## Title:
Phase I Inspection Report
Patterson Brixius Grey Creek Watershed Project, Site I
Susquehanna River Basin, Broome County, New York

## Author(s):
George Koch

## Report Date:
30 September 1980

## Abstract:
This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization.

The examination of documents and visual inspection of the Site I Dam and appurtenant structures did not reveal conditions which constitute a hazard to human life or property.
The discharge capacity of the spillways is adequate for the PMF (Probable Maximum Flood).

The following remedial actions must be completed within 1 year from notification to the owner:

1. Eliminate the pedestrian and vehicular traffic on the embankment and the auxiliary spillway, backfill all depressions and reseed these areas.

2. Repair the erosion and reseed the areas adjacent to the impact basin, along the toe of the embankment, and between the right abutment and the auxiliary spillway outlet. Also remove the stockpiles in the channel and near the outlet of the auxiliary spillways and reseed.

3. Recaulk the joint between the service spillway pipe and the impact basin wall. Repair the concrete surfaces of the impact basin and the left animal guard.

4. Remove the vegetation along the left slope of the auxiliary spillway and on the banks of the downstream channel. Remove the debris on the approach channel of the auxiliary spillway. Provide a program of periodic cutting and mowing of the dam and appurtenances.

5. Provide a program of periodic inspection and maintenance of the dam and appurtenances, including yearly operation and lubrication of the reservoir drain system. Document this information for future reference. Also develop an emergency action plan.
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PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

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

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

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

<table>
<thead>
<tr>
<th>Section</th>
<th>Page No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASSESSMENT</td>
<td>-</td>
</tr>
<tr>
<td>OVERVIEW PHOTOGRAPH</td>
<td>-</td>
</tr>
<tr>
<td>1 PROJECT INFORMATION</td>
<td>1</td>
</tr>
<tr>
<td>1.1 GENERAL</td>
<td>1</td>
</tr>
<tr>
<td>1.2 DESCRIPTION OF PROJECT</td>
<td>1</td>
</tr>
<tr>
<td>1.3 PERTINENT DATA</td>
<td>2</td>
</tr>
<tr>
<td>2 ENGINEERING DATA</td>
<td>4</td>
</tr>
<tr>
<td>2.1 GEOLOGY</td>
<td>4</td>
</tr>
<tr>
<td>2.2 SUBSURFACE INVESTIGATION</td>
<td>4</td>
</tr>
<tr>
<td>2.3 EMBANKMENT AND APPURTENANT STRUCTURES</td>
<td>4</td>
</tr>
<tr>
<td>2.4 CONSTRUCTION RECORDS</td>
<td>4</td>
</tr>
<tr>
<td>2.5 OPERATION RECORD</td>
<td>4</td>
</tr>
<tr>
<td>2.6 EVALUATION OF DATA</td>
<td>4</td>
</tr>
<tr>
<td>3 FINDINGS</td>
<td>5</td>
</tr>
<tr>
<td>3.1 FINDINGS</td>
<td>5</td>
</tr>
<tr>
<td>3.2 EVALUATION</td>
<td>6</td>
</tr>
<tr>
<td>4 OPERATION AND MAINTENANCE PROCEDURES</td>
<td>7</td>
</tr>
<tr>
<td>4.1 PROCEDURES</td>
<td>7</td>
</tr>
<tr>
<td>4.2 MAINTENANCE OF THE DAM</td>
<td>7</td>
</tr>
<tr>
<td>4.3 WARNING SYSTEM</td>
<td>7</td>
</tr>
<tr>
<td>4.4 EVALUATION</td>
<td>7</td>
</tr>
<tr>
<td>Section</td>
<td>Page No.</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>5 HYDROLOGIC/HYDRAULIC</td>
<td>8</td>
</tr>
<tr>
<td>5.1 DRAINAGE AREA CHARACTERISTICS</td>
<td>8</td>
</tr>
<tr>
<td>5.2 ANALYSIS CRITERIA</td>
<td>8</td>
</tr>
<tr>
<td>5.3 SPILLWAY CAPACITY</td>
<td>8</td>
</tr>
<tr>
<td>5.4 RESERVOIR CAPACITY</td>
<td>8</td>
</tr>
<tr>
<td>5.5 FLOODS OF RECORD</td>
<td>8</td>
</tr>
<tr>
<td>5.6 OVERTOPPING POTENTIAL</td>
<td>8</td>
</tr>
<tr>
<td>5.7 EVALUATION</td>
<td>8</td>
</tr>
<tr>
<td>6 STRUCTURAL STABILITY</td>
<td>9</td>
</tr>
<tr>
<td>6.1 EVALUATION OF STRUCTURAL STABILITY</td>
<td>9</td>
</tr>
<tr>
<td>7 ASSESSMENT/RECOMMENDATIONS</td>
<td>10</td>
</tr>
<tr>
<td>7.1 ASSESSMENT</td>
<td>10</td>
</tr>
<tr>
<td>7.2 RECOMMENDED MEASURES</td>
<td>10</td>
</tr>
</tbody>
</table>

**APPENDIX**

A. PHOTOS                  
B. ENGINEERING DATA CHECKLIST  
C. VISUAL INSPECTION CHECKLIST  
D. HYDROLOGIC/HYDRAULIC ENGINEERING DATA AND COMPUTATIONS  
E. REFERENCES  
F. STABILITY ANALYSES  
G. DRAWINGS
PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam: Patterson Brixius Grey Creek Watershed Project, Site 1 I.D. No. NY 698
State Located: New York
County Located: Broome
Stream: Patterson Creek (tributary of the Susquehanna River)
Date of Inspection: July 23, 1980

ASSESSMENT

The examination of documents and visual inspection of the Site 1 Dam and appurtenant structures did not reveal conditions which constitute a hazard to human life or property.

The discharge capacity of the spillways is adequate for the PMF (Probable Maximum Flood).

The following remedial actions must be completed within 1 year from notification to the owner:

1. Eliminate the pedestrian and vehicular traffic on the embankment and the auxiliary spillway, backfill all depressions and reseed these areas.

2. Repair the erosion and reseed the areas adjacent to the impact basin, along the toe of the embankment, and between the right abutment and the auxiliary spillway outlet. Also remove the stockpiles in the channel and near the outlet of the auxiliary spillways and reseed.

3. Recaulk the joint between the service spillway pipe and the impact basin wall. Repair the concrete surfaces of the impact basin and the left animal guard.

4. Remove the vegetation along the left slope of the auxiliary spillway and on the banks of the downstream channel. Remove the debris on the approach channel of the auxiliary spillway. Provide a program of periodic cutting and mowing of the dam and appurtenances.

5. Provide a program of periodic inspection and maintenance of the dam and appurtenances, including yearly operation and lubrication of the reservoir drain system. Document this information for future reference. Also develop an emergency action plan.
George Koch  
Chief, Dam Safety Section  
New York State Department of Environmental Conservation  
NY License No. 45937

Approved By:  

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

Date:  
30 Sep 89
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
Evaluation of 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. Description of Dam and Appurtenances
The Site I Dam consists of a 1300 feet long homogeneous earth embankment with an auxiliary spillway located at the right end of the embankment in a cut section beyond the abutment of the embankment. The maximum height of the dam is 65 feet. The embankment has a crest width of 20 feet, an upstream slope of 1 vertical on 3 horizontal, and a downstream slope of 1 on 2.5. Two berms, located near the principal spillway riser on the upstream slope, were incorporated into the design.

The auxiliary spillway is a vegetated earth channel, with a bottom width of 340 feet and side slopes of 1 on 3 (left slope) and 1 on 2 (right slope).

The principal spillway is a rectangular concrete riser which extends above the upstream slope near the toe of slope. The riser is topped by a triangular trash rack, the sides of which form a drop inlet, which is utilized during high reservoir levels. Under low flow conditions, a rectangular low stage inlet, in the upstream face of the riser, controls the reservoir level.

A 30 inch diameter reinforced concrete pipe controls the flow between the riser and the impact basin located at the toe of the dam. An 18 inch diameter pipe, with a manually operated slide gate, the controls of which are located atop the riser, serve as the reservoir drain system.

b. Location
The dam is located on Patterson Creek, a tributary of the Susquehanna River, approximately 1 mile north of Endwell, New York.
c. Size Classification
The dam is 65 feet high and is classified as "intermediate" in size (40 to 100 feet in height).

d. Hazard Classification
The dam is classified as high hazard because of its location above Endwell, New York.

e. Ownership
The dam is owned and operated by the County of Broome, New York.

f. Purpose
The dam is a floodwater retarding structure.

g. Design and Construction History
The dam was designed and construction supervised by the U.S.D.A. Soil Conservation Service (SCS). The dam was completed in 1968. The SCS office for Broome County, located at the Broome County Airport, has all design and construction information.

h. Normal Operating Procedures
Normal flows are discharged through the principal spillway. This structure has sufficient capacity to store and discharge a 100 year flood without use of the auxiliary spillway. Flow in excess of the 100 year storm will be discharged through the auxiliary spillway.

1.3 PERTINENT DATA

a. Drainage Area (sq. mi.)
4.42

b. Discharge at Dam (cfs)

| Principal spillway at Maximum high water | 160 |
| Principal spillway at auxiliary spillway crest elevation | 132 |
| Reservoir drain at Normal water elevation | 45 |
| Maximum known flood | 
| Total discharge at Maximum high water | 17,500 |

c. Elevations (USGS Datum)

| Top of dam | 1041.3 |
| Auxiliary spillway crest | 1034.0 |
| Principal spillway crest | 1016.0 |
| Low stage inlet | 998.0 |
| Reservoir drain | 981.9 |

d. Reservoir (acres)

| Surface area at top of dam | 67.2 |
| Surface area at crest of auxiliary spillway | 51.2 |
| Surface area at crest of principle spillway | 24.1 |

e. Storage Capacity (acre feet)

| Top of dam | 1280.0 |
| Auxiliary spillway crest | 905.0 |
| Principal spillway crest | 285.0 |
. Dam
   Type: Homogeneous earth fill, with keyed cutoff and drain parallel
to axis of dam.

   Length (ft.) 1250.
   Slopes: upstream 3H to 1V
            downstream 2.5H to 1V
   Crest Width (ft.) 20.

. Principle Spillway
   Type: Two stage reinforced concrete drop inlet structure. Low level
       orifice at elevation 998 and 15.0 weir at elevation 1016.0.

   Weir length: 15.
   Height 35.

. Auxiliary Spillway
   Type: Grass lined channel having trapezoidal cross section.

   Bottom Width 340.
   Length Control Section 50.

. Reservoir Drain
   Type: 18 inch diameter cast iron pipe with reinforced concrete inlet.

   Control: Manually operated valve located in the spillway riser.
SECTION 2: ENGINEERING DATA

2.1 GEOLOGY

The Patterson, Brixius, Grey Creek Watershed Project Dam No. 1 is located in the glaciated portion of the "Appalachian Uplands" (northern extreme of the Appalachian Plateau) physiographic province of New York State. These uplands were formed by dissection of the uplifted but flat lying sandstones and shales of the middle and upper Devonian Catskill Delta. The plateau surface is represented by flat-topped divides with drainage generally southwest toward the Susquehanna River system.

Glacial cover is generally thin, although some north-south valleys are so thick that they are completely buried. The present surficial deposits have resulted primarily from glaciations during the Cenozoic Era, the last of which was the Wisconsin glaciation, approximately 11,000 years ago.

2.2 SUBSURFACE INVESTIGATION

A subsurface investigation was conducted by the Soil Conservation Service in 1965. This program consisted of 14 drill holes and 20 test pits at locations along the dam, auxiliary spillways, structural elements, and borrow area. Applicable subsurface information is included in Appendix F, Drawings #15 and 16.

In general, the soils in the vicinity of the dam are of glacial till or glacial lacustrine origin, and are silty gravel, clayey gravels, and sandy silts over shale bedrock. The permeability of these soils is low.

2.3 EMBANKMENT AND APPURTENANT STRUCTURES

The dam was designed and constructed under the supervision of the Soil Conservation Service. "As-Built" drawings of this dam are on file at the SCS office in Broome County. Selected drawings of the dam and appurtenances are included in Appendix F. The dam is composed of homogeneous earth fill, the maximum height of which is 65 feet, a cut-off trench having side slopes of 1 on 1, and a foundation drain parallel to the axis of the dam near the downstream toe. A reinforced concrete riser serves as the principal spillway and a vegetated channel serves as the auxiliary spillway.

2.4 CONSTRUCTION RECORDS

Complete construction records are available from the SCS office in Broome County. No major construction changes were instituted.

2.5 OPERATION RECORD

Since the dam is an ungated floodwater retarding structure, no operating records are maintained regarding water levels. During periods of extreme rainfall, SCS personnel do monitor the reservoir.

2.6 EVALUATION OF DATA

The data presented in this report has been compiled from information obtained from Mr. Gary Page, Project Engineer for SCS in Broome County, and Mr. Donald Lake, Head of the SCS Design Section in Syracuse, New York. This information appears to be adequate and reliable for Phase 1 Inspection purposes.
SECTION 3: VISUAL Inspection

3.1 FINDINGS

a. General
Visual inspection of the Site #1 Dam was conducted on July 23, 1980. The weather was cloudy and the temperature ranged in the low 70's. The reservoir level at the time of the inspection approximately the invert of the low stage inlet of the service spillway riser (El.998.0).

b. Earth Embankment
No signs of distress were observed in connection with the earth embankment and no signs of misalignment, sloughing, seepage, subsidence, surface cracking or undesirable growth were noted. While no riprap was in use on the upstream slope for wave protection, no erosion was apparent. (See Photos #1 & 2)

Pedestrian and vehicular paths were noted on the crest and slopes of the embankment. These paths are a potential source of erosion. (Photos 5 & 6)

Near the downstream toe of the embankment on both sides of the impact basin erosion was evident. This erosion appears to be related to runoff from the embankment and the adjacent ball fields. (Photo #3)

Regrading in the area between the embankment and the auxiliary spillway was observed. A stockpile of soil was also evident near the outlet of the auxiliary spillway. Since no vegetation had been established on the regraded surface, erosion and slight ponding of runoff (from a previous storm) was noted. (Photo #5)

An internal drainage system composed of 2 - 8 inch diameter pipes surrounded by "drain fill" and extending parallel to the axis of the dam, provides drainage at the embankment-subgrade contact. These pipes exit through the concrete walls of the impact basin. Discharge from these pipes was 1 to 2 gpm each. The flow was clear. The animal guard on the left pipe was broken. (See Photo #3)

c. Service Spillway
The service spillway is generally in good condition. The maximum joint extension of the pipe is 0.5 inches. The joint between the pipe and the impact basin is open. The walls of the impact basin are slightly deteriorated. Calcification was noted from a crack or cold joint on the upstream wall about 1 foot above and to the right of the pipe. This area was dry at the time of the inspection.

d. Auxiliary Spillway
The grass lined service spillway beyond the right abutment is generally in good condition. Three ball fields were noted in the auxiliary channel, all with removable fences. Vehicular paths and soil stockpiles were noted in the channel. Vegetation was also evident on the slope between the auxiliary spillway and the embankment. (Photo #7)
e. Reservoir Drain
The 18 inch diameter reservoir drain pipe and manually operated slide gate, controls of which are located atop the riser, is reported to be operational.

f. Downstream Channel
The downstream channel below the impact basin is riprapped. Some vegetation was observed along the banks of this channel. (Photo #4)

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

3.2 EVALUATION
The problem areas observed during the inspection which require remedial measures are as follows:

1. Pedestrian and vehicular traffic has created paths and depressions on the slopes of the embankment, at the abutments and in the auxiliary spillway channel. This traffic must be eliminated, the depressions filled and the area seeded to prevent erosion.

2. Erosion was evident near the toe of the embankment in the vicinity of the impact basin, at the right abutment, and between the auxiliary spillway outlet and the right abutment. These areas must be regraded and vegetation established as soon as possible.

3. Stockpiles of soil were observed in the auxiliary spillway channel and near the outlet of the channel. These stockpiles must be removed and the vegetation beneath the piles restored.

4. Recaulk the joint between the service spillway pipe and the wall of the impact basin.

5. The walls of the impact basin are slightly deteriorated and the left animal guard is broken. Repair the concrete surfaces of the impact basin and the animal guard.

6. Remove the vegetation on the slope between the right abutment and the auxiliary spillway channel, and along the banks of the downstream channel. Provide a program of periodic cutting and mowing of the dam and appurtenances. Also remove the debris in the approach channel of the auxiliary spillway.

7. Provide a program of periodic inspection and maintenance of the dam and appurtenances, including yearly operation and lubrication of the reservoir drain system. Document this information for future reference. Also develop an emergency action plan.
SECTION 4: OPERATION AND MAINTENANCE PROCEDURES

4.1 PROCEDURES

The normal water surface elevation is approximated by the low stage inlet of the service spillway. Downstream flows are limited by the 30 inch diameter service spillway pipe, except during extremely heavy runoff when the auxiliary spillway is in service. The dam provides 862 acre feet of flood storage between normal water level and the crest of the auxiliary spillway.

4.2 MAINTENANCE OF THE DAM

The dam is maintained by the County of Broome, New York. Maintenance of the dam is considered unsatisfactory as evidenced by the extensive vehicle and pedestrian paths which have initiated erosion on the slopes of the dam. In addition, erosion at the toe of the embankment near the impact basin and debris along the toe of the downstream slope were noted.

4.3 WARNING SYSTEM

There is no warning system in effect or in preparation.

4.4 EVALUATION

The dam and appurtenant structures have not been maintained in satisfactory condition as noted in "Section 3: Visual Inspection."

-7-
SECTION 5: HYDROLOGIC/HYDRAULIC

5.1 DRAINAGE AREA CHARACTERISTICS

The drainage area above the Patterson Brixius Site 1 dam is 2829 acres or 4.42 square miles. Delineation of the watershed was made using the USGS 7.5 minute quadrangle, Maine, New York. The watershed consists of woodlands and some residences in a primarily rural setting. Relief ranges from moderate to fairly steep.

5.2 ANALYSIS CRITERIA

The analysis of the spillway capacity of the dam and storage of the reservoir was performed using the Corps of Engineers HEC-1 computer model. The unit hydrograph was defined by the Snyder Synthetic Unit Hydrograph method, and the Modified Puls routing procedure was incorporated. The Probable Maximum Precipitation (PMP) was 21.0 inches (24 hrs., 200 sq. mi.) from Hydrometeorological Report #33 in accordance with recommended guidelines of the Corps of Engineers. The floods selected for analysis were 20, 40, 50, 60, 80, and 100% of the Probable Maximum Flood (PMF) flows. The PMF inflow of 7082 cfs was routed through the reservoir with no significant attenuation.

5.3 SPILLWAY CAPACITY

The spillway is a reinforced concrete drop inlet structure, 35 feet in height. It creates a weir length of 15 feet at elevation 1016.0, approximately 25 feet below top of dam. At auxiliary spillway crest elevation it has a capacity of 132 cfs. At top of dam, the service spillway and auxiliary spillway have a total capacity of 17,500 cfs.

5.4 RESERVOIR CAPACITY

The reservoir capacities at the crest of the spillway and the top of dam are 285 and 1280 acre feet respectively. Surcharge storage from spillway crest to auxiliary spillway crest and auxiliary spillway crest to top of dam are 2.63 and 1.59 inches of runoff.

5.5 FLOODS OF RECORD

The highest known water elevation was 1026.2 or 10.2 feet above the low level orifice (not yet reaching the service spillway crest). This occurred during September 1975, the estimated outflow of this storm is 95 cfs.

5.6 OVERTOPPING POTENTIAL

The maximum capacity of the spillways is 17,500 cfs before overtopping would occur. This capacity passes the full PMF inflow of 7,083 cfs with 3 feet freeboard. The routed 1/2 PMF outflow is 3,457 cfs.

5.7 EVALUATION

The spillway has a capacity to pass the total PMF and attenuate storm of greater frequency.
SECTION 6: STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations
No signs of distress were observed in connection with the earth embankment.

b. Design and Construction Data
A stability analysis was conducted by SCS during the design of the dam. The analyses were performed using the modified Swedish circle method. The soil parameters assumed were $\gamma_d = 122.8$, $\gamma_m = 137.0$, $\gamma_s = 140.5$, $\gamma_b = 78.0$, $\phi = 27^\circ$, $c = 300$. The results of these analyses are as follows:

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<thead>
<tr>
<th>Condition</th>
<th>Minimum Factor of Safety</th>
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<tr>
<td>1. Upstream slope = 1:3, full draw down 15' berm at el. 1006 &amp; 10' berm at el. 995</td>
<td>1.45</td>
</tr>
<tr>
<td>2. Downstream slope = 1:2.5, drain at c/b = 0.6 No berm</td>
<td>1.58</td>
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The calculated factors of safety for this dam are in excess of the minimum factors recommended by the Corps of Engineers. The dam is, therefore, considered to have adequate factors of safety for stability. Further information concerning this analysis is included in Appendix E.

c. Post Construction Changes
No post construction changes were initiated. Removable fences for sporting activities have been installed in the auxiliary spillway.

d. Seismic Stability
The dam is located in Seismic Zone 1. Therefore, a seismic analysis is not warranted.
SECTION 7: ASSESSMENT/RECOMMENDATIONS

7.1 ASSESSMENT

a. Safety
The Phase I Inspection of the Patterson Brixius Grey Creek Watershed Project Site 1 Dam did not reveal conditions which constitute a hazard to human life or property. The earth embankment is not considered to be unstable and appears capable of retarding floodwaters resulting from the PMF.

b. Adequacy of Information
The information reviewed appears adequate for Phase I Inspection purposes.

c. Need for Additional Investigation
No additional investigations are required at this time.

d. Urgency
Within 1 year of notification to the owner, the following remedial measures must be completed.

7.2 RECOMMENDED MEASURES

1. Eliminate the pedestrian and vehicular traffic on the embankment and auxiliary spillway, backfill all depressions and reseed these areas.

2. Repair the erosion and reseed the areas adjacent to the impact basin, at the toe of the right abutment, and the regraded area between the right abutment and the outlet of the auxiliary spillway. Also remove the stockpiles of soil in the auxiliary spillway channel and channel outlet, and reseed.

3. Recaulk the joint between the service spillway pipe and the impact basin wall. Repair the concrete surfaces of the impact basin, and repair the left animal guard.

4. Remove the vegetation along the left slope of the auxiliary spillway and on the banks of the downstream channel. Remove the debris in the approach channel of the auxiliary spillway. Provide a program of periodic cutting and mowing of the dam and appurtenances.

5. Provide a program of periodic inspection and maintenance of the dam and appurtenances, including yearly operation and lubrication of the reservoir drain system. Document this information for future reference. Also develop an emergency action plan.
APPENDIX A

PHOTOGRAPHS
Photo #2
Upstream Slope & Riser

Photo #3
Impact Basin
Photo #4
Downstream Channel

Photo #5
Downstream Area
Viewed from Crest
Photo #6
Downstream Face - Left Abutment

Photo #7
Auxiliary Spillway & Right Abutment
APPENDIX B

VISUAL INSPECTION CHECKLIST
VISUAL INSPECTION CHECKLIST

1) Basic Data

a. General

Name of Dam: Parkers, Biscus Creek
Fed. I.D. #: NY 698
DEC Dam No.: E6 B 3457
River Basin: Susquehanna
Location: Town: Union, County: Bicoca
Stream Name: Parkers Creek
Tributary of: Susquehanna River
Latitude (N): 41° 8.2'
Longitude (W): 76° 1.3'
Type of Dam: Earth Embankment
Hazard Category: C High
Date(s) of Inspection: July 23, 1966
Weather Conditions: Cloudy, Lw 70s°F
Reservoir Level at Time of Inspection: Approx. Low Stage, Incl. (E1. 59 ft)

b. Inspection Personnel: [Blank]

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

- Gene Page, Project Eng., SCE Bankhead
  (C7-778-2751) Bureau Co. Decou. Bankhead
- M.L. Laty, 315-423-SSS5 Syracuse, SCE

D. History:

Date Constructed: 1966
Date(s) Reconstructed: [Blank]

Designer: [Blank]

Constructed By: RD Balagrin, Corp.

Owner: Bicoca County, N.Y.
2) **Embankment**

a. Characteristics

(1) Embankment Material

(2) Cutoff Type

(3) Impervious Core

(4) Internal Drainage System

(5) Miscellaneous

b. Crest

(1) Vertical Alignment

(2) Horizontal Alignment

(3) Surface Cracks

(4) Miscellaneous

's light depressions remaining'

---

c. Upstream Slope

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

(2) Undesirable Growth or Debris, Animal Burrows

(3) Sloughing, Subsidence or Depressions

---
(4) Slope Protection  

(5) Surface Cracks or Movement at Toe  

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

(7) Condition Around Outlet Structure  

(8) Seepage Beyond Toe  

C. Abutments - Embankment Contact  

Infill to earth contact
(1) Erosion at Contact: erosion along ten from right abut. = 60' side
(2) Seepage Along Contact: none

3) Drainage System
   a. Description of System: escarp parallel to axis e) dam d embattling
      in walls of impervious basins

   b. Condition of System: good - animal guard in left pipe broken
   c. Discharge from Drainage System: no visible discharge from area

4) Instrumentation (Monumentation/Surveys, Observation Wells, Weirs, Piezometers, Etc.)
5) Reservoir
   a. Slopes  __________
   b. Sedimentation  __________
   c. Unusual Conditions Which Affect Dam  __________

6) Area Downstream of Dam
   a. Downstream Hazard (No. of Homes, Highways, etc.) __________
      Land below dam  __________
      Fields  __________
   b. Seepage, Unusual Growth  __________
   c. Evidence of Movement Beyond Toe of Dam  __________
   d. Condition of Downstream Channel  __________

7) Spillway(s) (Including Discharge Conveyance Channel)
   a. General  __________
      Service Spillway - river and impact basin  __________
      Control Spillway - grass lined channel  __________
   b. Condition of Service Spillway  __________
      Impact basin walls slightly deteriorated - joint between wall and service spill pipe open needs caulking.
      Calcification on upstream wall of impact basin  __________
      Piping seen slight crack or possible cold joint - dry during inspection. Piping joint extension = max 2/"
c. Condition of Auxiliary Spillway: Generally good - Bell bunds
in steep sections w/ remeal piles - spillways form debris in approach channel.
Vegetation in eroded slope between aux. & right emb.

Condition of Discharge Conveyance Channel: 
Good - vegetation, 2 vehicular paths in auxiliary channel have created depressions.

8) Reservoir Drain/Outlet:

Type: Pipe ( ) Conduit ( ) Other ( )
Material: Concrete ( ) Metal ( ) Other ( )
Size: __________ Length __________
Invert Elevations: Entrance __________ Exit __________
Physical Condition (Describe): Unobservable
Material: __________________________
Joints: __________________________ Alignment __________
Structural Integrity: __________________________
Hydraulic Capability: __________________________
Means of Control: Gate ( ) Valve ( ) Uncontrolled ( )
Operation: Operable ( ) Inoperable ( ) Other ( )
Present Condition (Describe): __________________________
9) Structural

a. Concrete Surfaces  generally good  
   sem. slight deterioration of impol basin walls  

b. Structural Cracking  none  

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

d. Junctions with Abutments or Embankments  adequate  

e. Drains - Foundation, Joint, Face  down eroded  

f. Water Passages, Conduits, Sluices  good condition  

g. Seepage or Leakage  none evident  
h. Joints - Construction, etc.

- joint bed pipe (service spill) & pipe will require casing

i. Foundation

- unobservable

j. Abutments

- n/a

k. Control Gates

- operational

l. Approach & Outlet Channels

- good condition

m. Energy Dissipators (Plunge Pool, etc.)

- good condition

n. Intake Structures

- good condition

o. Stability

- appears acceptable

p. Miscellaneous
APPENDIX C

HYDROLOGIC / HYDRAULIC

ENGINEERING DATA AND COMPUTATIONS
# Area-Capacity Data

<table>
<thead>
<tr>
<th>Description</th>
<th>Elevation (ft.)</th>
<th>Surface Area (acres)</th>
<th>Storage Capacity (acre-ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Top of Dam</td>
<td>1041.3</td>
<td>67.2</td>
<td>1850</td>
</tr>
<tr>
<td>2) Design High Water (Max. Design Pool)</td>
<td>1038.0</td>
<td>60.2</td>
<td>1089</td>
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<tr>
<td>3) Auxiliary Spillway Crest</td>
<td>1034.0</td>
<td>51.2</td>
<td>975</td>
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<tr>
<td>4) Pool Level with Flashboards</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5) Service Spillway Crest</td>
<td>1046.0</td>
<td>84.1</td>
<td>285</td>
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**Discharges**

<table>
<thead>
<tr>
<th>Description</th>
<th>Volume (cfs)</th>
</tr>
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<tbody>
<tr>
<td>1) Average Daily</td>
<td></td>
</tr>
<tr>
<td>2) Spillway @ Maximum High Water</td>
<td>160</td>
</tr>
<tr>
<td>3) Spillway @ Design High Water</td>
<td>152</td>
</tr>
<tr>
<td>4) Spillway @ Auxiliary Spillway Crest Elevation</td>
<td>132</td>
</tr>
<tr>
<td>5) Low Level Outlet</td>
<td>45</td>
</tr>
<tr>
<td>6) Total (of all facilities) @ Maximum High Water</td>
<td>17,500</td>
</tr>
<tr>
<td>7) Maximum Known Flood</td>
<td></td>
</tr>
<tr>
<td>8) At Time of Inspection</td>
<td>417</td>
</tr>
<tr>
<td>CREST:</td>
<td>ELEVATION: 1041.2</td>
</tr>
<tr>
<td>-------</td>
<td>------------------</td>
</tr>
<tr>
<td>Type:</td>
<td>Drop over with fill</td>
</tr>
<tr>
<td>Width:</td>
<td>20'</td>
</tr>
<tr>
<td>Spillover</td>
<td>Drop inlet service, gross land channel auxiliary</td>
</tr>
<tr>
<td>Location</td>
<td>Right Bank, right abutment</td>
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<thead>
<tr>
<th>SPILLWAY: SERVICE</th>
<th>AUXILIARY</th>
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<tbody>
<tr>
<td>Elevation</td>
<td>1034.1</td>
</tr>
<tr>
<td>Type</td>
<td>Gross land channel</td>
</tr>
<tr>
<td>Width</td>
<td>340'</td>
</tr>
<tr>
<td>Type of Control</td>
<td>Uncontrolled</td>
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<tr>
<td>Controlled:</td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>(Flashboards; gate)</td>
</tr>
<tr>
<td>Number</td>
<td></td>
</tr>
<tr>
<td>Size/Length</td>
<td>Vegetated</td>
</tr>
<tr>
<td>Invert Material</td>
<td></td>
</tr>
<tr>
<td>Anticipated Length of operating service</td>
<td>2 mi.</td>
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<tr>
<td>Chute Length</td>
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<tr>
<td>Height Between Spillway Crest &amp; Approach Channel Invert (Weir Flow)</td>
<td>75'</td>
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Type: 

Location: 

Records:
Date - 
Max. Reading - 

FLOOD WATER CONTROL SYSTEM:
Warning System: None

Method of Controlled Releases (mechanisms):
carefully controlled release through 16" drains.
DRAINAGE AREA: 1.12 mi.²

DRAINAGE BASIN RUNOFF CHARACTERISTICS:

Land Use - Type: some development, fill-in hose
Terrain - Relief: moderate to steep slopes
Surface - Soil: loamy
Runoff Potential (existing or planned extensive alterations to existing (surface or subsurface conditions)

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

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

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

Reservoir:
Length @ Maximum Pool: 1250 ft. (Miles)
Length of Shoreline (@ Spillway Crest): 1050 ft. (Miles)
DA = 4.42 mi.
L = 4.17 mi.
L_{ca} = 1.70 mi.

C_t = 2.0 or slightly lower due to steepness

\[ t_p = C_t \left( L \times L_{ca} \right)^{0.3} \]
\[ = 2.0 \left( 4.17 \times 1.70 \right)^{0.3} = 3.6 \text{ hrs.} \]

\[ t_r = \frac{t_p}{5.5} = \frac{3.6}{5.5} = 0.65 \]

\[ T_p = t_p + 0.5 \left( t_r \right) = 3.925 \text{ hr.} \]

\[ C_p = 0.625 \]

\[ \text{Length} : \text{Comp.} \ (\text{ft}) \ 21.0" \ \% \ 6 \ 12 \ 24 \ 48 \]

\[ \text{Suspended Reservoir Chambers :} \quad \frac{EC}{(\text{sec})} \quad \frac{Q}{(\text{cfs})} \quad \frac{Q}{(\text{cfs})} \quad \frac{EC}{(\text{cfs})} \]

- Initial fill
- 95% - 93.4
- Max. sec. rate
- 1916.0 - 50 - 285.0
- Evap. - lost
- 1034.0 - 132 - 505.0
- Design hold \%
- 1058.0 - 6210 - 1069.0
- T. of Din
- 1041.2 - 17500 - 1280.0

\[ L = 1250' \quad C = 3.0 \]
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### ANALYSIS TO BE FRENED:

**VAL = 1, IUCD = 0, IAD = 0**

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<td>Area</td>
<td>Plan Ratio 1</td>
<td>Ratio 2</td>
<td>Ratio 3</td>
<td>Ratio 4</td>
<td>Ratio 5</td>
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</tr>
<tr>
<td>X: 3</td>
<td>5.42</td>
<td>1</td>
<td>14.0</td>
<td>2737.2</td>
<td>754.1</td>
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<td>(1 2)</td>
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<td>Y: 7</td>
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<td>2632.7</td>
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<td>(1 2; 3.3)</td>
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</table>
APPENDIX D

REFERENCES


APPENDIX E

STABILITY ANALYSIS
Memorandum

TO: W. S. Atkinson, State Conservation Engineer, SCS, Syracuse, New York 13210

FROM: Rey S. Decker, Head, Soil Mechanics Laboratory, SCS, Lincoln, Nebraska 68508

SUBJECT: ENG 22-5, New York WP-08, Patterson Creek, Site No. 1 (Broome County)

ATTACHMENTS

1. Form SCS-35, Soil Mechanics Laboratory Data, 1 sheet.
2. Form SCS-355, Triaxial Shear Test Data, 1 sheet.
3. Form SCS-352, Compaction and Penetration Resistance Report, 4 sheets.
4. Form SCS-353, Grain Size Distribution Graph, 1 sheet.
5. Form SCS-357, Summary - Slope Stability Analysis, 2 sheets.

DISCUSSION

FOUNDATION

A. Classification: The foundation conditions and materials at this site are clearly outlined and well depicted in the geology report. The abutments consist of till that is logged as a dense to very dense GM. This till contains approximately 15 percent material larger than 3 inches with numerous cobbles and flags larger than 6 inches.

The emergency spillway samples 65W2618, 65W2619 and 65W2620 are representative of the till at the surface on the abutments. Samples from the emergency spillway contain slightly less than 50 percent fines and are classed as GC.

The materials in the floodplain section consist of a dense till overlying gravels and silts of lacustrine origin. The lacustrine sediments in turn overlie a dense glacial till.

The surface till zone is about 8 feet thick. This material contains approximately 60 percent gravel and 20 percent fines. Laboratory sample 65W2617 is representative. The lacustrine gravels range from a few feet thick to 10 feet thick. Field samples indicate that these materials contain from 50 to 60 percent material passing the No. 4 sieve and from about 10 to 20 percent fines. The lacustrine silts contain approximately 90 percent fines. The till in the surface zone is classed as a GC-GM.
Gradation curves for the lacustrine materials are included in the geology report.

B. Blow Count: Blow count in the surface till zone was generally above 30 blows/foot. Tests in the surface couple feet in DH 3 and DH 4 showed blow counts of 19 and 13 blows, respectively. The material in this zone is logged as moist to wet but a water table is not indicated. The lacustrine material below the surface till zone has blow count values ranging from 56 to more than 100 blows/foot on centerline. The ML zone in Test hole 302 downstream from centerline had blow counts in the range of 15 to 19 blows/foot. The materials within the lacustrine zone are generally logged as wet and seepage was noted in some locations.

C. Shear Strength and Consolidation: Undisturbed samples were not submitted. The blow count data indicated a relatively strong foundation with a low consolidation potential for the loading range planned. The fine fraction of these materials is somewhat plastic and blow count could possibly be lower if the moisture content was not near theoretical saturation at the time of test.

D. Permeability: With the exception of the GW in the bottom of the channel, the permeability of the foundation material is expected to be relatively low for each class of material. The lacustrine gravel is expected to be the most pervious material other than the stream channel gravels. The D10 size of the lacustrine gravel is about 0.074 mm. or less. The blow count indicates a relatively dense gravel; therefore, we estimate the permeability rate will be in the range of 1 to 5 feet per day or less, depending upon the amount of fines.

ENCRANKMENT

A. Classification: The embankment material will come from the emergency spillway. Three samples were submitted from the spillway. The samples indicate that the till from the spillway is very uniform. It contains slightly less than 50 percent fines and is classed as a GC. The liquid limit is near 30 and the PI is about 12. About 15 percent of the material is larger than the 3-inch size.

B. Compactive Effort: Standard Proctor compaction tests were made on the three samples submitted. The tests were made on the fraction finer than 3/4 inch in accordance with ASTM D-698T, Method C. The maximum density obtained was 125 p.c.f. for all three samples.
A standard Proctor test was made on the minus No. 4 fraction of Sample 65W2619 for correlation purposes. The density obtained was 119 p.c.f. Based on the density and the percent of the material larger than the No. 4 sieve size included in the compaction sample for the minus 3/4-inch test, computations show that the density of the minus 4 fraction within this test sample was also 119 p.c.f. This indicates that the gravel fraction did not interfere with compaction of the minus 4 fraction in the 1/30 cubic foot compaction mold.

C. Shear Strength: A triaxial shear test was made on Sample 65W2619. The test was made on the minus 3/4-inch fraction at a density of approximately 98 percent of standard Proctor. A consolidated, undrained test was made and pore pressure was measured during the test. The effective stress shear strength values obtained were $\phi = 27^\circ$, $c = 300$ p.s.f. and the total stress shear values obtained were $\phi = 19^\circ$, $c = 325$ p.s.f.

The test values are considered representative of the borrow materials for a placement density of 98 percent of standard Proctor and are suggested for design.

SLOPE STABILITY

Slope stability was checked with a modified Swedish circle method of analysis. The analysis was made on the maximum embankment section and the trial failure arcs were limited to the embankment only.

A phreatic line was assumed from emergency spillway elevation to a drain at c/b = 0.6.

The analysis shows that the proposed 2 1/2:1 downstream slope with a drain has a factor of safety of 1.58.

A 3:1 upstream slope with a 10-foot berm at elevation 995 has a factor of safety of 1.36 with complete rapid drawdown considered. The addition of a 15-foot berm at elevation 1006 plus the 10-foot berm at elevation 995 results in a factor of safety of 1.48, which is very near the suggested minimum of 1.50 when effective stress shear parameters are used in the analysis.

SETTLEMENT ANALYSIS

The consolidation potential is expected to be low. The foundation conditions appear to be uniform and differential settlement is not expected to be a problem. The channel banks are near vertical in some places, however, and some differential might occur in this area.
### Soil Mechanics Laboratory

#### Sample No. 65W261

**Project:** Pattyson Creek #1  
**Location:** New York

#### Test Data

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<tr>
<th>Moisture-Density Data</th>
<th>Specifications:</th>
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<td><strong>Project</strong> Pattyson Creek #1</td>
<td><strong>Location</strong> New York</td>
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<td><strong>Dry Density</strong></td>
<td><strong>Saturated</strong></td>
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<td><strong>γ</strong></td>
<td><strong>γ_s</strong></td>
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<tr>
<td>123.0</td>
<td>98.5</td>
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<tr>
<td>9.2</td>
<td>98.5</td>
</tr>
<tr>
<td>2.2</td>
<td>93.0</td>
</tr>
</tbody>
</table>

| **γ_s** | **γ_s** |
| 141 | 13.3 |
| 10 | 9.2 |
| 30 | 12.4 |

| **γ_s** | **γ_s** |
| 126 | 125 |
| 0 | 0 |

| **Saturated Pressure** | **Consolidation Pressure** |
| **σ_0** | **σ_f** |
| 9.2 | 391 |
| 20 | 391 |
| 30 | 391 |

| **Internal Friction** | **Unit Cohesion** |
| **φ** | **C** |
| 27.0 | 20.0 psi |
| 27.0 | 200.0 psi |

#### Curve No. 2 of 3

**Diameter:** 5.0

**Height:** Max.

**Size:** Finer than 0.002 mm.

**Moisture:** 125.0%.

**Consolidated:**  
**Drained:**

**Unconsolidated:**  
**Undrained:**

**Redefined and Tested at:** 20% of Standard

| **L.L.** | **P.I.** | **Classification** |
| 3 | 12 | **s** |

**Specifications:**

- **Max.**
- **Consolidated**
- **Drained**
- **Unconsolidated**
- **Undrained**
- **Natural Moisture**
- **Saturation**
- **Standard**
- **Modified**

---

**Diagram:**

- 

---

### Notes

- Other factors affecting shear:
  - **Dispersed**
  - **Other**

- Specimen:
  - Max. Consolidated
  - Drained
  - Unconsolidated
  - Undrained

- **Pore Pressure Measured**

- **Undisturbed and Tested at:**
  - Natural Moisture
  - Saturation

- **Modified**

- **Lower than**
  - Optimum
  - Higher than
  - Saturated

---

**Other:**

- **Optimum**

---

**Density**

- **Dry**
  - **Max.**
  - **Saturated**
  - **End**

| **Dry Density** | **γ_s** | **γ_s** |
| 126 | 125 |
| 0 | 0 |

---

**Internal Friction**

- **φ**
  - 27.0

---

**Unit Cohesion**

- **C**
  - 20.0 psi
  - 200.0 psi
RECOMMENDATIONS

A. Site Preparation: Normal site preparation should be adequate to remove any loose materials at the surface.

We recommend that the channel banks be flattened to insure a good bond between the backfill and the foundation and to reduce the possibility of critical differential settlement in this area.

B. Cutoff: The Geologist suggested a shallow cutoff trench. We concur with this suggestion. A minimum trench depth of about 5 feet is suggested to insure that the trench bottoms below the zone affected by roots, rodents, cracking, etc.

The trench backfill may consist of GC material from the emergency spillway. The backfill should be compacted to a minimum of 98 percent of standard Proctor density.

C. Principal Spillway: The proposed principal spillway location is at T: Station 6+00. The foundation material at this location consists of till upstream from centerline. Downstream from centerline the foundation contains about a 4-foot zone of lacustrine silt and sand between layers or zones of till. The blow count within the lacustrine silt ranges from 15 to 19 blows per foot and blow count below the surface foot or two in the till is in excess of 30 blows per foot.

The conduit will be bedded in dense till and dense lacustrine silts. The consolidation potential is expected to be low and no unusual problems are anticipated.

Based on blow count, permeability is expected to be low. If zones or stratum of pervious materials are encountered in the lacustrine materials, it might be desirable to encompass the conduit with a filter drain.

The Geologist points out that the material at grade is erodible.

D. Drain: A drain is recommended to control the phreatic line in the embankment and to provide a safe outlet for underseepage. A trench drain with a pipe outlet is suggested. We concur with the trench depths suggested in the geologic report. At these depths the trench will bottom in the most pervious zones. The trench depths suggested are as follows:
Subj: ENG 22-5, New York WP-08, Patterson Creek, Site No. 1 (Broome County)

<table>
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<th>T.P.</th>
<th>Suggested Trench Depth</th>
<th>Material at the Trench Bottom Logged As</th>
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<td>508</td>
<td>6 feet</td>
<td>Till</td>
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<tr>
<td>503</td>
<td>5 feet</td>
<td>Till</td>
</tr>
<tr>
<td>302</td>
<td>12 feet</td>
<td>SM with gravel streaks</td>
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<tr>
<td>502</td>
<td>14 feet</td>
<td>SM with gravel streaks</td>
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<td>SM</td>
</tr>
<tr>
<td>509</td>
<td>8 feet</td>
<td>GM-GW</td>
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The suggested filter limits are shown on the attached Form SCS-353. The suggested limits are such that ASTM No. 78 road gravel may be used.

E. Embankment Design:

1. Placement of Material. The borrow materials consist of a uniform glacial till from the emergency spillway; therefore, a homogeneous embankment is recommended. The borrow material should be placed at a minimum of 98 percent of standard Proctor density with the control based on the minus 3/4-inch fraction. The placement moisture content should be slightly wet of optimum.

2. Slopes. The proposed 2 1/2:1 downstream slope has an acceptable factor of safety and is recommended. The proposed 3:1 upstream slope with a 10-foot berm at elevation 995 requires modification to obtain an acceptable factor of safety. The stability analysis shows that the addition of another berm 15 feet wide at elevation 1006 results in a factor of safety of 1.48. This addition or a comparable modification is recommended.

3. Settlement. An overfill allowance of 1.5 feet is suggested to compensate for residual consolidation within the fill and foundation.

Prepared by:

Lorn P. Dunnigan

Attachments

cc: B. S. Ellis, Syracuse, N.Y.
    Henry W. Davis, Penn Yan, N.Y.
    R. J. McElmains, Binghamton, N.Y.
    H. M. Kautz, Upper Darby, Pa.

Reviewed and Approved by:

Roland B. Phillips
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
SOIL MECHANICS LABORATORY

COMPACTION AND PENETRATION RESISTANCE REPORT

Date __________ Sample No.: Field 208.1 Lab 65W2618
Project Patterson Creek #1 Location New York
Sample Location and Depth Emergency Spillway 20'-120'

WET DENSITY CURVE:

WEIGHT OF COMPACTED SOIL
IN POUNDS PER CUBIC FOOT

DRO DENSITY /A MATERIAL

MOISTURE CONTENT IN PERCENT OF DRY WEIGHT

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<th>TEST PROCEDURE</th>
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<td>Standard Proctor</td>
<td>Weight of Hammer 5.5 Lbs.</td>
<td>Material compacted represents 73% of the sample and passed 3/4&quot; sieve</td>
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<tr>
<td>Modified AASHO</td>
<td>Drop 12 Inches</td>
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<td>Other</td>
<td>Lifts 3</td>
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<tr>
<td></td>
<td>Vol. of Cylinder 1/80 Cu.Ft.</td>
<td>(Sp. Gr.) Gs = 2.74</td>
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ASTM D698-5T Method C

Curve 1 of 3
### SUMMARY - SLOPE STABILITY ANALYSIS

**State:** New York  
**Project:** Patterson Creek Site #1  
**Date:** 12-13-68

**Method of Analysis:** Swedish O.C.

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#### UPSTREAM SLOPE

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<td>From esp. in 10 ft. slope 30% sec. 35% sec. from esp. in 24 ft. then E 27°-30° only</td>
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<td>3:1</td>
<td>From esp. in 50 ft. slope 45% sec. 55% sec. 95% sec. from esp. in E 27°-30° only</td>
<td>1.52</td>
</tr>
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<td>3</td>
<td>3:1</td>
<td>From esp. in 100 ft. slope 55% sec. 45% sec. from esp. in E 27°-30° only</td>
<td>1.45</td>
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#### DOWNSTREAM SLOPE

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<tbody>
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<td>From esp. 40° - N 0° W - Sec. 40% sec. cross from esp. 30% sec.</td>
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<td>2</td>
<td>2:1</td>
<td>From esp. 30° - N 0° W - Sec. 30% sec. cross from esp. 70°-80° only</td>
<td>1.42</td>
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<tr>
<td>3</td>
<td>2:1</td>
<td>From esp. 60° - N 0° E - Sec. 60% sec. cross from esp. 20°-30° only</td>
<td>1.50</td>
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**Note:** Sat. shear values only.
APPENDIX F

DRAWINGS
PATTERSON BRIXIUS & GREY CREEK
WATERSHED PROJECT
FLOODWATER RETARDING DAM NO. 1

DRAINAGE AREA
TOTAL STORAGE
TO EMERGENCY SPILLWAY CREST
WATER SURFACE AREA
AT SEDIMENT POOL
HEIGHT OF DAM
VOLUME OF FILL

2829 ACRES
905 ACRE FT.
7.6 ACRES
65 FEET
323,500 CUBIC YARDS

BUILT UNDER THE WATERSHED PROTECTION AND
FLOOD PREVENTION ACT
BY
COUNTY OF BROOME
WITH THE ASSISTANCE OF THE
SOIL CONSERVATION SERVICE
OF THE
U.S. DEPARTMENT OF AGRICULTURE
1965

INDEX
SHEET 1 - COVER SHEET
SHEET 2 - PLAN OF STORAGE AREA
SHEET 3 - PLAN OF DAMSITE
SHEET 4 - PROFILE ALONG E. OF DAM
SHEET 5 - PROFILES
SHEET 6 - DRAINAGE DETAILS
SHEET 7 - DRAINAGE DETAILS
SHEET 8 - PLAN-PROFILE OF PRINCIPAL SPILLWAY
SHEET 9 - RISER-STRUCTURAL DETAILS
SHEET 10 - RISER-REINF STEEL DETAILS
SHEET 11 - CRADLE, ANTI-SEEP COLLARS AND STEEL
SHEET 12 - POND DRAIN INLET DETAILS
SHEET 13 - IMPACT BASIN
SHEET 14 - TRASH RACKS, AND MISC. DETAILS
SHEET 15 - LOGS OF TEST HOLES
SHEET 16 - LOGS OF TEST HOLES
GREY CREEK PROJECT
DAM NO. 1

2829 ACRES
905 ACRE FT.
7.6 ACRES
65 FEET
3,500 CUBIC YARDS.

PROTECTION AND ACT

DEPARTMENT OF AGRICULTURE

AS BUILT

PATTERSON, BRIXTON, GREY CREEK WATERSHED PROJECT FLOODWATER RETARDING DAM NO. 1 ENDWELL BROOME CO. NEW YORK COVER SHEET
U S DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

M. H. KIRKLAND
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SLIDE GATE NOTES
18" S. L. GATE
FLAT CLAMP
E TYPE AISI 1030
HARDENED AND HEAT TREATED
18" 
34" 
12" 
12" 
9" 
HOLE 6" 
5" 
4" 
4" 
3 1/2" 

SUPPLIED: BOWEN HUNT MODEL 140

MANHOLE ASSEMBLY NOTE
1 30" DIA MANHOLE COVER WITH
UNDERSIDE HOOKS AND A
1" DIA MIN ROUND HOLE LIFTING DEVICE
2 PAINT IN ACCORDANCE WITH CONST SPEC 22

SUPPLIED: NICHURA FOUNDRY MODEL B-5074

AS BUILT
PATTERSON, BRIXIUS, GREY CREEK
WATERSHED PROJECT
FLOODWATER RETARDING DAM NO 1
ENDWELL BROOME CO. NEW YORK
RISER - STRUCTURAL DETAILS
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

NY-2013-P
<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-4</td>
<td>Poorly sorted gravel, sandy matrix; gravel pebbles are common.</td>
</tr>
<tr>
<td>4-8</td>
<td>Very poorly sorted gravel; gravel pebbles are common.</td>
</tr>
<tr>
<td>8-12</td>
<td>Silt and fine sand; gravel passable at 5 feet.</td>
</tr>
<tr>
<td>12-16</td>
<td>Poorly sorted gravel; gravel pebbles are common.</td>
</tr>
<tr>
<td>16-20</td>
<td>Poorly sorted gravel; gravel pebbles are common.</td>
</tr>
<tr>
<td>20-24</td>
<td>Silt and fine sand; gravel passable at 5 feet.</td>
</tr>
</tbody>
</table>

Note: The data is approximate and subject to change.
<table>
<thead>
<tr>
<th>Depth (in.)</th>
<th>Properties</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 3</td>
<td>Topsoil</td>
<td></td>
</tr>
<tr>
<td>3 - 11</td>
<td>Gravel, silty silt/sands - n/a</td>
<td></td>
</tr>
<tr>
<td>11 - 15</td>
<td>Medium gravel, sand - n/a</td>
<td></td>
</tr>
<tr>
<td>15 - 20</td>
<td>Medium gravel, sand - n/a</td>
<td></td>
</tr>
<tr>
<td>20 - 30</td>
<td>Medium gravel, sand - n/a</td>
<td></td>
</tr>
<tr>
<td>30 - 40</td>
<td>Medium gravel, sand - n/a</td>
<td></td>
</tr>
<tr>
<td>40 - 50</td>
<td>Medium gravel, sand - n/a</td>
<td></td>
</tr>
<tr>
<td>50 - 60</td>
<td>Medium gravel, sand - n/a</td>
<td></td>
</tr>
</tbody>
</table>

**NOTES:**
- Driller indicated a silty material from 27'-32'. He had poor recovery when he checked the samples. It is possible that there is a salt dome here.
- Below 30', the porosity increases significantly (13%).
Gravel, gravelly sand, sand, and clay are likely to be present in the soil. The soil texture can vary from fine to coarse. The presence of pebbles and cobbles indicates a glacial till soil. The soil may be moderately permeable to near impermeable, depending on the depth and the presence of clayey layers. The soil color can range from light gray to dark brown.