send is 0.	30 30	Approx. 15% graval, 10% anno, 75% alightly plastic fines, 11-27, 93-6		70ppe]]
62       12.0         62       0.40         112:00,77=5       112:00,77=5         64       0.40         112:00,77=5       0.40         112:00,77=5       0.40         112:00,77=5       0.40         112:00,77=5       0.40         112:00,77=5       0.40         112:00,77=5       0.40         112:00,77=5       0.40         112:00,77=5       0.40         112:00,77=5       0.40         112:00,77=5       0.40         112:00,77=5       0.40         112:00,77=5       0.40         112:00,77=5       0.40         112:00,77=5       0.40         113:01       0.0         113:01       0.0         114:01,77       0.0         115:01       0.0         113:01       0.0         113:01       1.5         113:01       1.5         113:01       1.5         113:01       1.5         113:01       1.5         113:01       1.5         113:01       1.5         113:01       1.5         113:01       1.5         113:	17 39	Gray; moist; elight: permability; v. stiff to hard consist tency (N=17 to 39); verved (throughout); lacustrine; C	HL I	0.5
<pre>12 12 20, 27=6 12 20, 27=</pre>			-	Silt w/gravel and sand Approx. 20% gravel, 20% sand, 60% slightly plastic fines
76       Orsynth haves to gray; molet to ver; slight to mederate paramebility (1=0.00 to 0.44); dense to very dense paramebility (1=0.00 to 0.44); dense to very dense (n=0 to 2.00); till; 0=. (2.5. 5>0)>-10, 0C-00)       65         100           100           100           100           100           100           100           100           100           100           101           102           103           103           103           104           105           106           107           103           104           105           106	si .	Approx. 35% growal, 30% annd, 35% slightly plastic fines	28	LL=23, PI=6 Nottled (gray-brown); moist; alight permeability; v. ati
135       0.64       (inter un > 100); till; (ds. 5. 53=13-14, (C-GM))       65         135       135       135       135         135       135       135       135         135       135       135       135         135       135       135       135         136       0.0       135       135         135       135       135       135         136       135       135       135         136       0.0       135       135         136       137       135       136         136       137       135       136         137       138       139       130       130         138       137       136       137       136         138       137       138       139       130         138       139       130       130       130       130         139       139       139       130       130       130       130         139       139       130       130       130       130       130         139       139       130       130       130       130       130	2	Grayish brown to gray; moist to wet; slight to moderate morembhility (b=0.00 to 0.64); dames to very dense	:	comsistency; subsoil; CL-ML
137       138       0.0         138       0.0       72         138       0.0       72         138       0.0       72         138       0.0       72         139       130       72         130       130       74         131       134       134         136       135       135         136       136       136         139       131       136         130       135       136         139       131       136         130       135       136         131       136       136         132       135       136         133       136       136         134       136       136         135       136       136         136       136       136         136       136       136         136       136       136         136       136       136         136       0.0       137         136       0.0       136         136       0.0       137         136       136       137 <td>196 0.6</td> <td>4 (1-40 to &gt; 200); 1122; 00. (0.5. 53-13-14, CC-00)</td> <td>65</td> <td>Silt v/gravel and sand</td>	196 0.6	4 (1-40 to > 200); 1122; 00. (0.5. 53-13-14, CC-00)	65	Silt v/gravel and sand
138     0.0       145     0.0       146     100       130     100       131     100       132     100       133     100       134     0.0       135     100       136     100       137     100       138     100       139     100       130     100       131     100       132     100       133     100       134     100       135     100       136     100       137     100       138     100       139     100       130     100       131     100       132     100       134     0.0       134     0.0       134     0.0       134     0.0       134     0.0       134     0.0       134     0.0       134     0.0       134     0.0       135     100       136     100       137     100       136     100       137     100       136     100       137     100	157		50	Hyperman are graves, 230 same, 535 slightly plastic fines Limbs, 29-5 Scout to grap, moist on uns, stath momentation to
105       105         131       136         132       135         135       136         136       138         137       139         138       139         139       139         130       139         131       139         135       139         136       139         137       139         138       139         139       139         139       139         139       130         139       130         130       139         131       139         132       139         139       139         139       130         139       130         130       130         131       0.0         132       130         131       0.0         132       130         133       131         134       131         135       132.0         136       137         137       136         138       139         139 <td< td=""><td>128 0.0 345</td><td>· · ·</td><td>72</td><td>consistency (1=44 to &gt; 72); till; CL-40.</td></td<>	128 0.0 345	· · ·	72	consistency (1=44 to > 72); till; CL-40.
133       135         134       135         135       135         135       135         136       139         136       139         136       139         136       139         136       139         136       139         136       139         136       139         136       139         136       139         136       139         136       139         136       139         136       139         136       139         136       14         136       14         136       14         136       14         136       14         136       14         136       14         136       14         137       130         138       131         139       14         141       0.0         151       0.0         161       0.0         161       0.0         161       0.0         161       0.0	105		• 44	
135       20       4pprox.15% norwal, 10% sond, 7% slightly plastic fines         135       136       30       anist; slight paramathility; v. stiff to hard         136       10       1       1       consistancy (h=10 to 20); locustring; CL-6%.         136       1       1       1       1       1         136       1       1       1       1       1         136       1       1       1       1       1       1         136       1       1       1       1       1       1       1       1         136       0.0       1<	133			Silt w/some gravel and sand
205 106 106 106 106 106 107 107 107 107 107 107 107 107	172		28 - 19 -	Appron. 15% gravel, 10% sand, 75% slightly plastic fines, 14-27, P1=6
114         0.0         32.0           121         0.0         5.11 w/growal and same           121         0.0         100           121         0.0         100           121         0.0         100           121         0.0         100           121         0.0         100           121         0.0         100           121         0.0         100           121         0.0         100           121         0.0         100           121         0.0         100           121         0.0         100           121         0.0         100           121         0.0         100           121         0.0         100           121         0.0         100           121         0.0         100           121         0.0         100           120         0.0  <	205		28 ]	moist; alight permanhility; v. stiff to hard consistency (W=19 to 28); lacustrine; CL-ML,
Image: State of the state	114			
IT4         II-19, Fred.           Erry: moist; ilight parmas bility; hard consistency         Erry: moist; ilight parmas bility; hard consistency           It-19, Fred.         It-19, Fred.           Erry: moist; ilight parmas bility; hard consistency         It-19, Fred.           It-19, Fred.		45.0	- 74	filt w/graval and sund Approx. 205 graval, 255 sand, 555 slightly plastic fines
()=74 66 > 100); till; (2-48. 32 (1.0', 5-19-76)	1	. <u></u> 4.0 , 3-20-70	174	Li-13, FI-6. Grey: moist; alight permenbility; hard consistency
Z 11 0', 5-19-70	j ·			(P=74 to > 100); till; CL-ML
			•	JZ 11.0°, 5-19-70
		<b>x</b> *		
			1	• .

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19 1253 HERCULENE, A&B SMITH CO., PGH., PA LT1530-1079

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$\frac{12}{0.0} = \frac{1}{2.0}$ $\frac{1}{0.0} = \frac{1}{2.0}$ $\frac{12}{0.0} = \frac{1}{2.0}$	INFORM NOTIVAL 1 A. 17/72. BS. 1984.7 Topool - dark brown Bit, w/mand and grownl 6 mai outbroaded to submanular siltations w/sem flags approx. 18 47. 23 3-47, 975 metrim (duich is seprem. 20 grownl, Boff and, and 60 slightly plantim flags Hetlied (grownlaw, units, allbidly paramable; stiff; humgensous subsail; Cl.41. [8.1.1.], Cl.41.] Boff and, and 60 slightly plantim flags Approx. 25 40°, 43 3-4°, 967 metrim (duich is seprem. 23 grownl, 14° mai subreunded to submanular siltations w/sem flags Approx. 25 40°, 43 3-4°, 967 metrim (duich is seprem. 23 grownl, 175 and; and 105 slightly plantim flags Approx. 25 40°, 43 3-4°, 967 metrim (duich is seprem. 23 grownl, 175 and; and 105 slightly plantim flags Approx. 25 40°, 43 3-4°, 967 metrim (duich is seprem. 23 grownl, 175 and; and 105 slightly plantim flags Approx. 25 40°, 45 3-4°, 967 metrim (duich is seprem. 23 grownl, 211] Cl-40. Note: Pry Pit h. 5/b/70. MAL 1272.4 Topsoil - dark brown Silt, w/sand and grownl 12° mai subreunded to submanular siltings Approx. 25 4°, 45 3-4°, 967 metrim (duice is seprem. 23 grownl, 20 sand, and 45 slightly plantim (duice is seprem. 23 grownl, 20 sand, and 45 slightly plantim (duice is seprem. 24 grownl, 20 sand, and 45 slightly plantim (duice is seprem. 24 grownl, 20 sand, and 55 slightly plantim (duice is seprem. 24 grownl, 20 sand, and 55 slightly plantim (duice is seprem. 24 grownl, 26 sand, and 55 slightly plantim (duice is seprem. 24 grownl, 26 sand, and 55 slightly plantim (duice is seprem. 24 grownl, 26 sand, and 55 slightly plantim (duice is seprem. 24 grownl, 26 sand, and 55 slightly plantim (duice is seprem. 24 grownl, 26 sand, and 55 slightly plantim (duice is seprem. 24 grownl, 26 sand, and 55 slightly plantim (duice is seprem. 25 grownl, 26 sand, and 55 slightly plantim (duice is seprem. 25 grownl, 26 sand, and 55 slightly plantim (duice is seprem. 25 grownl, 27 sand subrewald is submaple, wery stiff to hard; humgenseous cill; (cl-40.	9.8 9.7 9.6 13.8 13.8 12.6 0.0 0.0 2.6
$\frac{12}{0.0} = 0.7$ $0.0 = 0.7$ $0.0 = 3.8$ $\frac{12}{0.0} = 3.3$ $0.0 = 0.9$ $0.9 = 4.0$ $1.0 = 13.5$ $\frac{12}{0.0} = 0.7$ $0.0 = 1.6$ $1.0 = 3.2$	<ul> <li>ATT70. BM. LMA.T</li> <li>Topooll - dark brown</li> <li>Bit, W/mand and growel</li> <li>G mai outbroaded to submagnity militatume w/sem flags depres. 18 def. 23 3-4-, 975 metrim (which is seprem. 20 growel, 365 said, and 60 slipbily plactic flame)</li> <li>Bettel digre-trough units: alightly plactic flame</li> <li>Agrow. 36 def. digret plactic flame</li> <li>Topooll - dark brown</li> <li>Silt, w/and and growel</li> <li>Silt, wiand and growel</li> <li>Silt, wish, add 36 digret planetic flame)</li> <li>Brown unit: alightly planetic flame)</li> <li>Silt, wigned to submapilar silterne w/sem flags</li> <li>deport. 36 def. def de submapilar silterne w/sem flags</li> <li>fagrex. 31 def. def de submapilar silterne w/sem flags</li> <li>fagrex. 31 def. def def. def def def def def def def def def def</li></ul>	12. 6.7 3.6 32.0 <u>12</u> 0.0 0.1 3.6
8.0 - 0.9 $0.0 - 3.8$ $12 - 5.2 - 5.3 - 6.9$ $0.0 - 0.9$ $0.0 - 0.9$ $0.9 - 4.0$ $12 - 63 5.3$ $12 - 63 5.3$ $12 - 63 5.3$ $12 - 63 5.3$ $12 - 63 5.3$ $12 - 63 5.3$ $13 - 5.3$ $13 - 5.3$ $14 - 5.3$ $15 - 5.3$ $15 - 5.3$ $15 - 5.3$ $15 - 5.3$ $15 - 5.3$ $15 - 5.3$	<pre>Topseil - dark hream Bilt, w/mind and growel 6 max unbreamded to submagular siltstame w/same flags sparse. 16 40. 28 3-6. 975 metriz (which is seprem. 20 growel, Boff said, and 60 slightly plactic flame) Hetted (grow-tream) unit: allbidly paramethis: stiff; heneganeous subsail CL-EL. [8.8. 1.1, CL-EL] Botor Bay Pit Silt, growelly w/same 14 max subreamded to subhagellar siltstame w/same flags Sprem. 26 40. 46 3-46. 960 metrix (shift is sayrem. 228 growel, 175 said, and 108 slightly placets flame) Hetted (growell with the subhagellar siltstame w/same flags Sprem. 26 40. 46 3-46. 960 metrix (shift is here; humogeneous clil; CL-ER. Hette: Bry Pit h. 5/k/70. MAR. 1282.4 Yepsell - dark brown Silt, w/samd and growel 12 max subreamded to subhagellar siltstame w/same flags faprex. 26 40. 45 slightly placets flame) Heres; mait: slightly permethic; very stiff to here; humogeneous clil; CL-ER. Silt, mind and growel 12 max subreamded to subhagellar siltstame w/same flags faprex. 26 40. 45 slightly placets flame) Heres; moit: slightly permethic; very stiff to here; humogeneous clil; CL-ER. Silt, mindy w/grewel 14 max subreamded to subhagellar siltstame w/same flags faprex. 25 40. 35 3-6. 300 metrix (shift to here; humogeneous clil; CL-ER. Hete: Hoderste seepage 8 9.4'. Gaving at completion below 9.4' b. 5/k.75. MaR. 1280.0 Topicil - fark brown</pre>	2.6 33.8 <u>72</u> 0.0 0.1 3.6
$0.0 - 3.0$ $\frac{12}{2.0} - 3.3.0$ $\frac{12}{0.0} - 0.9$ $0.0 - 0.9$ $1.0 - 3.2$	Bit, w/mand and growel 6' min subremained to submagular silutions w/sems flags spreme. 16 4', 31 -4', 975 metrig (which is seprem. 20 growel, 305 said, and 605 slightly plantic finne) Mettled (grow-tream) moint; alightly paramable; sciff; hemagenesses subsoli CL-GL. [8.8. 1.1, CL-GL] Beter Ary Pit Silt, growelly w/smd 14' min subremained to submagular silitates w/sems flags Appen. 35 4'', 4 3-4', 84 metris (which is appen. 23 growel, 175 said, and 105 slightly plantic finne) Brows; moirt; slightly paramable; very stiff to hard; hemagenesses slilt, cl-dd. Meter Pry Pit h. 5/W/70. MAR. 1202.45 Yepsell - dark brows Silt, w/mand and growel 12' max subremaind to submagular siltings w/sems flags faprex. 35 4'', 6 3-6', 94 metris (which is appen. 23 growel, 200 sand, and 43 slightly plantic finne) Brows; moirt; sl	3.6 32.0 <u>12.0</u> 0.0 0.0 2.6
$\frac{12}{10} \frac{52}{10} = \frac{13}{10} \frac{51}{10} = \frac{51}{10} $	<pre>6 mail - subremaind to subangular silutane s/sam flags spreme. 16 mail, and 60 slightly plantic finant) Bottled (gry-tr-was) moist; alightly paramable; stiff; homogeneous subsoli CL-GL. [8.8.1.1, CL-GL] Botor Bry Pit Silt, grunully w/and 14° mail - subremaind to subangular silitates w/sam flags Appen. 25 m<sup>2</sup>, d 3-6°, 86 metris (shidh is appen. 25 grunul, 175 and, and 105 slightly plantic finant) Brows; moirt; slightly paramable; stiff to bard; homogeneous sill; CL-GL Hota: Bry Pit b. 5/k/70. MB, 1202(d Topsell - dark brows Silt, w/and and grunul 12° and, a subremaind to subangular silitates w/sam flags figure. 25 m<sup>2</sup>, d 3-6°, 96 metris (shidh is appen. 25 grunul, 117 and, and 105 slightly plantic finant) Brows; moirt; slightly paramable; very stiff to bard; homogeneous silt, w/and and grunul 12° mail - subremaind to subangular silitates w/sam flags fagrex. 25 m<sup>2</sup>, d 3-6°, 96 metris (shi is appen. 25 grunul, 26 sand, and 15° slightly plantic finant) Brows; moirt; slightly plantic finant) Silt, mindy w/grunul 14° mail - subremaind to subangular silitates w/sam flags fagrex. 25 m<sup>2</sup>, d 3-6°, 95 metris (shi is appen. 138 grunul, 26 sand, and 55 slightly plantic finant) Brows; moirt; slightly plantic finant) Grunu; moirt; slightly plantic finant fags fagrex. 25 m<sup>2</sup>, d 3-6°, god metris (shi is appen. 138 grunul, 26 sand, and 55 slightly plantic finant) Gruny; moist; slightly plantic finant fags fagrex. 25 m<sup>2</sup>, d 3-6°, god metris (shi is appen. 138 grunul, 26 sand, and 55 slightly plantic finant) Gruny; moist; slightly plantic finant fags fagrex. 25 m<sup>2</sup>, d 3-6°, god metris (shi is appen. 138 grunul, 26 sand; and 55 slightly plantic finant fags fagrex. 25 m<sup>2</sup>, d 3-6°, god metris (shi is appen. 138 grunul, 26 sand; and 55 slightly plantic finant fags fagrex. 25 m<sup>2</sup>, d 3-6°, god metris (shi is appen. 138 grunul, 26 sand; and 55 slightly plantic finant fags fagrex. 25 m<sup>2</sup>, d 3-6°, god metris (shi is appen. 138 grunul, 26 sand; and 55 slightly plantic finant fags fagrex. 25 m<sup>2</sup>, d 3-6°, d 3-6°, d 3-6°, d 3-6</pre>	3.6 32.8 72. 0.0 0.0 2.6 36.6
$\frac{12}{10} = \frac{13}{10} = 13$	<ul> <li>Bod samd, and sod slightly plantic fines)</li> <li>Bettled (gry-t-read) mois; alightly paramable; stiff; hamnganesses subsoil; CL-GL. [8.8. 1.1, CL-GL)</li> <li>Better Bry Pit</li> <li>Bilt, gruvelly w/and</li> <li>14° sai subreaded to subangular slitetens w/sems flags</li> <li>Approx. 35 40°, 45 3-6°, 860 metris (shidh is approx. 23 gruvel, 175 sand, and 400 alightly plarate finant)</li> <li>Brows; moist; slightly paramable; very stiff to bard; hamogenesses clil; CL-GL</li> <li>Hota: Bry Pit</li> <li>Silt, w/and and gruvel</li> <li>12° sai subreaded to subangular slitetens w/sems flags</li> <li>figres: 35°, 65 3-6°, 960 metris (shi is approx. 23 gruvel, 200 said, and 400 alightly plarate finant)</li> <li>Silt, w/and and gruvel</li> <li>12° said, and 400 alightly plarate (shi is approx. 23 gruvel, 200 said, and 400 alightly plarate (shi is approx. 24 gruvel, 200 said, and 400 alightly plarate (shi is approx. 24 gruvel, 200 said, and 400 alightly plarate (shi is approx. 24 gruvel, 200 said, and 400 alightly plarate finant)</li> <li>Silt, smidy w/gruvel</li> <li>14° min subreaded to subangular slitetens w/sems flags</li> <li>fapper: 35 40°, 53 3-6°, 500 metris (shi is approx. 24 gruvel, 200 said, and 55 alightly plarate finant)</li> <li>Silt, smidy w/gruvel</li> <li>14° min subreaded to subangular slitetens w/sems flags</li> <li>fapper: 35 40°, 53 3-6°, 550 metris (shi is approx. 138 gruvel, 201 said, and 55 alightly plarate finant)</li> <li>Gruy; moist: alightly promable, very stiff to bard; hamageneous till; CL-ML</li> <li>Hote: Rodersts seepage 8 9.4°. Gaving at completion below 9.4° 5.56.75. Bab. 120,0</li> <li>Topicel - 4ark brows</li> </ul>	12.0 <u>17</u> .0.0 0.0 2.6
$\frac{12}{10} = \frac{13}{10} = 13$	<pre>homsenses subsoli CL-GL. (B.S. 1.1, CL-GL) Reter hyp Pit Silt, gruvelly w/smd l4* mat subreunded to subangular siltstame w/smm flags Approx. 35 +**, 45 3-**, 545 metris (shish is approx. 255 gruvel, 175 sand, and 405 alightly paramakle; very stiff to hard; homsgenerate clil; CL-GL Nets. Pry Pit h. 5/W/70. MAD. 1272.d Yepseil - dark brown Silt, w/sand and gruvel l2* mat subreunded to subangular silt:-rise w/semm flags faprox. 35 +**, 45 3-**, 945 metris (shish is approx. 28 gruvel, 265 sand, and 405 alightly plantic filters int subreunded to subangular silt:-rise approx. 28 gruvel, 265 sand, and 405 alightly plantic filters Silt, snidy w/gruvel l4* mat subreunded to subangular silt:stees w/semm flags faprox. 35 +**, 95 3-**, 955 metris (shish is approx. 185 gruvel, 126 sand, and 55 alightly plantic filters Silt, snidy w/gruvel l4* mat subreunded to subangular siltstees w/semm flags faprox. 35 +**, 95 3-**, 95 3 metris (shish is approx. 185 gruvel, 105 sand, and 55 alightly plantic filters Silt. snidy w/gruvel l4* mat subreunded to subangular siltstees w/semm flags faprox. 35 +**, 95 3-**, 95 3 metris (shish is approx. 185 gruvel, 105 sand, and 55 alightly plantic filters Silt. Silt.</pre>	12.0 <u>17</u> 0.0 0.0 2.6
$\frac{12}{10} = \frac{13.8}{10}$ $\frac{12}{10} \frac{12}{10} = \frac{13.5}{10}$ $\frac{12}{10} \frac{13.5}{10} = \frac{13.5}{10}$ $\frac{12}{10} \frac{13.5}{10} = \frac{13.5}{10}$	Recer Byp Fit Silt, gruvelly wired 14° mai mikrunded to subangular alltatame wirem flags Approx. 35 40°, 45 3-6°, 560 metria (shish is approx. 25 gruvel, 175 and, and 105 allghdy piaranakle; very stiff to bard; humogenerum cili; Cieff. Nota: Bry Fit 5.3%270. MB. 1282.4 Topseil - dark brown Silt, wirend and gruvel 12° mai subrounded to subangular silt:	12.8 <u>17</u> .0.0 0.9 2.6
$\frac{1}{10} = \frac{1}{10} $	<pre>Sile, gruvelly w/same 14* mat. = mahrunded to subacquir siltstame w/same flags Appen. 35 40*, 45 3-0*, 565 metris (duint is appen. 25 gruvel, 175 and, and 105 clightly parametric finns) Brows; moint; slightly parametric finns) fota: Dry Pit 5. 5/0.70. MD, 1282.4 Topsoil - dark brows Sile, w/same and gruvel 12* max. = subrounded to subacquier silt:</pre>	13.8 72 0.0 0.0 2.6 34.4
<b>12 63. C/L PAR</b> 0.0 - 0.9 0.9 - 4.0 4.0 - 13.5 <b>17 63. C/L PAR</b> 0.0 - 1.C 1.0 - 3.2	Appent. 35 407, 45 3-67, 565 mittis (dains is appent. 25 growl, 175 and, and 105 algebrig piramskis; very stiff to hard; homogeneous till; C.46. Nota: Bry Fit 5.34,70, MB, 1282.4 Topsoil - dark brown Silt, wisard and growel 12° max subrounded to subangular silt:	12.6 0.0 3.6
<b>12 62. C/L PAR</b> 0.0 - 0.9 0.9 - 4.0 4.0 - 13.5 <b>12 63. C/L PAR</b> 0.0 - 1.0 1.0 - 3.2	Brown point; slightly preminika; very stiff to hard; homogeneous cill; CML. Note: Dry Fit h. 5/h/70. MB. 1272.4 Toposil - derk brown Silt; wimai - abrounded to subangular silt: one views flags faprox: 30 %, 65 -64 %, 967 mitrix (of to hard; being money trans, - subrounded to subangular siltstees views flags stil; CL-ML. Silt; endy wigreal 14° mai subrounded to subangular siltstees views flags Apprex: 35 %, 75 3-6, 958 mitrix (of to hard; being money till; CL-ML. Silt; endy wigreal 14° mai subrounded to subangular siltstees views flags Apprex: 35 %, 75 3-6, 958 mitrix (of to hard; being movel, 106 sand, and 55 slightly plantic flags Apprex: 35 %, 75 3-6, 958 mitrix (of to hard; being movel, 106 sand, and 55 slightly plantic flags Apprex: 35 %, 75 3-6, 958 mitrix (of to hard; being movel, 106 sand, and 55 slightly plantic flags Apprex: 35 %, 75 3-6, 958 mitrix (of to hard; being movel, 107 soil; alightly premable, very stiff to hard; being enouse till; CL-ML. Note: Rodersts seeping 0 9.4°. Caving at completion below 9.4° b. 5/b:75, BMB, hightly Topiosil - dark brown	<u>72.</u> 0.0 0.9 3.6
<b>12 62. C/L PAR</b> 0.0 - 0.9 0.9 - 4.0 4.0 - 13.5 <b>12 63. C/L PAR</b> 0.0 - 1.0 1.0 - 3.2	Note: Bry Fit h. 5/h/70. MB. 1282.4 Topooll - dark brown Silt, wimand and grevel 12° max subrounded to subangular silt: one views flags faprox. 30 %, 65 Å-67.967 metriz (of ic is approx. 23 greval, 20 sond, and 63 silghtly plantic files) Brown, most: slightly persoll 14° max subrounded to subangular siltetoon views flags Apprex. 35 %', 63 Å-67, 955 metrix (ofice is approx. 158 grevel, 205 sond, and 54 silghtly personable; very stiff to hard; being mosens till; CL-60. Silt, endy wigreel 14° max subrounded to subangular siltetoon views flags Apprex. 35 %', 63 Å-67, 955 metrix (ofice is approx. 358 grevel, 205 sond, and 54 silghtly personable, very stiff to hard; hemgeneous till; CL-60. Note: Roderste seepage 0.9.4°. Caving at completion below 9.4° b. 5/b.70. MB. 120bio Topioil - dark brown	<u>19 -</u> 0.0 0.9 2.6
12 62. 535 PM 0.0 - 0.0 0.9 - 4.0 4.0 - 13.5 12 63. 5,1 Pm 0.0 - 1.6 1.0 - 3.2	<ul> <li>3/br.70. MBJ. 1282.4</li> <li>Topsoil - dark brown</li> <li>Sile, wimmin and gravel</li> <li>12° max subrounded to subangular silt: one wisemp flags</li> <li>45° ed. 65 -64', 967 mitrix (of in a sprexe, 24% graval, 20% sond, and 45% slightly plastic fires)</li> <li>Brown, most: slightly personable; vory stiff to bard; beamgeneous till; CL-40.</li> <li>Silt, endy wigraval</li> <li>14° max subrounded to subangular siltstoon wisemp flags</li> <li>Apprex. 35' 40', 55 3-6', 250 mitrix (office is a spreae. 25% gravel, 20% sond, and 55 slightly plastic fires)</li> <li>Brown, most: slightly personable, very stiff to bard; beamgeneous till; CL-40.</li> <li>Bote. Rodersts seerage 0 9.4'. Caving at completion below 9.4'</li> <li>5/br.70. MBB. 1200.</li> <li>Topical - dark brown</li> </ul>	<u>12</u> .0.0 0.9 3.6
$\frac{1}{100} = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 13.5$ $\frac{12 \ d3. \ c_1 \ bac}{0.0 = 1.0 = 0.0 = 1.0 = 0.2$	Toposil - dark brown Sile, viand and grevel 12° max subrounded to schengular siltms visems flags sprox. 32 4°, 47 John (1970), 947 metris (40 metris (1970), 208 grevel, 208 sond, and 43 alightly plastic fines) Brown, most: slightly permeable; very stiff to bard; being mesons till; CL-48. Silt, mindy vigravel 14° max subrounded to subingular siltstoom vising flags Apprex. 35 4°, 45 John, 958 metris (40 metris in appres. 188 grevel, 208 sond, and 54 slightly plastic fines) Gravy, moist: alightly permeable, very stiff to bard; heing moone till; CL-48. Bote. Roderste seging 0 9.4°. Gaving as completion below 9.4° 5.5%;7%, MBM. J2000 Topioil - dark brown	2.6 34.4
0.9 - 4.0 4.0 - 13.5 12 43. <u>C.1 Per</u> 0.0 - 1.6 1.0 - 3.2	<ul> <li>Silt, visuid and graval</li> <li>Silt, visuid and graval</li> <li>Silt, visuid and graval</li> <li>Silt, visuid and graval</li> <li>Silt, visuid and silt alightly plastic fixes)</li> <li>Brown, most: slightly permusble; very stiff to bard; homogeneous</li> <li>till; CL-GL</li> <li>Silt, endy vigraval</li> <li>Silt, and y vigraval</li> <li>Silt, and y sightly permusble; very stiff to bard; homogeneous</li> <li>till; CL-GL</li> <li>Silt, and y vigraval</li> <li>Silt, and y sightly plastic fixes)</li> <li>Brown, most slightly plastic fixes)</li> <li>Gravi, most slightly plastic fixes)</li> <li>Gravi, most slightly plastic fixes)</li> <li>Gravi, control and slightly plastic fixes)</li> <li>Site, Addition and statistic fixes)</li> <li>Gravi, control alightly plastic fixes)</li> <li>Kete. Roderste segrege 0 9.4°. Caving at completion below 9.4°</li> <li>Site, 70, Ball Aldbio</li> <li>Topicial - dark brown</li> </ul>	0.0 0.9 3.6
4.6 - 13.5 17 43. C.1 Per 0.0 - 1.6 1.0 - 3.2	<ul> <li>12* mai subrounded to subsnpilar siltings</li> <li>42 proz. 25 *6', 6'3-6', 90 artrs (of cc. is approx. 25 graval, 20 sond, and 55 alightly planter fixed)</li> <li>120 sond, and 55 alightly planter fixed)</li> <li>Brown; moist: slightly permeable; very stiff to bard; beamgeneous still; (cl-66.</li> <li>Silt, max subrounded to subsnpilar siltstoon v/smm flags days of '0', 55 -6', 955 metrix (which is approx. 25 graval, 206 sond, and 55 alightly planter fixed)</li> <li>Corey: moist: alightly permeable, very stiff to hard; hemmgeneous till; CL-66.</li> <li>Note: Anderste seepage 0 9.4'. Caving at completion below 9.4'</li> <li>5.5's.7C. M.B. 120:0</li> <li>Topiesil - dark brown</li> </ul>	0.9 3.6 34.4
4.6 - 13.5 <u>17 43. C.1 Per</u> 0.0 - 1.6 1.0 - 3.2	<ul> <li>20 sand, and 40 alightly plastic fixes)</li> <li>20 sand, and 40 alightly plastic fixes)</li> <li>Brown; moist: alightly permeable; very stiff to bard; hemogeneous stil; (2-40.</li> <li>Silt, sandy wigraval</li> <li>14' smax subroaded to subangular siltstoom wisems flags approx. 35 w<sup>4</sup>, 95 ab., 955 ab., 955 ab., 100 alightly plastic fixes)</li> <li>Gray; moist: alightly permeable, very stiff to hard; hemogeneous till; CL-40.</li> <li>Note: Aloghtly permeable, very stiff to hard; hemogeneous till; CL-40.</li> <li>Note: Anderste seepage 0 9.4'. Caving at completion below 9.4'</li> <li>5.5's.7C, Md. 120:0</li> <li>Topiesil - dark brown</li> </ul>	2.6
4.0 - 13.5 17 43. <u>C.1 Per</u> 0.0 - 1.6 1.0 - 3.2	<pre>til: () to start y promotely very till to marg paragraphic till: () to the subsequence of the sub</pre>	<b>3.6</b> 34.4
4.0 - 13.5 <u>17 43. C.1 Per</u> 0.0 - 1.6 1.0 - 3.2	Silt, max subroaded to subangular siltstoom v/smm flags l4' max subroaded to subangular siltstoom v/smm flags approx. 35 %*', 95 -0*, 955 metrix (vhich is approa. 15 gravel, 20G sand, and 655 slightly plastic flass) Gray; moist: alightly permable, very stiff to hard; homogeneous till; CL-40. Note. Roderste seepage 0 9.4'. Caving at completion below 9.4' <u>5. 5/b.7C. Md. 1205.0</u> Topieil - dark brown	3.6 34.4
17 43. C.1 Dec 0.0 - 1.6 1.0 - 3.2	<ul> <li>A. The second sec</li></ul>	34.4
1 <u>17 43. (.1 Per</u> 0.0 - 1.C 1.0 - 3.2	aun som, une cys sagerig pakette russej Grey: noiset alightly permable, very stiff to herd; homogeneous till; CL-ML Note. Roderste seepage 0 9.4°. Caving at completion below 9.4° <u>5. 5/b.7C. MMB. 1205.0</u> Topietl - dark brown	34.4
17 43. 6,1 <del>0.</del> 0.0 - 1.6 1.0 - 3.2	tili; CL-ML Note: Roderste seepage 0 9.4°. Caving at completion below 9.4° <u>5. 3/6:7C, BAB, 1205.0</u> Topieil - dark brown	34.4
<del>17 f3, 6/1 be</del> 0.0 - 1.6 ; 1.0 - 3.2	neve, nomenver snepage # 9.4". Gaving av campletion belev 9.4" <u>v. 5/6.75, BAB, 1286.0</u> Topiezh - dark brown	34.4
<u>17 83. 6/1 Dec</u> 0.0 - 1.0 ; 1.0 - 3.2	5. 228,244 (MR. 4695)0 Topsell - dark brown	
0.0 - 1.6	Topsell - dark brown	
, 1.0 - 3.2		
	Gravel, silty w/samd 12° max slot flags	
	Appres. 45 46", 65 3-6", 66 metrix (velice is appres. 365 gravel, 325 mend, and 345 mon plastic fines)	-
	Brown; naturated, republy permeable; loose; mined alluvium; GR	
3.2 - 6.2	Silt, v/graval Accros, 25 3-4", 955 matrix (which is approx, 195 em val. 105	0.0
	and, and 75% alightly plastic fines) Grav: wet, alightly permable: stiff: homoseneous lacustring;	1.4
	CL-HL. D.S. 3.1 (CL-HL)	
6.2 - 11.0	Gravel, silty w/mansi 12° ma slat Class w/mans subrounded to subsymbles chie	
	Apprent. 45 "6", 65 3-4", 865 metrix (which is apprent. 355 gravel, Mi abod and 155 gravel,	2.6
	Gray; wat; mederataly permetals, dense; homegenerus till; GC-GH	
	hote: Neavy seepage @ 1.4: and 3.0:	
TE Et. S/L DAM	. 5.0.7C. BAB. 1264.4	
e.e - 2.e	Silt, w/samd and gravel	15.0
	Approx. 25 %", 45 3-6", 945 mitrig (which is approx. 205 graval,	
	Grayinh brean, woist, slightly personals; v. stiff; homogeneous	
•• ••		
•··· •··	Approx. 25 3-6*, 965 matrix (which is approx. 55 gravel, 125 same, and 505 allocation slaves from 1	<b>12</b> /
•	Gray, maist, slightly permote times; Cray, maist, slightly permotels; v. stiff, immeganeous lacustring;	0.8
	terne. Sole - s(cod and const)	0.1
4.5 - 10.0	sist, where the prevex 18" max subrounded to subregular slat w, some flags	
	Approx. 25 mo", 52 3-6", 53 metrix (which is approx. 1"S gravel, 235 must, and cOE all litly plastic fixes)	ţ
	Gray, meist, slightly permovale, v. stiff, humogeneous till, CL-MG	
,	Note Light seepage @ 2.0' or upper portion of pit in the	2.5
	alung area	ļ
		ł
		บม
		·
ŧ	•	
		- 1
_	3.2 - 6.2 6.2 - 11.0 TF f4. C/L pag C.C - 2.C 2.0 - 4.5 4.5 - 10.0	<ul> <li>Brown, Millerick, republy presenting, Leese; mand alluryum; GH</li> <li>3.2 - 6.2 Silt, wigneral, Angren. 55.4-*, 565 matrix (which is appres. 156 green). Cony. Ver. 412(157) presenting: silf() homogeneous lacustrum; Claff. 5.3.31 (Claff)</li> <li>6.2 - 11.0 Green, silfy views 13° mm sist flags views subrounded to submediate chin. Appres. 56.4-*, 56.5-*, 566 metrix (which is appres. 136 green). 366 sand, and 356 silphily plastic from?.</li> <li>6.2 - 11.0 Green, Silfy views 13° mm sist flags views subrounded to submediate chin. Appres. 56.4-*, 56.5-*, 566 metrix (which is appres. 136 green). 366 sand, and 356 silphily plastic from?.</li> <li>7.6 - 2.6 Silt, visual and green] 37° mm metrix premounded to submediate sist visuant flags 4 spres. 35.4-*, 66.5-*, 566 metrix (which is appres. 266 green). 36° sand, and cold silphily plastic from?.</li> <li>7.6 - 3.8 Silt 4 spres. 35.4-*, 665 metrix (which is appres. 266 green). 36° sand, and cold silphily plastic from?.</li> <li>7.0 - 4.8 Silt 4 spres. 35.4-*, 665 metrix (which is appres. 136 green). 136 mand, and 605 silphily plastic from?.</li> <li>7.6 - 10.0 Silt, visual and greening clafd.</li> <li>7.6 - 10.0 Silt, visual and greening clafd.</li> <li>7.6 - 10.0 Silt, visual and repres. 378 band, and cold sil hily plastic from?.</li> <li>7.8 from, and cold sil hily plastic from?</li> <li>7.9 from the cold sile for visual visual for system flags 4 spres. 35 scile sile sile sile science is a spres. 136 greening clafd.</li> <li>8.6 - 10.0 Silt, visual and cold sil hily plastic from?</li> <li>7.8 mand, and cold sil hily plastic from?</li> <li>7.9 million sile science of science is a spres. 136 green sile sileming area.</li> </ul>

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jt 100.6	THE ST. M.	10.77. M. 1843.	H. C.M. Marcon	4 Arms. 1/1/10. 848. 1396.4
1	; 0.0 - 0.7	Topooll - dark brown	0.0 - 2.0	Topotil, dark brown
<i>(</i>	1.4 <b>9.7 - 2.6</b>	Silt, v/sand and growal S'mag subremaided to subragular alst v/sems flags	1.0 - 2.3	Silt, growally want t' ma, - subcomies in subcouler alot store flats
	•	135 and, and 156 alightly playtic fines). Rettled (grap-form); mist; elightly pressile; stiff; here- emean when 1: C.H.		Approx. 15 44", 35 346", 966 metria (which is approx. 208 growel, 146 mend, and 956 alightly playtic finan)
Mingular Siltstone w/some flags DTS metrim (which is sparse. 208 graval, REY plastic fines)	3.6 - 22.8	Silt, grovally v/sami 10° mag subrounded to submarular alst v/same flags		Notled (groy-brown); moist; alightlypermechie; stiff; broageneous subsoil; CL-ML
AL. (8.8. 1.1, CL-ML)		<pre>Approx. 35 66", 46 3-6"; 935 migrax (which is approx. 25 gravel, 205 sand, and 335 slightly playtic fines) Desytic browns maint; adjubly permetils; v. stiff to have; henegeneous till; CL-ML</pre>	2.3 - 13.8	511: gravally system to subagular alst u/seems flags. Approx. 25 46°, 25 5-4°, 935 metrix (which is approx. 285 graval, 205 sand, and 525 aligntly placese flags)
minagular siltatena u/amo flags	33.8 - 14.5	Silt, many w/gravel 19" max sebreunded to subangular slot w/seme flags		Grayish brows; moist; slightly paramable; v. stiff to hard; bunganeous till; CL-6L
tly plastic finns) manble; very stiff to bird; homogeneous		approx. as "or," as and ", but mirits (which is approx. its proves, i 135 and, and 135 alightly permetable; v. stiff to have; homegeneous till; CL-M. here: Last serunce 0.1.0". Area caving at completion.	13.0 +	Silt, samty v/growal subremied to subangular slot v/ones flags. Apren. 34 40°, 51 -4°, 536 metrix (which is appres. 306 growal, 355 seems, and 355 alightly plaster flags)
	: TP (10). Borren	r Arma, 5/3/70, 348, 1299,9		Dray; most; mightly paramaking v. stiff to hard; homogeneous till; CL-ML
	0.0 0.9	Topeell - dark brown		Note: Very light reagings at 2.8".
Bubbbundar Billingen w/amm diese	0.9 - 2.6	Silt, gravel a/same	TP AQ5. Berre	x Arms. 5/5/70, Ball. 1309.2
Ministria (ve.c. is appress 205 graval, - thy plastic fines)		6° mmz. ~ subrounded to subangular slot w/some flags Approx. 15 + 6°, 35 3-6°, 566 matrix (which is approx. 205 gravel, 1 m and and 6 m alubric planas flags)	0.6 - 2.0	Topsoil - dark brown
maable; vary stiff to bard; homogeneous		In and and the set of	1.0 - 4.6	Silt, gravally wheat '12' max subrounded to subangular alst whome flags. Approx. 15 '0', 35 3-0', 50% matrix (shuch is approx. 200 month 100 month and the high shuch a bottom.
whengular siltstons w/sums flags MES untrix (which is appres. 15% gravel, Mastic fines) mable, warm stiff of benefiting a	3.6 - 14.4	3134, graval v/sand 12° max subrounded to subangular slat v/same flags Approx. 25 +6°, 35 3-6°, 935 matrix (which is approx. 25% graval, 22% sand, and 53% slightly plastic fluxes)		<pre></pre>
manate; very still to here; hereageneous		Gray:ah brown; moist; slightly permashle; v. stiff to hard; bommgeneous till; CL-90	4.6 - 14.4	Silt, prevally w/same
9.41. Caving at completion below 9.41	24.4 +	Silt, eardy v/grevel subrounded to subangular sist v/some flags Approx.25 **. 53 -5*. 535 matrix (which is approx. 205 grovel.		14" max Subrounded to Subaguisr hist Vienne Tinge. Apprax. 25 %6", 45 3-6", 94% metrix (which is approx. 25% gravel, 20% send, and 55% slightly plastic fines Gregich brown; moist; alightly permeable; v. stiff to
1	r	25% sand, and 55% slightly plastic fines) Grey; moint; slightly pressable; v. stiff to herd; howegensous till; CL-ML	14.4 - 15.2	bard; hemogeneous till; CL-ML Silt, sandy w/graval f max subrounded to subencular alst w/some flags
W matrix (which is approx. 305 gravel,		Noto: Dry Pit		Approx. 25 % , 45 3-6", 945 metrix (which is approx. 205 grevel, 25% sand, and 59% slightly plastic fines
personble; losse; mined alluvium; (M	12 62.02. Dorrow	- Arms. 5/5/70. BAB. 1301.7 -		Gray; moist; slightly permashe; v. stiff to hard; homogeneous till; GL-ML
In (sauch un annum a sauch a sauch	8.9 - 1.2	Topseil - dark brown		Noto: Light scopedo at 7.5: and 2.4%
B [which is approx. 195 grava], 105 Mastic finds)	1.2 - 2.6	Silt, (revelly w/seed 6" max subrounded to subangular sist w/some flags	IF #201. Later.	Sport. 5/8/70. BAB. 1331.9
wie; stiff; nomogeneous lacustrine; 		approx. 15 46", 35 3-6", 965 metrix (which is approx. 205 graval, 155 aand, and 655 alightly plastic fines) Motflat (are adment), mourt, alightly paramethar, stiff, home	0.0 - 1.2	Topsoil - dark brows
subrounded to subangular chis.		Sensous; subsoll CL-HL	1.2 - 4.0	Silt, w/sand and growel 12" max subrounded to subangular alst w/some shale
We within (which is approx. 35% graval, Ay plastic fissa). moble; dense; bomogeneous till; GC-QN	2.6 - 15.0	Silt, gravelly v/and 12° maz subrounded to subsagular sist v/some flags Approz. 25 4°, 46 3-4°, 465 metrix (which is approz. 255 gravel,		Approx. 15 %*, 36 3-6*, 96% matrix (which is 20% 'graval, 20% sand, and 50% slightly plastic fines) Hottlad (gray-brown); moist; slightly parmable; stiff homocomesus subsoli Cl-90.
· and J.C.		Grayish brown; moist; slightly permeable; v. stiff to hard; homogeneous till; CL-HL.	4.0 - 14.0	Silt, and y v/gravel 14 max, subrounded to subangular alst v/some shale
whenguler slat w/some flags WS matrix (which is approx. 20% growal, dy glastic fines).	15.0 - 16.0	5.11; gruvelly v/aand 8° max subrounded to subangular slat v/seme flags Approx. 25 46°, 45 3-6°, 945 metrix (which is approx. 205 gravel, 255 sand, and 555 slightly plastic fines)		Approx. ap to , 39 Job, 50 Million (Million approx. 20% provel, 25% s.und, and 55% slightly plastic far Grayigh brown; moist; slightly permeable; v. stiff to hard; bemogenerus till; CL-ML
Mily permenale; v. stiff; hemopeneous		pormeshla; v. stiff to hard; homogeneous till; CL-HL	. 14.0 - 15.5	511t, sandy w/graval 10' mag subrounded to subengular plat w/some shale
a [which is approx. 85 grave]. 125 und.		Note: Light seeings @ 7.0'		Approx. 35 +6', 55 3-6", 925 mitrix (which is approx. 205 gravel, 305 sand, and 505 slightly plastic fines
finee) mble; v. stiff; homogeneous Lacustrine;	<u>17 2103. Borron</u> 0.0 - 0.7	r Arma, 5/5/70, Adb, 1314,2		Gray; moist; slightly permusible; v. stirr to move; homogeneous till; CL-HCL.
	0.7 - 2.9	Silt, gravelly w/mand		Note: Very light seepsge at 7.2".
phagular slet v/some flage 25 metrix (which is approx. 175 graval, 17 plastic fizee) meble; v. stiff; homogéneous till;		6° mmil - subbrounded to subacquiar alst , s Approx. 15 ver, 35 3-67, 955 marcus (Asch s sporsa. 205 gravea, 155 eaud, and 555 slightly plastic funts) Mattled (gray-brown); moist; alightly permeable; stiff; boxngameeum subsol; CL-ML		AS BUILT
' en upper partien af ĝit in tha	2.9 - 13.0	Silt, gravelly w/sand- 12° max subrunded to subangular slot Approx. 25 46°, 46 3-46, 466 metrix (which is approx. 25% gravel, 20% sand, and 55% sliphily plartic fines) Gravish brown: saidt is lichtly second blart. Stiff to bend.		1-28-76
	13.0 - 13.7	hamagawaeus till; CL-40. Silt, sandy w/graval 34° max subsounded to subangular elst		NEWTOWN-HOFFMAN CREEKS WATERSHED PROJECT
		Approx. 25 ***, 45 3-6*, 445 mstrim (vhich is approx. 205 gravel, 235 same, and 356 slightly placetic fines) Gray, maint, alightly parashle; v. stiff to hard; hemogeneous sill; cM.		CHEMUNG COUNTY, NEW YORK
		Note: Light stopage at 1.0'.	U.S	SOIL CONSERVATION SERVICE
		:		LALE A. Bandon S. 10 Institute CONS. ENGINEER
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TP #200 Lant. Smrt. 5/4/71. BAL. 1588.9 20 121 0.C - 1.C Topunil - dorb bront TP #202, Mar. Spyr. 3/4/76, Mb. 1330.8 1.0 - 2.5 Silt, v/sams and gravmal 8° mma. - subrounded to subangular alet v/sems shale appras. 25 40°, 45 44°, 945 mstras (duch is appras. 205 graval, 205 ased, and toff alightly plastic fines) Hertied (gray-driven), mist; sightly permatic stiff. hemepengeue subaril, CL+00. 0.0 -. 0.0 - 1.4 Topsell - Bark brown .... 4.0 Silt, v/und and preval 10 max, - subrounded to subargular alst v/seme shale Approx. 15 ecc. 38 Jac. 945 metrix (which as approx 207 grows), 205 sand, and hOS alightly plastic fines) h.ttlad (proy-brows), meint; alightly perventile; stiff; hemogeneous subsell: CL-ME. . 2.5 - 14.5 Silt, aandy w/graval 12" has - subrounded to subanguiar alst u, some shalo Appres. 25 4\*, 35 4\*, 935 metrus (which is appress 155 graval, 255 shale, and 555 slightly plastic funns) Gravist inves: moist; alachtly permasale, v. stift to have; homogeneous till; CL-62. DRAWING 3.2 - 14. - 14.6 Silt, sandy w/graval 14 max. - subreunded to subsnyular slot w/sees sha Approx. 35 eff. 38.3-6, 925 matrix (which is approx 205 gravel, 255 sand, and 536 slightly plastic fu Crayish brees, maist; slightly premackle; v. stiff ( bard; hangussous till; CL-46. 4.0 shale stic fimes) Note: Light asepage at 7.0" i hete: Very light seeps ge at bottom of pit. TP #207. Buer. Smit. 5/5/70. MB. 3366.0 TP #40. 8 17 4203, Smar. Sper. 5/4/79. 848. 1349.6. 0.0 - 0.0 Tepseil - dark brown Silt, w/aand and grownl 6' max. - subsagular to subrounded alst v/ama shala Appras. 25 v6', 45 J-4', 945 mitrui (which is appras. 20% grava), 20% aand, and 60% olightly platic (ross) Hottlad (gray-brow), moist, slightly paramable, stiff, beengelasus autopul, CL+48. 0.0 - 0.0 0.9 - 3.3 0.0 - 1.5 Topsoil - darb brown 4.0 Silt, v/mand and graval 4'max, - subrounded to subargular slat v/sume shale Approx 15 40°, 35 3-0°, 45° metrix (vurd: is approx. 30° graval, 20° and, and soff alightly plastic fisse) Nettled (grav-brown), music; slaghtly permeable; stiff; homogeneous subsoll; CL-46. c.s . 2.1 1.5 3.5 - 15.5 Salt, w/graval and sand 14" max - subangular to 3.1. v<sub>s</sub>(reveal and more 14<sup>2</sup> max. - v<sub>s</sub>(re) and re) results a state of the 2.2 - 6.4 - 13.0 Silt, sandy w/grawal 14° max. -subrounded to sub-ngular slat w/sume shale Approx. 35 -6°, 55 -6°, 955 metrix (which is approx. -00 provid, 255 sand, and 556 blightly plastic flows) Crayish (rown; moist) slightly permeatur, v. stiff ta -party tomagements till; CL-462. 4.0 Note: Light sorphge at 1.2'. S.1t, sardy w/growel 12° max. - subrewised to subargular slat wyseem schole Approx. 35 40°, 35 Job; 935 matrix (which is approx. 205 gravel, 305 sand, and 505 alightly plastic fines) Gray, moist; slightly permeable; w. stiff to hard; homegresous slib; CL+40. 0.5 - 12.6 CHECKED B APPROVED 1P #205. Reer. Spor. 3/5/70. BAB. 1337.2 13.0 - 16.6 0.0 - 0.9 Tepseil - dark brown 0.9 - 2.3 Silt, v\_And and graval B<sup>i</sup> mma. - subrounded to subangular alst v/some shale Approx. 25 vol. 65 Silt view Ministrum (+b:ch is approx. 205 graval, 205 and, and 607 silt(h)p plastic fimes) Hottled (proy-brown); moist; slightly permotale; stiff; homogeneous subsoil; CL-ML Note: Light scopige at 3.0" 17 #301. 17 #254. Ever. 1.04.70. B.B. 1345.7 0.0 - 0.0 2.5 - 13.0 Silt, sandy w/gravel 14 mmax. - subrounded to sub-negular slat w/some shale Approx. 25 wid, 43 see, 946 metrix (which is approx. 20% grava), 23% sand, and 55% slightly plastic fines) Gispieb brown; suivit to well 8.5<sup>3+1</sup>, slightly perusshle; r. stiff to isn't, usangeneous till, CL-MA. 0.0 - C.9 Tepacil - dars brown <u>6. J. G.</u> 5-27-81 2.6 0.8 -2.0 S:lt, v, sand and graval P mag. - subrounded to sub-supular elect v/same shale Signa. 15 \*\*\* . 35 -0\*\* . 965 matrix (which is approx. 205 gravel, 205 sand, and b06 slightly plastic fines) Nottled (gray-trown); most; slightly permeable; stiff bong promous subsol; CL+80. 0.9 hote: Light seepsgs at 5.3' and 0.9 2.0 - 9.4 - 11.0 Silt, andy w/graval l+"max. - subrounded to subanguiar alst w/seme shale Approx. 25 447, 35 307, 925 and and 357 slightly plastic fixed (or yis) hreat, moist; alghtly permashle; v. atiff to herd (artreally dense at bottom w/boulders); hemp-generus till; CL-ML IR #209. Beer. Spor. 5/5/70. Bab. 13.7.4 2.6 DRAWI 0.0 - 1.4 Topasil - dark prove 1.4 - 3.0 Silt, v/graval and sand 6\* max. - submagular and subreunded als: v/same flags Approx. 35 40\*, 35 30\*, 946 matrix (which is approx. 305 graval, 155 sand, and 655 slightly plastic fuses) Hertied (proy-brows); moist; sliphtly permethes; stiff; hemogeneous subsail; CL-HL. 9.0 - 12.4 Note: Light seepage at 1.0' near interface of topsoil and subsoil. 3.0 - 14.8 Silt, w/graval and sand 14" max. == subengular and subrounded slat w/some flags Approx. 25 %\*9, 65 3-4\*, 665 matrix (which is approx. 256 graval, 205 sand, and 555 slightly plastic flues) Creysab fromm: moist: slightly permaable; v. sliff to hard; hemoge till; CL-ML 19 #205, Barr. Spor. 1,4/70, BAB. 1346.0 0.0 - 1.0 Topseil - dark brown Silt, v/aand and gravel 8 mag. - subrounded to subangular slat v/some shale 4 mag. - subrounded to subangular slat v/some shale 4 mag. - subscription of the state of the subscription 2 mag. - subscription of the state of the state 2 mag. - subscription of the state of the subscription 2 mag. - subscription of the state of the state 2 mag. - subscription of the state of the subscription of the subscription 2 mag. - subscription of the state of the state 2 mag. - subscription of the state of the state of the subscription of the state 2 mag. - subscription of the state of the state of the state 2 mag. - subscription of the state of the state of the state of the state 2 mag. - subscription of the state 11 1:02. 1 - 2.8 1.0 0.0 - 14 Silt, anody v/gravel 14" max. - subrounded to subengular slat v/some flags Approx. 27 6%, 45 3-67, 455 matrix (which is approx. 205 gravel, 235 sand, and 355 slightly platic floss) Gray: moist; slightly permanals; v. stiff to herd; homogeneous till; CL-40. -14.8 + 1.0 2.8 - 13.4 Selt, u/grevel and sand 14' wat. - sulrounded to sulargular slat u/some shale Apper, 35 40, 55 3-57, 57, matrix (which is approx. 208 graval, 256 saud, and 556 slightly plastic fines) Graysab brows, m.srt alightly permeable; v. stiff to hard; homogeneous till; CL-ME. Note: V. Light snopage at 6.8" 4.5 - 20. TP #210, Dasg. Spor. 5/5/70, BAB. 1326.3 13.4 - 14.4 Silt, andy w/grewal f" max. - subrounded to subangular elst w/some shale Approx. 35 46, 95 344, 945 matrix (which is approx. 205 gravel, 305 and, and 505 alightly plastic fines) Gray; moist; slightly permasable; v. stift to hard; hmmogeneous till; CL-ME. D.S. 205.1 (OC-OM) 0.0 - 1.6 Tobanil - damb house 3.4 Silt w/mand and graval 6" mma. - multpund to nulangular slat w/mmm shale Appras. 15 40: 35 3-60; 305 mmtris (vhich is appras. 155 graval, 155 and, and 705 alightly plastic fisse) Mattled (grav-brows); moist; mlightly percende; stiff; hemogeneous subsei; (1-44) 1.6 -10.0 - 11 Note: Light seepage at 1.6' to 9.0' 3.4 - 14.3 512t, gravnily s/sand 16° max. - subround to Subangular alst v/semes flags Asprox. 25 6° (5 4°) 465 matrix (duich is sprox. 235 gravni, 205 asve, and 535 slightly plastic fines) Overfab browe; moriet: slightly permashis; v. stiff to hved; benegen till; CL-46. 9.5, 210.1 (0C-40) Hote: Very light souphge at 3.6" A.Cen 19 1253 HERCULENE, AAB SMITH CO . PGH . PA LT1530-1079 

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	Tr.fill. Imer.	. 5207. 5/3/TC. BAB. 1329.3	TP #503. Press	1 Lane, 5/1/7C, BAD, 1207.2
	0.0 - 0.9	Topasíl - dark brown	0.0 - 2.0	Topen13 - dark brown, including submil
let v semu akale (dasch is appras 208 greval, fires) v permeatle, stiff, homogeneoue	0.9 - 3.2	Sit; gravelly w/and b' man subangular to subrounded alst w/some shale Approa. 15 40-7, 35 3-4-7, 3-5 martra (which is approa. 205 gravel, 105 sand, and 705 sliphly plastic fixes) Nottlef(gray-crum), moist; slightly jermeshle; stiff; bomogeneous subsair: Cl-ML.	2.0 - 5.5	6.1t, gravally v/sand 14' m.z subround to subangular alst v/same flags Appras. 25 v6', 47 3-6. 945 metrix (white is approxi- 255 graval, 205 sand, and 555 alightly plastic finms) Nottled (grav-brown); meist; alightly permenhlu; v. staff harogenrous till; Cl 40.
palst upommo sanla La (oblich is appres. 2015 gravel, Bagest funns) Samenble, v. stiff to barel; ;	3.2 - 14.0	511; endy w/greval 12° max subarpular to subreseded slat w/some stals Approax 25 wes, ed 3.4°, 965 matrix (vhuch is apjrox. 20% greval, 25% mand,and 55% slightly pattic fines) Grayish brows; monit: slightly permovble; v. stiff to mard; homegeneous till; CL-ME.	<b>3.5 - 14.0</b>	Silt, growally v/sand lb* max subroand to subsequiar alst v/seme flags approx. 3* e*, 3\$ J.**, 975 metrix (which is approx. 23\$ growal, 13\$ sand, and 6\$ singhtly plotts finne) Dray; moist; singhtly presention; v. stiff; hemogeneous till; CL-40.
	-	Note: Light seepsge at 2.2'	TR ALCI DENA	- 5/6/70. Bab 1304 3
	TP P492. 51r.	<u>Chennel, 5/6/70, 848 1282,6</u>	0.0 - 1.4	Topeoil - dary areas
alet s'eme shale	0.8 ~ 1.2	Gravel, silty w/mand	1.4 - 5.3	Silt, gravelly w/sund
(mild is approx. its gravel, f.nee) g parme-ble, stiff, humogeneous		12' mai,Sier (Taga Approx, 56', 105'-5-, 655' motris (vhich -s spiros, 405' graval, 395' avos, and 255' non-plast,c fines) Brean; asturated; repidly primable; lesse, howegeterus sliving; QN		18" max subrounded to subhagular alst v/sems flags Approx. 3: 44', 55 3-6', 93 metra: (which is approx. 24 gravel, 205 sand, and 556 slightly plastic famm) Brown; mcut; alightly permeable; v. stiff; hemageneeum till; CL-6L
alst wisses shale (which is appran. 20% gravah, :floss) whis, v. stiff to hard; 	2.2 - t.5	Graval, silty u/sind lb*mms Slat flags w/some sutre inded to schungular clls. Approx. 35 Mey. 165 3-4:, "15 metrix (w.:ch is epprox. 405 graval, 305 med, and 305 non-plastic fines) Gray: miturated; bepidly permeable; losse; homegeneous alluvium; GN	5.3 - 12.5	Sand, silty v(graval 14' mm subreunded to subengular slat v/some flags. Appron. 37 -6', 78 -6', 80' matrix (abich is approx. 305 gravel, 335 sand, bad 335 slaphly plastic finne) Gray: v. vet; moderato y srunelle; loose; homogeneous till (unshed); SC-SH
	<b>8</b> .5 - 12.0	Gravel, solty w/sand 14" exa, - s-brounded to subanjular slat w/some flags : Approx. SS 66", 75 3-6", 605 mutrix (which is approx. 355 gravel, 255 sand, and 405 mon-plasts: firse) Gray: wet/mederately permovable; dense; homo, ensous till; GN	12.5 - 14.0	Silt, sandy v/graval 12 max subrounded to subsingular alst v/some flags Approx. 25 40-, 65 1-60, 965 matrix (which is approx. 155 gravel, 205 sand, and 955 sliphtly plastic fines) Gray; wet; alightly permeable; v. stiff, nome, monous till; C.44L.
inst v/some shale (which is approx. 20% gravel, fines)		Note: Neavy seepage at 2.2'		Note: Hoderste seepage 8 b.41 - Caved at completion.
y permachle; stiff; bemogeneeus	17 #501, Dream	Line, 5/7/7C, MB, 1283.4	TP A.O. Other	r. 5/5/20. BAB. 1286.4
alot w/order simile	0.8 - 2.0	Silt, w/send and gravel	0.0 - 1.2	Topsoil - dark brown.
(which is a pprox. 20% gravel, fines) slightly permethle; v. stiff		6' max's subrounded to subnegalar slat viscome Clags Appear 15 we'z 25 1-6', 977 metriz (which is a approx. 205 gravel, 205 and, and NCS slightly plastic funce) Nottled (grav-brown); most;slightly permemble; stiff, basegeneous subsold CL-ML.	1.2 - 3.5	511; W/s-md and gravel 14° mai sibround to ubuneular alst v/some flags Apprez. 35 ***, 45 3-**, 945 mctris (which is apprez. 208 gravel, 105 and, and 105 alignily plastic fame) Grayish brown, moist; slightly permeable; V. #tiff; homogeneous; till; Cl-46.
	2.0 - 9.0	Silt, gravelly w/mand 12° max subrounded to subangular mlat w/some flags Approx. 35 et*, 46 34°, 94° artix (vtich is approx. 35° gravel, 175 sand, and eCS slightly pistic fines) Brown; moist; alightly parmmable; v. stiff to bard; homogeneous; till; CL-ML. D.5. 50.1 (CL-ML)	3.5 - 8.8	Silt Approx. 2% 3-6", 99% matrix (which is approx. 6% graval, 12% sand, and 90% slightly plastic fines) Gray: moist slightly permashle; v. stiff; homogeneous lacustrine; CL-40.
lat v/seme flags which is approx. 205 gravel, floos) permonble; stiff, hemogeneous i	9.0 - 12.5	Silt, gravally w/sand 14° max subrended to subanyular alat w/some flags Approx. 25 46°, 45 3-6°, 45% matrix (vtich is approx. 20% graval, 15% sand, and 65% silchtly plastic flags) Gray: moist; alightly permetiles v. stiff to hard; homogeneous till; CL-40. No. 5. 501.2 (m)	c.C - 13.O	Silt, V/send and gravel 12° max subround to subangular slat v/some flags Aprox. 37 %6', 55 3-6', 575 matrix (vb/cb )s apprex. 171 graval, 237 sand, and 605 slightly plastic fines) Grayish troom, moist; slightly premashle; v. stiff; homogenesus till; CL-ML
f slat v/some flags which is apprent. 255 gravel,		Note: Bry Pit.		Note: Dry pit.
lues) le: v. stiff te burd; hemogeneeweb	IP #102. Drain	Line, 5/6/70, BAB, 1253.9		·
	0.0 - 1.0	Topses1 - dark brown		
lat w/some flags which is approx. 20% gravel, fich is approx. 20% gravel, fiff to herd; homogeneous till; iff to herd; homogeneous till;	1.0 - 4.5	Grevel, slity v/smd 14° max Slet flags Approx. 55° 46°, 105° 3-6°, 855° metrix (which is approx. 405° gravel, - 355° sand, ami 255° non-plastic flags) Brows, saturated; repidly permeable; losse; bomugeneous alluvium; OH. 9.5° 502.1 (GM)		
	4.5 - 10.0	Sand, silty v/grevel 14° max sist flags v/subround to suiangular chis Approx. # 6°, 125 3-6°, 79% metrix (which is approx. 35% gravel, 49% sand, and 20% non-plastic fines) Gregi anturated; republy permeable; lesse; homogeneous till (washed) 38		AS BUILT
t w/some abale (which is apprex. 155 gravel, fines) y permemble; stiff; hemogeneous	10.0 - 11.0	Silt, v/mood and graval 12° max alst flags v/subrounded to subangular chis Appres. 35 40°, 75 3-4°, 605 matris (which is appres. 205 graval, 205 sand, and 605 slightly plarance flags Gway, wet, slightly permentils; demse; homogeneous till; CL-ML		1-28-76
et w/seme flags (which is approx. 25 gravel, fines) hle; v. stiff to hard; hemegeresus		Nate: New vy seegage at 1.0'		NEWTOWN-HOFFMAN CREEKS WATERSHED PROJECT FLOODWATER RETARDING DAM SITE I CHEMUNG COUNTY, NEW YORK
			U	S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE
• •		" <i>.</i> "	Drawn	Buch Beter 520 Linder of An Stilling
· · · ·			Chertag	NY-2284-
				PLATE 8
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APPENDIX F

GEOLOGY MAP



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CANADAWAY GROUP

800-1200 ft. (240-370 m)

Machias Formation-shale, siltstone: Rushford Sandstone; Caneadea, Canisteo, and Hume Shales. Canaseraga Sandstone: South Wales and Dunkirk Shales: In Pennsylvania Towanda Formation-shale, sandstone

### JAVA GROUP

300-700 ft. (90-210 m.)

Wiscoy Formation--sandstone. shale: Hanover and Pipe Creek Shales

### WEST FALLS GROUP 1100-1600 ft. (340-490 m.)

- Nunda Formation-sandstone, shale. West Hill and Gardeau Formations-shale, siltstone; Roricks Glen Shale; upper Beers Hill Shale: Grimes Siltstone.
- lower Beers Hill Shale; Dunn Hill, Millport, and Moreland Shales.
- Nunda Formation-sandstone, shale: West Hill Formation-shale, siltstone: Corning Shale.
- Dwnm "New Milford" Formation-sandstone, shale
- Gardeau Formation-shale, siltstone: Roricks Glen Shale
  - Slide Mountain Formation-sandstone, shale, congiomerate.
- Beers Hill Shale; Grimes Siltstone; Dunn Hill, Millport, and Moreland Shales

#### SONYEA GROUP 200-1000 ft. (60-300 m.)

In west: Cashagua and Middlesex Shales. In east: Rye Point Shale, Rock Stream ("Enfield") Siltstone; Pulteney, Sawmill Creek, Johns Creek, and Montour Shales.

#### GENESEE GROUP AND TULLY LIMESTONE 200-1000 ft. (60-300 m.)

- West River Shale; Genundewa Limestone; Penn Yan and Geneseo Shales; all except Geneseo replaced eastwardly by Ithaca Formation-shale, siltstone and Sherburne Siltstone.
- **Oneonta Formation**—shale, sandstone
- Unadilla Formation-shale, siltstone.
- **Tully Limestone**

### LOCKPORT GROUP 80-175 ft. (25-55 m.)

Oak Orchard and Penfield Dolostones, both replaced eastwardly by Sconondoa Formation-limestone. dolostone

GEOLOGY MAP LEGEND

# DAPPOLONIA

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APPENDIX G

## STABILITY ANALYSES

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## UNITED STATES DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE - Soil Mechanics Laboratory

SUBJECT: ENG 22-5, New York WP-08, Newton-Hoffman, Site #1 DATE: February 4, 1971 (Chemung County)

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

#### ATTACHMENTS

- 1. Form SCS-354, Soil Mechanics Laboratory Data, 1 sheet.
- 2. Form SCS-355A, Triaxial Shear Test Data, 2 sheets.
- 3. Form SCS-352, Compaction and Penetration Resistance, 1 sheet.
- 4. Form SCS-357, Summary Slope Stability Analysis, 2 sheets.
- 5. Figure No. 1, Compactive Effort vs. Compacted Density, 1 sheet.
- 6. Investigational Plans and Profiles.

#### DISCUSSION

#### GENERAL.

The proposed 54-foot high damage class c flood control dam is located in the Allegheny Plateau physiographic area of Chemung County. The foundation material is principally glacial till with some lacustrine-material in the floodplain section.

#### FOUNDATION.

A. <u>Soil Classification</u>. Foundation samples were not submitted to the Soil Mechanics Laboratory for testing. The field classification, along with gradation and plasticity data obtained in the field laboratory, are included in the geology report.

## EMBANIMENT.

A. <u>Spil Classification</u>. One sample of glacial till was submitted from the borrow area. The sample contains 33 percent gravel size material and 52 percent fines. The LL is 25 and the PI is 6. It is classed as a CL-ML.

A dispersion test indicated 32 percent dispersion in the fraction finer than 0.005 mm.

Richard L. Phillips Subj: ENG 22-5, New York WP-08, Newton-Hoffman Site #1

B. <u>Compacted Density</u>. A Standard Proctor compaction test was made on the minus No. 4 fraction. The maximum dry density obtained was 120.5 pcf and the optimum moisture content is 12 percent.

In addition to the Standard Proctor test, tests were made at varying compactive efforts, and the data obtained are shown on the attached Figure No. 1.

C. <u>Shear Strength</u>. The till submitted from Site 3A on this watershed appear to be comparable to the till at this site. Consolidated undrained triaxial shear tests were made on the till from Site 3A at 95 percent of Proctor density and low shear strength parameters were obtained. It appeared that a higher test density was necessary, and the sample from this site was tested at 97 percent of Proctor density. Low shear strength parameters were obtained at this density also, and additional tests were made on the Site 3A samples of till at 100 percent of Proctor density. The shear test data obtained on the samples from Site 3A and the sample from this site are summarized as follows:

[					PI				P	Shear Strength Parameters							
	Site	Sample	% <	LL		Class	Test De	ensity	Parameter	Tot	al	Effec	tive				
	No.	No.	NO: 4				γ <sub>d</sub>	đ			655		-				
	$\sim$						pcf	Proctor		deg	psf	deg	c psf				
	1	204.1	67	25	6	CL-ML	116.8- 118.5	97 <b>-</b> 98.5	0.97-0.98	18 <u>1</u>	0	26 <u>}</u>	0				
	3A	207.1	89	19	2	ML	114.9- 115.7	95 <b>-</b> 95 <b>-5</b>	0.96-1.0	19	0	26 <del>]</del>	0				
							118.7- 119.4	98 <b>-</b> 98.7	0.95-0.96	21	575	32	0				
	3A	108.1	70	29	9	CL	111.0- 111.2	94.5	0.96-0.99	12	175	22 <del>]</del>	125				
							116.7- 118.2	100	0.98-1.0	15	425	25	200				

The data indicates that these materials have low shear strength at 95 percent of Proctor density. The compaction study shown on Figure No. 1 indicates that 95 percent of Proctor density is obtained with a compactive effort of about 5000 ft.lbs. per cubic foot, which is in the range of 40 percent of Standard Proctor compactive effort.

The low shear strength parameters obtained at 95 percent of Proctor density may result because of the relatively small amount of energy applied to obtain this density. The laboratory data indicate that this type of material should compact quite well on the fill and that a density in the range of 100 percent of Proctor is necessary. Richard L. Phillips Subj: ENG 22-5, New York WP-08, Newton-Hoffman Site #1

On the basis of the testing from this site and from Site 3A, we suggest that the shear strength parameters obtained on the till at 100 percent of Proctor density from Site 3A be used for this site also.

### SLOPE STABILITY.

The stability of the proposed 3:1 upstream slope and the  $2\frac{1}{2}$ :1 downstream slope was checked with a Swedish circle method of analyses and with a block method of analyses. The circle analyses considered the embankment only and it was made with the computer and the SCS program. The NavDocks block method was used and it considered the embankment and 2 feet of  $\beta = 35^{\circ}$ , c = 0 foundation material. The upstream slope was analyzed for the full drawdown condition and the downstream slope was analyzed for the full drawdown condition with a drain at the c/b = 0.6 point.

The circle analyses for the 3:1 upstream slope with planned 10-foot berm, using total stress shear strength parameters of  $\phi = 15^{\circ}$ , c = 425 psf, shows a factor of safety of 1.36. The block analyses, considering the foundation, shows a factor of safety of 1.59. The circle analyses on the downstream slope shows that a 20-foot berm is required at elevation 1300 in order to obtain an acceptable factor of safety (Trial 5A, F<sub>s</sub> = 1.52).

An infinite slope analysis was made for the upstream slope of Site 3A considering the effective stress shear strength parameters of  $\overline{\emptyset} = 32^{\circ}$ ,  $\overline{c} = 0$ . For the condition of parallel flow, a 3:1 slope has a factor of safety of 1.02 and a  $3\frac{1}{2}$ :1 slope has a factor of safety of 1.19. For the condition of horizontal flow, a 3:1 slope has a factor of safety of 0.93 and a  $3\frac{1}{2}$ :1 slope has a factor of safety of 1.12.

#### CONCLUSIONS AND RECOMMENDATIONS

A. <u>Site Preparation</u>. The material designated as F in the floodplain and described as floodplain silt and topsoil was not tested for strength; therefore, we suggest that it be stripped from the foundation area of the dam.

The material designated as slump on the lower part of the left abuttent should be removed from the base area of the dam and we concur with the proposal to excavate the slope to 2:1.

B. <u>Cutoff</u>. We concur with the proposal to bottom the cutoff trench in the till and the lacustrine material underlying the GM alluvium which is designated as material A. On the abutments, the trench should bottom in till below the zone affected by surface disturbances. A minimum trench depth of 4 feet is suggested.

We suggest that the trench backfill be compacted to 100 percent of Proctor density.

Richard L. Phillips Subj: ENG 22-5, New York WP-08, Newton-Hoffman Site #1

- C. Principal Spillway. It is reported that no unusual problems are expected.
- D. <u>Drain</u>. We recommend that a foundation trench drain be used to provide a controlled outlet for seepage that may be expected to by-pass the cutoff. We suggest that the drain be located at about the c/b = 0.6 point, and we suggest that it be carried up the abutments to about elevation 1305. In the floodplain, the trench should extend through the GM alluvium designated as material A and we suggest that it penetrate the till on the abutments to at least a 4-foot depth.

When the cutoff trench is opened, the conditions on the left abutment should be evaluated to determine if additional drainage measures are required.

The filter requirements should be checked in order to meet the criteria outlined in Soil Mechanics Note No. 1.

- E. Embankment Design.
  - 1. <u>Placement of Materials</u>. We recommend that the till used for the embankment be placed at a minimum of 100 percent of Standard Proctor density. The placement moisture content should be near optimum.
  - 2. Slopes. The following slopes are suggested:
    - a. Upstream:  $3\frac{1}{2}$ :1 in the area where the slope will be subjected to drawdown. A steeper slope can be used above this point. The test data indicate that the shear strength parameters are quite sensitive to changes in density and, since it appears possible that the effective  $\overline{c}$  parameter might be 0, we are suggesting the flatter slope to reduce the possibility of shallow slides developing during drawdown. Your experience with these materials may indicate that a 3:1 slope would be satisfactory, however.
    - b. Downstream.  $2\frac{1}{2}$ : 1 with a 20-foot berm at elevation 1300.
  - 3. <u>Settlement</u>. An overfill allowance of 0.75-foot is suggested to compensate for residual consolidation.

Prepared by:

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Attachments

cc: Bernard S. Ellis, Syracuse, N.Y. Loring C. Ibbitson, Syracuse, N.Y. D. W. Shanklin, Binghamton, N.Y. Neil F. Bogner, Upper Darby EWPU

G4 OF 10





G6 OF 10



G7 OF 10

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G8 OF 10

30 OF 10



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G9 OF 10



APPENDIX H

# REFERENCES

#### APPENDIX H

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7

