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National Dam Safety Program

Davis Brook Dam
Cattaraugus County, New York

Phase I Inspection Report
Inventory No. 564

Erdman, Anthony, Associates
252 Andrews Street, P.O. Box 9589
Rochester, New York 14602

Approved for public release; Distribution unlimited.

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.

Examination of available documents and visual inspection of Conewango
Creek Watershed Davis Brook Dam (Site 1) and appurtenant structures did not
reveal conditions which constitute a hazard to human life or property. However,
the dam has some deficiencies which require further investigation and remedial
action.
A wet condition of unknown cause was observed on the lower portion of the left downstream slope. It is recommended that the services of a qualified registered professional engineer be retained to evaluate this condition.

Using the Corps of Engineers screening criteria for review of spillway adequacy, it has been determined that the dam would not be overtopped under full PMF conditions. The PMF routed through the reservoir required only 46 percent of the spillway outflow capacity. The spillway capacity is therefore judged as adequate.

The recommended investigation should be completed within 12 months of notification to owner, and remedial actions resulting from these investigations completed in the subsequent 12 months.

The following remedial measures should be performed within 1 year of notification to owner:

- Develop a formal downstream warning system.
- Develop and maintain a program of periodic technical inspections.
- Implement a program of diligent and periodic maintenance.
- Remove trees and brush from slopes.
- Regrade and fill in the erosion gullies.
- Install ladder rungs on the riser.
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 aid 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>PROJECT INFORMATION</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>General</td>
<td>1-1</td>
</tr>
<tr>
<td>1.2</td>
<td>Description of Project</td>
<td>1-1</td>
</tr>
<tr>
<td>1.3</td>
<td>Pertinent Data</td>
<td>1-5</td>
</tr>
<tr>
<td>2.1</td>
<td>Design Data</td>
<td>2-1</td>
</tr>
<tr>
<td>2.2</td>
<td>Construction Data</td>
<td>2-1</td>
</tr>
<tr>
<td>2.3</td>
<td>Operational Data</td>
<td>2-1</td>
</tr>
<tr>
<td>2.4</td>
<td>Evaluation of Data</td>
<td>2-1</td>
</tr>
<tr>
<td>3.1</td>
<td>Findings</td>
<td>3-1</td>
</tr>
<tr>
<td>3.2</td>
<td>Evaluation</td>
<td>3-2</td>
</tr>
<tr>
<td>4.1</td>
<td>Procedures</td>
<td>4-1</td>
</tr>
<tr>
<td>4.2</td>
<td>Maintenance of Dam</td>
<td>4-1</td>
</tr>
<tr>
<td>4.3</td>
<td>Description of Warning System in Effect</td>
<td>4-1</td>
</tr>
<tr>
<td>4.4</td>
<td>Evaluation</td>
<td>4-1</td>
</tr>
</tbody>
</table>
# TABLE OF CONTENTS - con't.

<table>
<thead>
<tr>
<th>SECTION 5</th>
<th>HYDRAULICS/HYDROLOGY</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1</td>
<td>Drainage Area Characteristics</td>
<td>5-1</td>
</tr>
<tr>
<td>5.2</td>
<td>Design Data</td>
<td>5-1</td>
</tr>
<tr>
<td>5.3</td>
<td>Analysis Criteria</td>
<td>5-1</td>
</tr>
<tr>
<td>5.4</td>
<td>Reservoir Capacity</td>
<td>5-1</td>
</tr>
<tr>
<td>5.5</td>
<td>Experience Data</td>
<td>5-2</td>
</tr>
<tr>
<td>5.6</td>
<td>Overtopping Potential</td>
<td>5-2</td>
</tr>
<tr>
<td>5.7</td>
<td>Analysis of Downstream Impacts</td>
<td>5-2</td>
</tr>
<tr>
<td>5.8</td>
<td>Evaluation</td>
<td>5-2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SECTION 6</th>
<th>STRUCTURAL STABILITY</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.1</td>
<td>Visual Observations</td>
<td>6-1</td>
</tr>
<tr>
<td>6.2</td>
<td>Design and Construction</td>
<td>6-1</td>
</tr>
<tr>
<td>6.3</td>
<td>Post Construction Changes</td>
<td>6-1</td>
</tr>
<tr>
<td>6.4</td>
<td>Seismic Stability</td>
<td>6-1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SECTION 7</th>
<th>ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.1</td>
<td>Dam Assessment</td>
<td>7-1</td>
</tr>
<tr>
<td>7.2</td>
<td>Recommendations</td>
<td>7-1</td>
</tr>
<tr>
<td>7.3</td>
<td>Remedial Measures</td>
<td>7-1</td>
</tr>
<tr>
<td>7.4</td>
<td>Alternatives</td>
<td>7-2</td>
</tr>
</tbody>
</table>

## APPENDICES

- **APPENDIX A**: INSPECTION CHECKLIST
- **APPENDIX B**: ENGINEERING DATA
- **APPENDIX C**: PHOTOGRAPHS
- **APPENDIX D**: HYDROLOGIC AND HYDRAULIC COMPUTATIONS
- **APPENDIX E**: INFORMATION AS CONTAINED IN THE NATIONAL INVENTORY OF DAMS
PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam: Conewango Creek Watershed
Davis Brook Dam (Site 1)

State Located: New York
County Located: Cattaraugus
Stream: Davis Brook
Basin: Allegheny River
Date of Inspection: April 3, 1981

ASSESSMENT

Examination of available documents and visual inspection of Conewango Creek Watershed Davis Brook Dam (Site 1) and appurtenant structures did not reveal conditions which constitute a hazard to human life or property. However, the dam has some deficiencies which require further investigation and remedial action.

A wet condition of unknown cause was observed on the lower portion of the left downstream slope. It is recommended that the services of a qualified registered professional engineer be retained to evaluate this condition.

Using the Corps of Engineers screening criteria for review of spillway adequacy, it has been determined that the dam would not be overtopped under full PMF conditions. The PMF routed through the reservoir required only 46 percent of the spillway outflow capacity. The spillway capacity is therefore judged as adequate.

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- Remove trees and brush from slopes,
- Regrade and fill in the erosion gullies.
- Install ladder rungs on the riser.

Robert J. Farrell, P.E.
New York No. 55983

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

18 Aug 81
Davis Brook Dam
(Site 1)

AERIAL VIEW
PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
CONEWANGO CREEK WATERSHED
DAVIS BROOK DAM (SITE 1)

SECTION I - PROJECT INFORMATION

1.1 GENERAL

a. Authority

The Phase I inspection reported herein was authorized by the New
York District Corps of Engineers in a letter dated 24 February 1981, in fulfillment
of the requirements of the National Dam Inspection Act, Public Law 92-367,
dated 8 August 1972.

b. Purpose of Inspection

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

1.2 DESCRIPTION OF THE PROJECT

a. Location

The Davis Brook Dam is located approximately one-quarter mile
east of the Chautauqua-Cattaraugus County line and approximately 800 ft.
south of New York Rte 394. It can be reached from both New York Rt. 394
and Grubb Hill Road. The dam is approximately 2.5 miles east of Kennedy, New
York and shown on U.S.G.S. Kennedy, New York quadrangle with coordinates
approximately at N42° 09.7, W79° 03.4 (see location plan). Page B-4 of
Appendix B is a site plan for this dam.
b. Description of Dam and Appurtenances

The dam consists of a zoned earthfill embankment with an earthfill cutoff trench below; a principal spillway with a reinforced concrete riser structure and outlet pipe; and a vegetated earth channel emergency spillway located at the right abutment. The length of the dam embankment is approximately 565 ft. The overall length of the dam is approximately 794 ft. including the emergency spillway which has a weir length of 200 ft.

1) Dam Embankment

The embankment consists of a zoned compacted earth structure of gravelly or silty sand and clayey silty gravelly sand. It is founded on glacial till. It is a maximum of 48 ft. high.

The upstream slope is 3 horizontal to 1 vertical and the downstream slope is 2.5 horizontal to 1 vertical. The crest width is 16 ft.

Beneath the embankment is an earthfill cutoff trench of variable width at the bottom. According to available plans it is constructed of the same material as the embankment.

2) Emergency Spillway

The emergency spillway is cut into sand and gravel in the right abutment. A diversion berm of compacted fill has been constructed on the east side with side slopes of 3 horizontal to 1 vertical. The grass covered channel curves around the east end of the dam embankment.

The control section is 200 ft. wide and 30 ft. long and the downstream channel is roughly 250 ft. long.

3) Principle Spillway

The principle spillway consists of a reinforced concrete drop inlet structure with a sluice gate controlled inlet pipe, two uncontrolled orifice inlets and a 30 in. outlet pipe supported on a concrete cradle.

The inside dimensions of the riser structure are 32.25 ft. high and 7.5 ft. wide normal to the axis of the dam. It is 2.5 ft. long parallel to the embankment and flares to 14.2 ft. long at the top. The walls of the structure are 15 in. thick for the bottom 6 ft., 12 in. thick for the next 5 ft., and 10 in. thick for the top section. The top slab is 8 in. thick. The structure is founded on a 14 ft. by 15.5 ft. spread footing.
The "low stage inlet" is an uncontrolled opening approximately 16.3 ft. above the sluice gate invert. It is 16 in. wide and 12 in. high and is located in the upstream face of the riser structure. The water flows over this orifice and drops into the riser structure. It is protected by a trash rack assembly approximately 5.5 ft. high and 4.2 ft. wide. This assembly is fabricated from galvanized steel angle sections.

The "high stage inlet" consists of two openings approximately 30 ft. above the sluice gate invert. They are 7.5 ft. wide and 15 in. high and are located in the left and right sides of the flared portion of the riser structure. They are protected by a galvanized steel grating 25 in. high placed in front of each high stage opening and 5 galvanized steel angles placed in the sloping section below each opening. A 30 in. diameter manhole permits access into the riser structure.

The riser structure is drained by a 30 in. diameter reinforced concrete pressure pipe. It is approximately 224 ft. long and drops approximately 4.2 ft. over that length. The pipe penetrates the downstream side of the riser structure and is supported by a 7.5 in. thick concrete cradle within the embankment. Plans indicate 6 concrete anti-seep collars cast around the pipe within the embankment.

The downstream end of the conduit and cradle extend approximately 8 ft. downstream of the embankment. The pipe and bedding is supported by a reinforced concrete bent. The discharge conduit outlets into a stone revetted plunge pool.

4) Foundation and Embankment Drainage

A vertical seepage drain with graded filter is located in the downstream foundation at a variable distance downstream of the centerline of the dam. It extends the full length of the embankment. The drain is approximately 4 ft. wide and variable depth. For approximately 100 ft. either side of the principal spillway the drain includes a system of 8 in. diameter pipe which outlets to the left and right of the outlet conduit.

5) Reservoir Drain

The reservoir drain consists of a reinforced concrete inlet with an invert elevation of 1323.0 ft. (MSL). The inlet is drained by 42.0 ft. of 12 in. diameter cast iron pipe resting on a 4 in. thick unreinforced concrete cradle. The pipe enters the upstream side of the riser structure with an invert elevation of 1321.4 ft. (MSL), 1.0 ft. above the riser floor. The drain is regulated inside the riser structure by a 12 in. diameter slide gate, and a stem and pipe sleeve which rise to the wrench socket flush with the top slab of the riser, where a T-wrench handle may be inserted.
c) **Size Classification**

The dam's maximum height of 48 ft. places it in the INTERMEDIATE size category according to the Corps of Engineers' Recommended Guidelines.

d) **Hazard Potential Classification**

The hazard potential classification for this dam is HIGH because of the significant economic and high potential for loss of life downstream in the event of dam failure. Section 5 of this report presents more detailed discussion of the hazard potential.

e) **Ownership**

The dam is owned by Richard L. Shields
P.O. Box 224
Kennedy, New York 14747
Tele: (716) 267-4801

f) **Operator**

The dam is operated by:

Conewango Creek Watershed Commission
Donald Crowell, Chairman
RD #2
S. Dayton, New York 14138
Tele: (716) 988-3300

g) **Purpose of Dam**

The purpose of this dam is to reduce downstream flooding by providing temporary storage for the runoff from 1030 acres. The temporary storage is released gradually through the two-stage principal spillway system.

h) **Design and Construction History**

The dam was built under the Watershed Protection and Flood Prevention Act by the Conewango Creek Watershed Commission with the assistance of the Soil Conservation Service. It was completed in 1964.

i) **Normal Operating Procedure**

The dam is normally self-regulating.
1.3 Pertinent Data

a) Drainage Area

The drainage area for this dam covers 1.6 square miles. It is made up primarily of hilly woodland and pasture.

b) Discharge at Dam Site

1) Outlet Works

Normal discharge at the site is through the 30 in. diameter outlet pipe. In the event of severe flooding water would flow over the emergency spillway at elevation 1356.8 ft. (MSL). The invert of the low stage orifice is at elevation 1337.7 ft (MSL). The invert of the high stage orifice is at elevation 1351.4 ft. (MSL).

2) Maximum Known Flood

There is no data available for the maximum known flood at this dam site. Recent high water was observed at elevation 1347.5 ft. (MSL).

3) Ungated Spillway Capacity at Top of Dam

The capacity of the principal spillway with the reservoir at top of dam elevation 1361.6 ft. (MSL) is 165 cfs. The capacity of the emergency spillway is 6835 cfs at this level.

4) Ungated Spillway Capacity at Test Flood

The capacity of the principal spillway with the reservoir at test flood elevation (1359.7 ft. MSL) is 151 cfs. The capacity of the emergency spillway is 3103 cfs at this level.

5) Gated Spillway Capacity at Normal Pool

There are no gated spillways.

6) Gated Spillway Capacity at Test Flood

As previously mentioned, there are no gated spillways.

7) Total Spillway Capacity at Test Flood

The total spillway capacity at test flood elevation (1359.7 ft. MSL) is 3254 cfs.

c. Elevation (ft. above NGVD)

1) Streambed at toe of dam: 1313.4
2) Bottom of cutoff: variable, approximately 1312 minimum
3) Maximum tailwater - unknown, outlet conduit invert 1316.2
4) Normal pool: 1337.7
5) Full flood control pool: 1356.8
6) Spillway crest - Pond Drain Invert: 1323.0
   Low level orifice: 1337.7
   High level orifice: 1351.4
   Emergency spillways: 1356.8
7) Design surcharge (original design): 1358.9
8) Top of dam: 1361.6
9) Test flood surcharge: 1359.7
d. **Reservoir (Length in feet)**
   1) Length of maximum pool: 2100 ft.
   2) Length of normal pool: 800 ft.

e. **Storage (acre-feet)**
   1) Normal pool: 23
   2) Flood control pool: 175
   3) Spillway crest pool:
      a) Low stage inlet: 23
      b) High stage inlet: 86
      c) Emergency spillway: 175
   4) Top of dam: 273
   5) Test flood pool: 230

f. **Reservoir Surface (acres)**
   1) Normal pool: 4
   2) Flood control pool: 18
   3) Spillway crest pool:
      a) Low stage inlet: 4
      b) High stage inlet: 14
      c) Emergency spillway: 18
   4) Test flood: 21
   5) Top of dam: 23


g. **Dam**
   1) Type: Earth Embankment
   2) Length: 565
   3) Height: 48 ft.
   4) Top Width: 16 ft.
   5) Side Slopes:
      Upstream: 3H:1V  
      Downstream: 2.5H:1V
   6) Zoning: Embankment of clayey, silty, gravelly sand with dual graded filter at downstream embankment seepage drain under full length of embankment
   7) Impervious Core: Semi-pervious clayey silty gravelly sand
   8) Cutoff: Variable width, earthfill
   9) Grout Curtain: None

h. **Diversion and Regulating Tunnel**
   Not applicable
i. **Spillways**

1. **Type:**
   a) Principal Spillway: Reinforced concrete drop inlet
   b) Emergency Spillway: Grass covered earth channel cut in right abutment

2. **Length of Weir:**
   a) Low Level Orifice: 16 inches
   b) High Level Orifice: 15 feet
   c) Emergency Spillway: 200 feet

3. **Crest Elevation: (feet above NGVD)**
   a) Low Level Orifice: 1337.7
   b) High Level Orifice: 1351.4
   c) Emergency Spillway: 1356.8

4. **Gates:** None

5. **Upstream Channel:** Davis Brook, narrow stream to reservoir through farm and woodland

6. **Downstream Channel:** Davis Brook, narrow stream through farm and woodland

j. **Regulating Outlet:**

   None
2.1 GEOLOGY

Bedrock at the dam site is upper Devonian Age (345-375 million years ago) known as the Canadaway Group. These relatively underformed and flat-lying sedimentary rocks consist of interbedded shales and siltstones. Regionally, the rock forms a homocline dipping southward to southwestward at approximately 40 feet per mile. Small terraces and low folds locally modify this dip to essentially flat-lying over short distances. Only minor folding and faulting are found in the region with no major or active faults known to exist in the area.

The Davis Brook Dam is in a region classified as Zone 2 seismicity, as shown in Figure No. 1 of the Recommended Guidelines for Safety Inspection of Dams.

Pleistocene glaciation (beginning approximately 2 million years ago) modified the topography by means of both erosion and deposition. The thick continental ice sheet, moving southward from Quebec and Ontario, advanced and receded repeatedly in the area smoothing terrain by glacial scour and mantling the uplands with till deposits.

The Pleistocene geology of the dam site is that of glacial ground moraine. Generally alluvial gravels overlay dense sandy glacial till at the site. The till tends to be sparsely to moderately stony and very impermeable. In recent times, alluvium eroded from uplands has been deposited on these glacial deposits.

2.2 SUBSURFACE INVESTIGATION

Test hole logs are contained in the "As-Built" drawings; however, the copies are illegible and are not included in Appendix B.

2.3 DESIGN RECORDS

The records available for the project consists of 18 contract drawings which show the plans, sections and details for the dam, appurtenant structures, fencing details, and logs of test holes; and a design report issued by the U.S. Soil Conservation Service dated May 1969.

2.4 CONSTRUCTION RECORDS

Construction records and specifications are available at the U.S. Soil Conservation Service, Design Section, Syracuse, N.Y.

2.5 OPERATION RECORDS

No written maintenance or operation records exist for the dam.

2.6 EVALUATION OF DATA

Information obtained from the "As-Built" drawings is consistent with observations made during this inspection. The information obtained from available data was considered adequate for the Phase I inspection and evaluation.
SECTION 3 - VISUAL INSPECTION

3.1 Findings

a. General

The Davis Brook Dam is in GOOD condition at the present time.

b. Dam

1) Earth Embankment (See Photos 1, 5, 6, and 8)

The grass growth is heavy on this embankment impeding inspection of the slopes. Shrubs were noted along the right upstream abutment contact and to the right of the intake structure on the upstream slope.

Erosion gullies 1 to 2 in. wide and 1 in. deep were noted in the right downstream abutment contact.

The crest of the dam is in good condition.

There is no slope protection on the upstream slope other than the vegetative cover. Approximately 6 to 8 in. of erosion due to wave action was noted at and above the water line on the upstream slope.

The toe drain under the downstream slope shows no flow emanating from its outlets. The downstream left slope is wet over the bottom 15 ft. This may be the result of seepage or natural groundwater from the abutment. No staining was observed.

Animal burrows were noted in the right upstream and downstream slopes.

2) Emergency Spillway (See Photos 6, 7, and 8)

This spillway is in good condition. Some wet areas were noted but they are the result of natural groundwater or ponded runoff. Some debris was noted in the channel and should be cleared.

c. Appurtenant Structures

1) Drop Inlet Service Spillway (See Photos 1 and 2)

The structure is in good condition with no evidence of spalling, cracking, or efflorescence. The trash racks are in good condition, and free from debris accumulation.

2) Pond Drain Inlet Pipe

At the time of inspection, the 12 in. pond drain inlet was completely submerged and could not be observed.
d) **Reservoir Area** (See photos 5 and 8)
   The shore of the reservoir is generally shallow sloping pasture or woodland. It appears to be stable and in good condition.

e) **Downstream Channel** (See photo 4)
   The downstream channel is a narrow channel passing over relatively flat flood plain. There is rip rap protection of the plunge pool. Some erosion of the right bank has taken place downstream of the plunge pool.

3.2 **Evaluation**
   The dam is generally in good condition. The potential problems noted during the visual inspection are listed below.

a) The wet area noted over the bottom 15 ft. on the downstream left slope.

b) Drainage gullies along the right downstream abutment.

c) Animal burrows on the right upstream and downstream slopes.

d) Debris on upstream slope and in the emergency spillway channel.

e) Erosion of the downstream channel and the upstream slope of the dam at the waterline.

f) Brush growing on the upstream slope and the right abutment contact.

g) Operation of the drain gate could not be checked due to its inaccessibility.
SECTION 4 - OPERATION AND MAINTENANCE PROCEDURES

4.1 PROCEDURES

No written operation and maintenance procedures exist for the project. The normal operation of the project consists of allowing water to flow through the service spillway outlet pipe.

4.2 MAINTENANCE OF DAM

It is reported that maintenance of the dam is performed when the need arises. Maintenance is considered adequate.

4.3 WARNING SYSTEM IN EFFECT

No warning system is in effect or in preparation.

4.4 EVALUATION

The overall condition of the dam and appurtenant structures appears to be good. Recommendations in connection with regular maintenance are discussed in Section 7.
SECTION 5 - HYDRAULIC/HYDROLOGIC

5.1 Drainage Area Characteristics

Davis Brook Dam is located on Davis Brook, a tributary of Conewango Creek in the Allegheny River basin, and has a drainage area of 1.6 square miles. The dam is situated approximately 2.5 miles northwest of Kennedy New York. The topography of the watershed is hilly woodland and pastures.

5.2 Design Data

This dam was designed as a Class C structure in accordance with criteria established in Washington Engineering Memorandum SCS-27. Under this classification, the emergency spillway is designed for a rainfall equal to P(100) + 0.26 [PMP - P(100)], while the freeboard pool is designed for the PMP rainfall.

The Soil Conservation Service (SCS) design calculations have been reviewed. The dam was designed to contain the runoff for the 100-year flood without discharging through the emergency spillway. The peak outflow is 126 cfs and the peak elevation is 1356.8 ft. (MSL). The SCS design allowed for a 50-year sediment accumulation with a storage of 23.3 acre-ft. The principal spillway consists of 30 in. diameter reinforced concrete water pipe and a 2.5 ft. x 7.5 ft. reinforced concrete riser with two 7.5 ft. x 15 in. openings with a crest elevation of 1351.4 ft. (MSL). The riser has a 1.0 ft. x 1.3 ft. orifice with a crest elevation of 1337.7 ft (MSL). The emergency spillway control cross section is 200 ft. wide, with side slopes of 3 horizontal to 1 vertical and a crest elevation of 1356.8 ft. (MSL). The dam crest elevation is 1361.6 ft. (MSL).

5.3 Analysis Criteria

The analysis of the spillway capacity of the dam and the storage of the reservoir was performed using the Corps of Engineers HEC-1 Dam Safety Version 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 22.8 in. (24 hours 200 sq. miles) from Hydrometerological Report #33 in accordance with the Recommended Guidelines of the Corps of Engineers. The dam is 48 ft. high and impounds approximately 273 acre-ft. at the top of the dam. The dam is classified as a HIGH hazard and INTERMEDIATE in size, according to the Recommended Guidelines of the Corps of Engineers. The spillway design flood is the Probable Maximum Flood (PMF). The floods selected for analysis were 20, 40, 50, 60, 80 and 100% of the PMF flows. The PMF inflow of 3261 cfs was routed through the reservoir and the peak outflow was determined to be 3254 cfs. The peak PMF outflow would produce a velocity of 7.0 ft./sec. on the emergency spillway and should not create an erosion problem.

5.4 Reservoir Capacity

The reservoir capacities at the crest of the emergency spillway and at the top of the dam are 175 acre-ft. and 273 acre-ft., respectively. Surcharge storage between the emergency spillway crest and the top of dam is equivalent to 1.1 in. of runoff from the drainage area.
5.5 Experience Data

There are no flood records for the dam site, however, during the field investigation, evidence of recent high water was observed at elevation 1347.5 ft. (MSL). This reservoir elevation corresponds to a peak outflow of 16 cfs.

5.6 Overtopping Potential

The maximum capacity of the spillways is 7000 cfs which is greater than the PMF peak outflow of 3254 cfs. The dam is not overtopped by the PMF, the peak elevation being 1.9 ft. below the top of the dam.

5.7 Analysis of Downstream Impacts

During the field investigation, dwellings and highways located downstream of the dam were identified and referenced to the channel invert. The cross section locations used in the downstream channel routing are shown on Page D-2, Appendix D. The impacts of the PMF on dwellings located downstream of the dam are shown in Table 5.1. For the purposes of this analysis, a danger of loss of life was assumed to exist if the computed PMF water surface was above the first floor elevation of a structure. This situation does not occur at any of the structures and no roads are overtopped during the PMF. In spite of these results, the potential danger of loss of life and economic damage is substantial enough to warrant classification as a HIGH hazard dam.

5.8 Evaluation

The spillway of Davis Brook Dam will safely pass the PMF without overtopping, and is therefore assessed as "Adequate". Potential problems include:

a) The danger of loss of life and economic damage downstream of the dam for the test flood conditions.
<table>
<thead>
<tr>
<th>Location #</th>
<th>Location</th>
<th># of Dwellings</th>
<th>Structure Height above Streambed* (ft)</th>
<th>Peak Flow (cfs)</th>
<th>Peak Stage (ft)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1600' d/s of dam</td>
<td>1</td>
<td>14</td>
<td>3254</td>
<td>6</td>
<td></td>
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<tr>
<td>2</td>
<td>1100' d/s Location #1</td>
<td>2</td>
<td>12</td>
<td>3251</td>
<td>8</td>
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<tr>
<td>3</td>
<td>1600' d/s of Location #2</td>
<td></td>
<td>1 house</td>
<td>3246</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 trailer</td>
<td>9.6</td>
<td>3246</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>500' d/s of Location #3</td>
<td>1</td>
<td>11.1</td>
<td>3246</td>
<td>7</td>
<td></td>
</tr>
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</table>

*The structure height above the streambed is the difference between the first floor elevation and the channel invert.*
SECTION 6 STRUCTURAL STABILITY

6.1 Visual Observations

There does not appear to be significant displacement or distress associated with the embankments at this site. The dam appears to be in good condition at the present time.

6.2 Design and Construction Data

Analyses carried out by the Soil Conservation Service during the design and construction phase included slope stability analyses by the infinite slope and Swedish circle methods. The soil parameters assumed for the final analysis were: Relative density 97%, $\theta = 31.3^\circ$ and $c = 675$ psf. Based on these assumptions, the factors for safety were higher than 2.5 for both upstream and downstream slopes. The dam is therefore considered to have adequate factors of safety for stability.

6.3 Post Construction Changes

There have been no known changes to any of the embankments or structures at this dam.

6.4 Seismic Stability

The dam is located in Seismic Zone No. 2 and, in accordance with the recommended Phase I guidelines, a seismic stability analysis is not warranted.
SECTION 7 - ASSESSMENT/RECOMMENDATIONS

7.1 ASSESSMENT

a. Safety

Examination of the available documents and visual inspections of the Conewango Creek Watershed Davis Brook Dam (Site 1) and appurtenant structures did not reveal any conditions which constitute a hazard to human life or property. The dam and its appurtenances are considered to be in good condition at the present time.

Using the Corps of Engineers screening criteria for review of spillway adequacy, it has been determined that the dam would not be overtopped for the spillway design flood of the full PMF nor for one-half the PMF. The principal and auxiliary spillway capacity are, therefore, judged as adequate.

b. Adequacy of Information

This report and its conclusions are based on visual inspection, interview data, contract drawings, and office hydrologic/hydraulic studies. This information and data are adequate for a Phase I inspection.

c. Need for Additional Investigations

It is recommended that the services of a qualified registered professional engineer be retained to evaluate the wet condition observed on the lower portion of the left downstream slope.

The engineer should make recommendations for remedial measure if warranted and the owner should implement the findings of these studies.

d. Urgency

The recommended investigation should be completed within 12 months of notification to owner and remedial actions resulting from these investigations completed in the subsequent 12 months. The remedial measures or actions listed below should be completed within one year from notification to owner.

7.2 RECOMMENDED MEASURES

It is recommended that the owner institute the following remedial measures:

1) Develop a formal written downstream warning system to alert the appropriate officials and residents in the event of an emergency.

2) Develop and maintain a program of periodic technical inspections.
3) Implement a program of diligent and periodic maintenance including but not limited to: mowing of slopes and spillway channels; backgilling ruts, drainage gullies, and animal burrows with suitable compacted material; clearing debris from trach racks and upstream slopes; and checking the operability of the drain gate.

4) Remove trees and brush from slopes including the roots. The resulting voids should be backfilled with suitable compacted material.

5) Regrade and fill in the erosion gullies on the downstream right slope and reseed the disturbed areas.

6) Install ladder rungs on the riser to provide access to the drain gate housing.
VISUAL INSPECTION CHECKLIST

1) Basic Data
   a. General
      Name of Dam _______Davis Brook Dam
      Fed. I.D. # _______NY 00564 _______DEC Dam No. _______88-3805
      River Basin _______Allegheny
      Location: Town _______Randolph _______County _______Cattaraugus
      Stream Name _______Tributary of Davis Brook
      Tributary of _______Conewango Creek
      Latitude (N) _______42° 09.7' _______Longitude (W) _______79° 03.4'
      Type of Dam _______Earth Embankment
      Hazard Category _______High
      Date(s) of Inspection _______April 3, 1981
      Weather Conditions _______Sunny, 70°
      Reservoir Level at Time of Inspection _______Approximately elevation 1338.2 ft.

   b. Inspection Personnel _______Mr. James Reynolds, Mr. Jeff Hardin, Mr. Bob Farrell,
      Mr. Ken Avery

   c. Persons Contacted (including Address & Phone No.)
      U.S. Soil Conservation Service Rm 771-Federal Bldg., 100 So. Clinton St., Syracuse, NY
      State Construction Eng: Philip "Skip" Nelson 1-315-423-5502
      ARea 1 Proj. Engr. (Batavia): Pete Wright 1-716-343-3364
      Contracting Ofc. (Conewango Creek Commission) Dick Shields 1-716-267-4801

   d. History:
      Date Constructed _______1971 _______Date(s) Reconstructed _______
      Designer _______U.S.D.A. Soil Conservation Service
      Constructed by _______
      Owner _______
Embarkment

a. Characteristics
   (1) Embankment Material: Gravelly or silty sand (SM) to clayey silt, gravelly sand (SC-SM) and (SP)
   (2) Cutoff Type: Earthfill trench of variable bottom width
   (3) Impervious Core: None
   (4) Internal Drainage System: A dual graded filter makes up the downstream embankment, a 4 foot wide trench drain below the downstream embankment
   (5) Miscellaneous

b. Crest
   (1) Vertical Alignment: Good
   (2) Horizontal Alignment: Good
   (3) Surface Cracks: None noted
   (4) Miscellaneous

c. Upstream Slope
   (1) Slope (Estimate) (V:H): 1 vertical to 3 horizontal
   (2) Undesirable Growth or Debris, Animal Burrows: Brush growth approximately 30 feet right of intake structure, minor amounts of debris
   (3) Sloughing, Subsidence or Depressions: None noted
(4) Slope Protection. Vegetative cover and berm at water level 6 to 8 inches of wave erosion at or just above the present water level

(5) Surface Cracks or Movement at Toe. None noted

d. Downstream Slope

(1) Slope (Estimate - V:H) 1 vertical to 2.5 horizontal

(2) Undesirable Growth or Debris, Animal Burrows. Burrows 40 feet from right abutment 6 feet below crest (6" diameter), two more down slope

(3) Sloughing, Subsidence, or Depressions. None noted

(4) Surface Cracks or Movement at Toe. None noted

(5) Seepage. Bottom 15 feet of left downstream slope is wet. This may be seepage or natural groundwater from the abutment, no flow could be discerned. No flow from toe drain outlets

(6) External Drainage System (Ditches, Trenches, Blanket). None noted

(7) Condition Around Outlet Structure. Good

(8) Seepage Beyond Toe. None noted

e. Abutments - Embankment Contact

A 6' x 6' slough has occurred approximately 12 feet below the crest at the left upstream contact. Heavy brush at right upstream contact

(1) Erosion at Contact. None noted other than slough at left upstream contact

(2) Seepage Along Contact. None noted other than seepage at left downstream slope discussed at 2-d-5
3) Drainage System

(a) Description of System 4 ft. wide trench drain containing a system of 8 in. diameter perforated pipe exiting on either side of the principal spillway outlet conduit

(b) Condition of System No flow was observed from the system

(c) Discharge from Drainage System None noted

4) Instrumentation (Monumentation/Surveys, Observation Wells, Weirs, Picometers, etc.) None installed

5) Reservoir

a. Slopes Appear stable and in good condition

b. Sedimentation Very minor accumulation

c. Unusual Conditions Which Affect Dam None noted

6) Area Downstream of Dam

a. Downstream Hazard (No. of homes, highways, etc) Refer to Table 5.1

b. Seepage, unusual growth None noted

c. Evidence of movement beyond toe of Dam None noted

d. Conditions of Downstream Channel Small Slough on downstream right bank, approximately 20 ft. downstream of plunge pool
7) Spillway(s) (including Discharge Conveyance Channel)

- **General** Good

b. Condition of Service Spillway: Good, no evidence of cracking, spalling or efflorescence

c. Condition of Emergency Spillway: Generally good; needs mowing and clearing of debris

d. Condition of Discharge Conveyance Channel: Good

J) Reservoir Drain/Outlet

- **Type:** Pipe X Conduit Other
- **Material:** Concrete Metal Other Cast Iron
- **Size:** 12" I.D., Length 42' (from dwgs)
- **Invert Elevations:** Entrance 252 ft. Exit 252 ft.
- **Physical Condition (Describe):** Unobservable X
  - **Material:**
  - **Joints:**
  - **Structural Integrity:**
  - **Hydraulic Capability:**
- **Means of Control:** Gate Valve X Uncontrolled
  - **Operation:** Operable Inoperable X Other
  - **Present Condition (Describe):** Could not be operated due to missing handle.
9) Structural

a. Concrete Surfaces N/A

b. Structural Cracking N/A

c. Movement - Horizontal & Vertical Alignment (Settlement) N/A

d. Junctions with Abutments or Embankments N/A

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

f. Water Passages, Conduits, Sluices N/A

g. Seepage or Leakage N/A

h. Joints - Construction, etc. N/A

i. Foundation N/A

j. Abutments N/A

k. Control Gates N/A

l. Approach & Outlet Channels N/A

A-7
m. Energy Dissipators (Plunge Pool, etc.) N/A

n. Intake Structures N/A

o. Stability N/A

p. Miscellaneous N/A

10) Appurtenant Structures (Power House, Lock, Gatchouse, Other)
   a. Description and Condition None
APPENDIX B

ENGINEERING DATA
## APPENDIX B

<table>
<thead>
<tr>
<th>TITLE</th>
<th>PAGE</th>
</tr>
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<tbody>
<tr>
<td>Cover Sheet</td>
<td>B-2</td>
</tr>
<tr>
<td>Plan of Storage Area</td>
<td>B-3</td>
</tr>
<tr>
<td>Plan of Structural Works</td>
<td>B-4</td>
</tr>
<tr>
<td>Cut-Off Trench Excavation</td>
<td>B-5</td>
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<tr>
<td>Emergency Spillway</td>
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<td>Fill Placement &amp; Principal Spillway-Excavation</td>
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<tr>
<td>Plan Profile of Principal Spillway</td>
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<td>Riser Structural Details</td>
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<td>B-15</td>
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<td>Conduit Details</td>
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<td>Reservoir Drain Inlet Details</td>
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</table>
CONEWANGO CREEK WATERSHED
FLOODWATER RETARDING DAM
SITE 1

DRAINAGE AREA
FLOOD STORAGE
WATER SURFACE AREA
HEIGHT OF DAM
VOLUME OF FILL

BUILT UNDER THE WATERSHED PROTECTION
FLOOD PREVENTION ACT
BY
CONEWANGO CREEK WATERSHED COMMUNITY
WITH THE ASSISTANCE OF THE
SOIL CONSERVATION SERVICE
OF THE
U.S. DEPARTMENT OF AGRICULTURE

INDEX

SHEET 1 
SHEET 2 
SHEET 3 
SHEET 4 
SHEET 5 
SHEET 6 
SHEET 7 
SHEET 8 
SHEET 9 
SHEET 10 
SHEET 11 
SHEET 12 
SHEET 13 
SHEET 14 
SHEET 15 
SHEET 16 
SHEET 17 
SHEET 18 
SHEET 19 

COVER SHEET
PLAN OF STORAGE AREA
PLAN OF STRUCTURAL WORKS
CUTOFF TRENCH EXCAVATION
EMERGENCY SPILLWAY
FILL PLACEMENT AND PRINCIPAL SPILLWAY EXCAVATION
DRAINAGE SYSTEM
DRAINAGE SYSTEM
PLAN PROFILE OF PRINCIPAL SPILLWAY
RISER STRUCTURAL DETAILS
RISER STRUCTURAL DETAILS
RISER STRUCTURAL DETAILS
RISER STRUCTURAL DETAILS
RISER TRASH RACKS
CONCRETE DETAILS
RIP-RAP DRAIN PIPE DETAILS
FENCING DETAILS
LOGS OF TEST HOLES
LOGS OF TEST HOLES
1. ALL APPARATUS, ANCHORS AND FOUNDATIONS SHOWN ON SHEET 1
   ARE ANCHOR LUGS

2. AREA I 30'-0" X 60'-0" FOR EXCAVATION WITH WIDE PART OF AREA I
   AT THE 30'-0" Dimension AND FOUNDATION EXCAVATION ON
   LEFT ABUTMENT AS SHOWN ON SHEET 2

3. AREA I - 15'-0"

4. AREA II 15'-0" X 20'-0" TO CLEAR CUT EASEL TO FULL WIDTH OF AREA A
   AT THE RPM (OR BOA) TO ELN. 17'-0"

5. AREA 3 A CLEARAND AND FILL WILL BE STORED IN THE
   FIELD TO THE EXTENT.

6. DEPTHS AND LIMITS OF NARRA EXCAVATION WILL BE DETEMINED IN
   THE FIELD BY THE CONTRACTOR AS REQUIRED. SLOPE OF THE NARRA
   AREA SHALL BE NO STEEPER THAN A VERTICAL TO 1 HORIZONTAL.

7. AREA II FOR EAR AND A LOW ELEVATION 15'-0" SHALL BE PLANED
   LIMITS OF AREA II IN "PLAN AND SHALL BE STARED IN THE FILL IN THE
   FIELD.

8. OTHER SPECIFICATIONS WILL BE LOCATED WITH THE
   TOP OF THE FOUNDATION BASE.

   Elav. 8

   BM #3 15'-0"

   TBM 1/2 12'-0"  Elmv. - Cherry Tree
   En-Creek, Saur

   TBM 2/5 13'-0"  Dark Oak - Cherry Tree
   From Line 10'-0" Traffic Right Abutment

   TBM 5/5 15'-0"  Dark, Oak - Elm Tree
   Left Abutment -
   Roadline From & Dam
RAIN SIEFDER-IT-1'll FIL I PAI% FILL KAI AIA

1. MAIN rILI I 1 IN'F SIALL Ai-

2. MAIN FIL I (COMBO) SHALL TEST THE TRANSMISSION OF 600 GPM PER FOOT OF STREAM. THE PERMISSIBLE MATERIALS IN MAIN FILL I (COMBO) SHALL BE HAND MIXED.

CONTRACT MODIFICATION NO. 3

CONEWANGO CREEK WATERSHED PROJECT
SITE 1
FLOODWATER RETARDING DAM
CATARASUS COUNTY, NEW YORK
DRAINAGE SYSTEM
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

CONSTRUCTION MODIFICATIONS:
1. All main fill shall consist of 30% diameter in fill shall not be greater than 3 percent.
2. All main fill shall consist of 48" dia. pipe, fill shall not be greater than 3 percent.
3. All main fill shall consist of 48" dia. pipe, fill shall not be greater than 3 percent.

CONSTRUCTION MODIFICATIONS:
1. All main fill shall consist of 30% diameter in fill shall not be greater than 3 percent.
2. All main fill shall consist of 48" dia. pipe, fill shall not be greater than 3 percent.
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CONEWANGO CREEK WATERSHED PROJECT
FLOODWATER RETARDING DAM
CATTARAUGUS COUNTY, NEW YORK
DRAINAGE SYSTEM
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Note (Cone Dam 9- Sub S-19)
Ref: To Job Details Report No.
(119 - 198)
ALL Changes Made ok by
Drs. Kubis and Dr. Sharkin

CONTRACT MODIFICATION 3
CONEWANGO CREEK WATERSHED PROJECT
SITE 1
FLOODWATER RETARDING DAM
CATTARAUGUS COUNTY, NEW YORK
DRAINAGE SYSTEM
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

D. Z'N 3396 NY-285-P

B-9
32. **Reinforced Concrete Pipe Strength Requirements**

- **Section A-A**
  - Riprap Details
  - All riprap shall be placed from a soil site, if in use, at 0.3% to 0.5%.
  - Riprap shall be placed from 0.3% to 0.5%.
  - Maximum of 6' in soil, with riprap less than 12' in soil.

### Fabrication Instructions

<table>
<thead>
<tr>
<th>Item</th>
<th>Section</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>O.56</td>
<td>Section</td>
<td>Pipe suppliers note O.56 on sheet 10.</td>
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<tr>
<td>O.57</td>
<td>Section</td>
<td>Pipe suppliers note O.57 on sheet 10.</td>
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</table>

**As Built**

Conewango Creek Watershed Project

Site 1

Floodwater Retarding Dam

Cattaraugus County, New York

Plan Profile of Principal Spillway

U.S. Department of Agriculture

Soil Conservation Service

Date: 9-24-71

D. Zografos

D. Angelo

Pollock

NY-2155-P

Elevation 155.0

Sheet 10

Principal Spillway

160, 20, 40

Note: Scale in feet
As Directed By Engineer, Steel in Shaded Area Will Be Cut, Bent Or Moved As Required To Accommodate Grouting. See Exact Location Of Grout See Sheet 3-1-D.

Outside steel - inside steel

SECTION A-A

0 - 2 - 3
Scale: in feet

Steel 2' from outside face
Steel 2' from inside face

ENDWALL ELEVATION
LOW STAGE TRASH RACK BILL OF MATERIALS

<table>
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<tr>
<th>ITEM</th>
<th>SIZE</th>
<th>LENGTH</th>
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<td>3' x 6'</td>
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<td>1' x 6'</td>
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<td>2</td>
</tr>
<tr>
<td>Angle</td>
<td>2 x 1 1/2</td>
<td>6' x 6'</td>
<td>2</td>
</tr>
<tr>
<td>&quot;Hook&quot; Bolts</td>
<td>1/4&quot; Dia</td>
<td>2 1/2&quot;</td>
<td>2</td>
</tr>
<tr>
<td>Pipe Sleeve</td>
<td>1/4&quot; Dia</td>
<td>2&quot;</td>
<td>4</td>
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</tbody>
</table>

CONSTRUCTION DETAILS

1. All points of contact between angles to be welded.
2. Low stage trash rack to be galvanized in accordance with Spec 119. If necessary, a painting trash rack may be fabricated in sections and bolted with the approval of the Engineer.
3. Material of low stage trash rack shall conform to Spec 117 for structural carbon steel plates, shapes and bars.

"Hook" BOLT
Supply with washer and Type 2 nut

WELDING DETAILS

SECTION AA

SECTION BB

LOW STAGE TRASH RACK DETAILS
CONSTRUCTION DETAILS
1. Material in high stage trash rack shall conform to Spec 119 for structural carbon steel plates, shapes, and bars.
2. Entire high stage trash rack to be galvanized in accordance with Spec 119.

HIGH STAGE TRASH RACK DETAILS

HIGH STAGE TRASH RACK BILL OF MATERIALS

<table>
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<th>ITEM</th>
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<tr>
<td>Strap</td>
<td>1 1/8&quot; x 2&quot; x 25&quot;</td>
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<tr>
<td>&quot;L&quot; Bolt</td>
<td>3/4&quot; Dia.</td>
<td>8' x 13&quot;</td>
<td>28</td>
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<tr>
<td>Grating Panel</td>
<td>2 3/4&quot; x 8' 4&quot;</td>
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<td>2</td>
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<tr>
<td>Sleeves</td>
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<td>10&quot;</td>
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CONEWANGO CREEK WATERSHED
SITE I
FLOODWATER RETAINING DAM
CATTARAUGUS COUNTY, NY
RISER TRASH RACKS

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

AS BUILT
Reinforced Concrete Anti-Seep Collar

6 - Req'd.

Reinforced Concrete Cradle and Bent Details

Seal with Joint Compound (Spec.102)

Steel Bell Ring

250% Min. Joint Extensibility

Steel Spigot Ring

Rubber Gasket

Maximum allowable joint gap after installation and adjustment to line and grade shall be 1/8" for straight pipe sections. For covered pipe or pipe on a curved section, the inside joint opening at the closest point shall not exceed 3/4".

Reservoir Drain Concrete Bedding

(not to scale)

Reinforced Concrete Pipe: Joint Details

CC: E: 3C (4/8/67)
POND DRAIN INLET TRASH RACK DETAILS
NOT TO SCALE

PLAN

UPSTREAM ELEVATION

SECTION ALONG C

SCALE IN INCHES
STEEL SCHEDULE

<table>
<thead>
<tr>
<th>MARK</th>
<th>SIZE</th>
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<td>2-10</td>
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<td>2</td>
<td>2-1</td>
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<td>B-5</td>
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<td>2</td>
<td>3-5</td>
<td></td>
<td>2</td>
<td>2-1</td>
<td>684</td>
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<tr>
<td>B-6</td>
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<td>3-5</td>
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<td>2-1</td>
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<td>2</td>
<td>2-7</td>
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<td>B-8</td>
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<td>3-5</td>
<td></td>
<td>2</td>
<td>2-1</td>
<td>684</td>
</tr>
</tbody>
</table>

Bar B100, Grade 50 or higher. Close hole.

SCALE: NOT TO SCALE

BOLT DETAIL GALVANIZED

BOLT DETAIL GALVANIZED

CONCRETE REINFORCED 0.9 CU YDS

BILL OF MATERIALS

<table>
<thead>
<tr>
<th>ITEM</th>
<th>SIZE</th>
<th>LENGTH</th>
<th>QUAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANGLE IRON</td>
<td>2</td>
<td>2' x 8'</td>
<td>2</td>
</tr>
<tr>
<td>ANGLE IRON</td>
<td>3</td>
<td>2' x 8'</td>
<td>2</td>
</tr>
<tr>
<td>BOLT (GALV.)</td>
<td>3/4 DIA</td>
<td>8&quot;-11&quot;</td>
<td>4</td>
</tr>
<tr>
<td>GALV PIPE SLEEVE</td>
<td>3/4 DIA</td>
<td>8&quot;-8&quot;</td>
<td>4</td>
</tr>
</tbody>
</table>

CONSTRUCTION DETAILS

1. ALL PIPE AND FITTINGS SHALL BE GALVANIZED.

2. MATERIALS TO BE Galvanized.

3. EARTHWORK TO BE ACCORDANCE WITH SPEC 22.

AS BUILT

CONEWANGO CREEK WATERSHED PROJECT

SITE 1

FLOODWATER RETARDING DAM

CATTARAUGUS COUNTY, NEW YORK

RESERVOIR DRAIN INLET DETAILS

U. S. DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

SIGNED: ZOGRAGOS 12/68

W.E. GRAIJO JR.

J.E. POLULECH 4/69  NY-2155-P

B-17
1. Principal spillway inlet structure

2. Principal spillway inlet structure showing low stage inlet and trash rack
3. Principal spillway outlet pipe and plunge pool

4. Plunge pool and downstream channel
5. Upstream face of dam and impoundment

6. Upstream face of dam and emergency spillway
7. Emergency spillway

8. Aerial view
APPENDIX D

HYDRAULIC AND HYDROLOGIC COMPUTATIONS
APPENDIX D

PAGE

Cross Section Location Plan D-2
HEC-1 Dam Safety Version Computer Program - Input D-3
HEC-1 Dam Safety Version Computer Program - Output D-4
Supporting Calculations
- Hydrology D-12
- Spillway Hydraulics D-14
- Downstream Channel Routing D-25
Davis Brook Dam
(Site 1)

CROSS SECTION LOCATION PLAN

Scale: 1'-2000'
D-2
| Cols | Heads | Elev. | Gross | Net | K   | L   | M   | N   | O   | P   | Q   | R   | S   |
|------|-------|-------|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| T1   | 1     | 0.1   | 0.03  | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| T2   | 1     | 0.1   | 0.03  | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| T3   | 1     | 0.1   | 0.03  | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| T4   | 1     | 0.1   | 0.03  | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| T5   | 1     | 0.1   | 0.03  | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| T6   | 1     | 0.1   | 0.03  | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| T7   | 1     | 0.1   | 0.03  | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| T8   | 1     | 0.1   | 0.03  | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |

**Page 0001**

**D-3**

**ANALYSIS OF DAM OVERTOPPING USING RATIOS OF PMF**

**HYDROLOGIC-HYDRAULIC ANALYSIS OF SAFETY OF DAVIS BROOK DAM**

**RATIOS OF PMF ROUTED THROUGH THE RESERVOIR AND DOWNSTREAM**

**K1: CALCULATION OF INFLOW HYDROGRAPH TO RESERVOIR**

**K2: CALCULATION OF OUTFLOW HYDROGRAPH FROM RESERVOIR**

**K1: CHANNEL ROUTING - MOD PULS RESERVOIR**

**K2: CHANNEL ROUTING - MOD PULS REACH**

**K3: CHANNEL ROUTING - MOD PULS REACH**

**K4: CHANNEL ROUTING - MOD PULS REACH**
ANALYSIS OF DAM OVERTOPPING USING RATIOS OF PMF

DAM NY 564

HYDROLOGIC-HYDRAULIC ANALYSIS OF SAFETY OF DAVIS BROOK DAM

RATIOS OF PMF ROUTED THROUGH THE RESERVOIR AND DOWNSTREAM

JOB SPECIFICATION

<table>
<thead>
<tr>
<th>NO</th>
<th>NHR</th>
<th>NMIN</th>
<th>IDAY</th>
<th>THR</th>
<th>IMIN</th>
<th>METRC</th>
<th>IPLY</th>
<th>IFRT</th>
<th>NSTAN</th>
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<td>0</td>
<td>0</td>
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</table>

JOPER NWT LROPT TRACCE

5 0 0 0 0

MULTI-PLAN ANALYSES TO BE PERFORMED

NPLAN= 1 HRATIO= 6 LATIO= 1

RTIOS= 0.28 0.30 0.40 0.50 0.60 0.80 1.00

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

SUB-AREA RUNOFF COMPUTATION

CALCULATION OF INFLOW HYDROGRAPH TO RESERVOIR

ISTAG ICOMP IECON ITAPE JPLY JPRT INAPE ISTAGE ITAUTO

INFLOW 0 0 0 0 0 1 0 0

HYDROGRAPH DATA

INHYUG IUNG IAREA SNAP ITSDA ITSPC RATIO 1SNOV 1SAME LOCAL

1 1 1.60 0.00 1.60 0.00 0.800 0 1 0
**PRECIP DATA**

<table>
<thead>
<tr>
<th>SPFE</th>
<th>PMS</th>
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<th>R12</th>
<th>R24</th>
<th>R46</th>
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<th>R96</th>
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**LOSS DATA**

<table>
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<tr>
<th>LROPT</th>
<th>STRKR</th>
<th>DLTKR</th>
<th>RTIOL</th>
<th>GRAIN</th>
<th>SINKS</th>
<th>RTIOL</th>
<th>STRIL</th>
<th>CNSTL</th>
<th>ALSNK</th>
<th>RTIMP</th>
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<tbody>
<tr>
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<td>0.00</td>
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<td>0.10</td>
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**UNIT HYDROGRAPH DATA**

<table>
<thead>
<tr>
<th>TP=</th>
<th>CP=.63</th>
<th>NTA=</th>
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<tbody>
<tr>
<td>3.33</td>
<td></td>
<td>0.10</td>
</tr>
</tbody>
</table>

**RECESSION DATA**

| STRAT= | 2.00 | QRCSN= | -0.10 | RTIOL= | 2.00 |

**UNIT HYDROGRAPH 73 END-OF-PERIOD ORDINATES, LAG= 3.32 HOURS, CP= 0.63, VOL= 1.00**

<p>| | | | | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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<tbody>
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<td>4.</td>
<td>16.</td>
<td>32.</td>
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**END-OF-PERIOD FLOW**

<table>
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<tr>
<th>DOY</th>
<th>HR</th>
<th>MN</th>
<th>PERIOD</th>
<th>RAIN</th>
<th>EXCS</th>
<th>LOSS</th>
<th>CONF Q</th>
</tr>
</thead>
</table>

**SUM 27.54 25.79 3.75 85971**

**HYDROGRAPH ROUTING**

**CALCULATION OF OUTFLOW HYDROGRAPH FROM RESERVOIR**

<table>
<thead>
<tr>
<th>ISAQ</th>
<th>ICOMP</th>
<th>IECON</th>
<th>ITAPE</th>
<th>JPLT</th>
<th>JPRN</th>
<th>INAPE</th>
<th>ISTAGE</th>
<th>IAUTO</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>1.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

**ROUTING DATA**

<table>
<thead>
<tr>
<th>QLOSS</th>
<th>CLoss</th>
<th>AVG</th>
<th>INES</th>
<th>SAME</th>
<th>IOPT</th>
<th>IPMP</th>
<th>LSTR</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>1.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

**NSTPS | NSTOL | LAG | AMSKK | X | TSK | STOR | ISPRAT |
<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>1.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

**STAGE**

| 1337.70 | 1351.40 | 1356.80 | 1356.80 | 1359.00 | 1359.00 | 1360.00 | 1361.00 | 1362.00 | 1363.00 |

**FLOW**

| 0.00  | 23.00 | 126.00 | 960.00 | 2201.00 | 3805.00 | 5687.00 | 7876.00 | 10276.00 |

**CAPACITY**

| 23.00 | 66.00 | 175.0 | 214.0 | 273.0 |

**ELEVATION**

| 1333.0 | 1351.0 | 1357.0 | 1359.0 | 1362.0 |

**CREL | SPWIN | COGW | UPW | FLEV | COOL | CARFA | FYFL |
<table>
<thead>
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<td>0.0</td>
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### DAM DATA

<table>
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<tr>
<th>TOPEL</th>
<th>QGQD</th>
<th>EXPD</th>
<th>DAMWID</th>
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<tr>
<td>1361.6</td>
<td>2.7</td>
<td>1.5</td>
<td>565.0</td>
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</table>

#### PEAK OUTFLOW IS.

- 621.0 AT TIME 43.50 HOURS
- 1301.0 AT TIME 43.00 HOURS
- 1626.0 AT TIME 43.00 HOURS
- 1951.0 AT TIME 43.00 HOURS
- 2604.0 AT TIME 43.00 HOURS
- 3254.0 AT TIME 43.00 HOURS

#### HYDROGRAPH ROUTING

**CHANNEL ROUTING -MOD PULS RESERVOIR -1**

<table>
<thead>
<tr>
<th>ISTAQ</th>
<th>ICOMP</th>
<th>IICON</th>
<th>ITAPE</th>
<th>JPLT</th>
<th>JPRRT</th>
<th>INAPE</th>
<th>ISTAGE</th>
<th>IAUTO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td>0</td>
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**ROUTING DATA**

<table>
<thead>
<tr>
<th>QLOSS</th>
<th>CLOSS</th>
<th>AVG</th>
<th>IRES</th>
<th>ISAME</th>
<th>IOPT</th>
<th>IPHP</th>
<th>LSTR</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>0.00</td>
<td>0.00</td>
<td>1</td>
<td>1</td>
<td>0</td>
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<td>0</td>
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</table>

**NORMAL DEPTH CHANNEL ROUTING**

<table>
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<tr>
<th>QN(1)</th>
<th>QN(2)</th>
<th>QN(3)</th>
<th>FLNVT</th>
<th>ELMAX</th>
<th>RLNTH</th>
<th>SEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0456</td>
<td>0.0506</td>
<td>0.8458</td>
<td>1298.0</td>
<td>1350.1</td>
<td>1600.0</td>
<td>0.0400</td>
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</tbody>
</table>

#### CROSS SECTION COORDINATES--STA, ELEV, STA, ELEV, ETC

- 0.00 1350.00
- 420.00 1320.00
- 742.50 1298.00
- 752.50 1298.00
- 782.50 1300.00
- 950.00 1320.00
- 1025.00
- 1156.00

#### STORAGE

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<th>0.00</th>
<th>2.40</th>
<th>5.59</th>
<th>10.41</th>
<th>23.24</th>
<th>45.43</th>
<th>76.97</th>
<th>117.87</th>
<th>167.12</th>
<th>221.42</th>
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<td>490.10</td>
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<td>740.49</td>
<td>840.63</td>
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#### OUTFLOW

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<tr>
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<th>5108.31</th>
<th>11732.69</th>
<th>25084.71</th>
<th>167587.94</th>
<th>81348.67</th>
<th>128278.72</th>
<th>155471.58</th>
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</thead>
<tbody>
<tr>
<td>777066.0</td>
<td>372970.56</td>
<td>603500.00</td>
<td>608981.50</td>
<td>749814.63</td>
<td>906415.88</td>
<td>1079216.75</td>
<td>1286658.25</td>
<td>1475188.50</td>
<td>169725.00</td>
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</table>

#### STAGE

<table>
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<tr>
<th>STAGE</th>
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<th>1300.74</th>
<th>1303.47</th>
<th>1306.71</th>
<th>1309.95</th>
<th>1311.68</th>
<th>1314.42</th>
<th>1317.16</th>
<th>1319.09</th>
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<tbody>
<tr>
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<td>1330.84</td>
<td>1333.58</td>
<td>1336.32</td>
<td>1339.05</td>
<td>1341.79</td>
<td>1344.53</td>
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#### FLOW

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<th>2246.87</th>
<th>5108.31</th>
<th>11732.69</th>
<th>25084.71</th>
<th>167587.94</th>
<th>81348.67</th>
<th>128278.72</th>
<th>155471.58</th>
</tr>
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<tbody>
<tr>
<td>277066.0</td>
<td>372970.56</td>
<td>603500.00</td>
<td>608981.50</td>
<td>749814.63</td>
<td>906415.88</td>
<td>1079216.75</td>
<td>1286658.25</td>
<td>1475188.50</td>
<td>169725.00</td>
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</table>
### Maximum Stage

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</table>

### Maximum Stage

<table>
<thead>
<tr>
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</table>

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### Hydrograph Routing

**Channel Routing - MOD PULS Reach 1-2**

<table>
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</tr>
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<tr>
<td>IECON</td>
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</tr>
<tr>
<td>ITAPE</td>
<td>0</td>
</tr>
<tr>
<td>JPLT</td>
<td>0</td>
</tr>
<tr>
<td>JPRU</td>
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</tr>
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<td>INAPE</td>
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<tr>
<td>ISTAGE</td>
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</tr>
<tr>
<td>IAUTO</td>
<td>0</td>
</tr>
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</table>

**Routing Data**

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</tr>
<tr>
<td>ISAME</td>
<td>1</td>
</tr>
<tr>
<td>IOPT</td>
<td>0</td>
</tr>
<tr>
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### Normal Depth Channel Routing

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<th>ONIN2</th>
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<th>RLTH</th>
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**Cross Section Coordinates**

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<th>ELEV</th>
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**Stage**

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<th>996.47</th>
<th>1524.14</th>
<th>2208.74</th>
<th>3296.75</th>
<th>4907.28</th>
<th>7514.62</th>
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<tbody>
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**Maximum Stage**

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<table>
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MAXIMUM STAGE IS 1293.2
MAXIMUM STAGE IS 1293.8
MAXIMUM STAGE IS 1294.7
MAXIMUM STAGE IS 1295.4

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

HYDROGRAPH ROUTING

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

CHANNEL ROUTING - MOD PULS REACH 2-3
ISTAQ ICMP IECON ITAPE JPLT JPRT INAPE IStage IAUTO
3 1 0 0 0 0 1 0 0

ROUTING DATA
OLoss Closs Avg Isres ISame IPOC IPMP LSTR
0.0 0.00 0.0 1 1 0 0

NSIPS NSDOL LAG ANSJK X TSK STOR A ISPRAT
1 0 0 0.000 0.000 0.000 0.0 0

NORMAL DEPTH CHANNEL ROUTING

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

ON(1) ON(2) ON(3) ELMVT ELMAX RLMTH SEL
0.8750 0.0500 0.8750 1262.0 1275.0 1700 0.01500

CROSS SECTION COORDINATES--STA+LEV sta+LEV --ETC
0.00 1275.00 300.00 1270.00 300.00 1269.00 715.00 1262.00 735.00 1262.00
750.00 1269.00 850.00 1270.00 950.00 1275.00

STORAGE 0.00 0.57 1.22 1.95 2.76 3.65 4.61 5.66 6.76 7.90
9.25 13.27 25.02 41.60 59.91 77.79 98.03 119.74 142.90 167.53

OUTFLOW 0.00 39.47 126.25 258.82 430.06 642.43 891.04 1195.33 1538.90 1921.44
2360.67 3004.79 4255.19 6355.04 9136.22 12574.61 16668.92 21427.97 26865.85 32995.66

STAGE 1262.00 1262.68 1263.37 1264.05 1264.74 1265.42 1266.10 1266.79 1267.47 1268.16
1268.84 1269.52 1270.21 1270.90 1271.58 1272.26 1272.95 1273.65 1274.31 1275.00

FLOW 0.00 39.47 128.25 258.82 430.06 642.43 891.04 1195.33 1538.90 1921.44
2360.67 3004.79 4255.19 6355.04 9136.22 12574.61 16668.92 21427.97 26865.85 32995.66

MAXIMUM STAGE IS 1265.4
MAXIMUM STAGE IS 1267.0
MAXIMUM STAGE IS 1267.6
MAXIMUM STAGE IS 1268.2
### HYDROGRAPH ROUTING

**CHANNEL ROUTING - MOD PULS REACH 3-4**

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<th>IECON</th>
<th>ETAPE</th>
<th>JPLT</th>
<th>IPRM</th>
<th>ENAME</th>
<th>ISTDE</th>
<th>IAUTO</th>
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**ROUTING DATA**

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<th>AVG</th>
<th>IRES</th>
<th>ISAME</th>
<th>IOPT</th>
<th>IPMP</th>
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**NSTPS | NSTOL | LAG | AMSKX | X | TSK | STOR | ISPRAT |**
|--------|-------|-----|-------| |     |      |        |
| 1      | 0     | 0   | 0.00  | 0.00 | 0.00 | 0.00 | 0.0   | 0     |

### NORMAL DEPTH CHANNEL ROUTING

**ON(1) | ON(2) | ON(3) | ELNVT | ELMAX | RLNTH | SEL**
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**CROSS SECTION COORDINATES -- STA=ELEV, STA=ELEV--**

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<th>2729.67</th>
<th>3381.74</th>
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<td>8958.66</td>
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**STAGE**

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**FLOW**

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<th>814.36</th>
<th>1208.78</th>
<th>1674.19</th>
<th>2135.11</th>
<th>2729.67</th>
<th>3381.74</th>
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<td>4009.36</td>
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<td>11042.13</td>
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<td>16244.30</td>
<td>19408.60</td>
<td>22971.48</td>
<td>26971.96</td>
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### MAXIMUM STAGE IS

- 1269.1
- 1269.7
- 1257.7
- 1259.1
- 1259.6
- 1260.2
- 1261.1
- 1261.8
### PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS

**FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)**

**AREA IN SQUARE MILES (SQUARE KILOMETERS)**

<table>
<thead>
<tr>
<th>OPERATION</th>
<th>STATION</th>
<th>AREA</th>
<th>PLAN RATIO</th>
<th>RATIO 1</th>
<th>RATIO 2</th>
<th>RATIO 3</th>
<th>RATIO 4</th>
<th>RATIO 5</th>
<th>RATIO 6</th>
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<td>18.47</td>
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<td>46.17</td>
<td>55.41</td>
<td>73.88</td>
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<td>1</td>
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<td>1949.</td>
<td>2602.</td>
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### SUMMARY OF DAM SAFETY ANALYSIS

**PLAN 1**

<table>
<thead>
<tr>
<th>ELEVATION STORAGE</th>
<th>INITIAL VALUE</th>
<th>SPILLWAY CREST</th>
<th>TOP OF DAM</th>
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<tbody>
<tr>
<td>1391.00</td>
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<td>1361.00</td>
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**PLAN 1 STATION 1**

<table>
<thead>
<tr>
<th>RATIO OF RESERVOIR</th>
<th>MAXIMUM DEPTH OF RESERVOIR</th>
<th>MAXIMUM STORAGE</th>
<th>MAXIMUM OUTFLOW</th>
<th>MAXIMUM TIME OF FAILURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>PDF</td>
<td>W.S.ELEV</td>
<td>OVER DAM</td>
<td>AC-FT</td>
<td>CFS</td>
</tr>
<tr>
<td>0.20</td>
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<td>0.00</td>
<td>180.</td>
<td>621.</td>
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<td>1626.</td>
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<td>0.80</td>
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<tr>
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<td>221.</td>
<td>2684.</td>
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**PLAN 1 STATION 1**

<table>
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<tbody>
<tr>
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<tr>
<td>STAGE FT</td>
<td>FLOW CFS</td>
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<tr>
<td>----------</td>
<td>----------</td>
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<tr>
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<td>0.00</td>
<td>13000</td>
</tr>
</tbody>
</table>

D-11
DAM 564  DAvis Broof Dam  Rep. Quad. Kennedy, N.Y.

Distance L & Lca. measured by map measuring wheel (1" = 2000')

Computations for L Distance

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
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</tr>
</thead>
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<td>7.95</td>
<td>1.0</td>
<td>15900'</td>
</tr>
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</table>

*L = 15900' FT.

Computations for Lca. Distance

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</tr>
</thead>
<tbody>
<tr>
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<td>5.0</td>
<td>4.35</td>
<td>1.0</td>
<td>8700'</td>
</tr>
</tbody>
</table>

*Lca. = 8700' FT.
\[ T_p = C_t \left( L - L_{ea} \right)^{0.3} \]

\[ T_p = \frac{T_p}{5.5} \]

\[ T_{pr} = T_p + 0.25(T_R - T_p) \]

\[ L = 15900' = 3.01 \text{ mi} \]

\[ L_{ea} = 8700' = 1.65 \text{ mi} \]

\[ T_p = 2 \left( 3.01 \times 1.65 \right)^3 = 3.23 \text{ hr} \]

\[ T_r = \frac{3.23}{5.5} = 0.59 \text{ hr} \]

\[ T_{pr} = 3.23 + 0.25(1-0.59) = 3.33 \text{ hr} \]
Service Spillway

Assume that the 30° ZCP is the control of develop an eqtn. of the form $Q = CA2gH$ to describe the flow.

From Design Report

$Q_s = 23 \, cfs \, @ \, El. \, 1351.4$

$Q_3 = 126 \, cfs \, @ \, El. \, 1356.8$

$A_o = \pi (2.25')^2 = 4.9 \, ft^2$

Determine $C_o$ from $Q_3 = 126 \, cfs \, \& \, Q_s = 23 \, cfs$

$H_o = 1356.8 - 1351.4 = 5.4$

$C_o = \frac{Q_s}{A_o \sqrt{2gH_o}} = \frac{126 \, cfs \, - 23 \, cfs}{4.9 \, ft^2 \times 5.4} = 1.13$

$Q_3 = 1.13 \times (4.9 \times 5.4) \times (12 \times 322) \times H_o^{0.65} + 23 \, cfs = 44.43 \, H_o^{0.65} + 23$

<table>
<thead>
<tr>
<th>Elev.</th>
<th>$H_o$</th>
<th>$Q_3$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1356.8</td>
<td>5.4</td>
<td>126</td>
</tr>
<tr>
<td>1355.8</td>
<td>6.6</td>
<td>137</td>
</tr>
<tr>
<td>1359.0</td>
<td>7.6</td>
<td>145</td>
</tr>
<tr>
<td>1360.0</td>
<td>8.6</td>
<td>153</td>
</tr>
<tr>
<td>1361.0</td>
<td>9.0</td>
<td>161</td>
</tr>
<tr>
<td>1362.0</td>
<td>10.0</td>
<td>168</td>
</tr>
<tr>
<td>1363.0</td>
<td>11.0</td>
<td>174</td>
</tr>
<tr>
<td>1361.5</td>
<td>10.2</td>
<td>165</td>
</tr>
</tbody>
</table>

$Q_3 = 44.43 \, H_o^{0.65} + 23$
Emergency Spillway

Ref. "Brauer & King" Table 8-7 pg. 8-59

Determining the Discharge Q of a Trapezoidal Chan

nel when the flow is at Critical Depth

Check to see if flow passes through critical depth. Determine critical slope for a flow depth of y = 1.0'. If spillway slope > critical slope, then flows pass through the critical depth and Table 8.9 holds

\[ Q_c = \sqrt{\frac{g}{B}} \]

For \( y = 1.0' \)

\[ A = 200'(1') + 2(1.5' \times 3') = 203 \text{ ft}^2 \quad \checkmark \]

\[ B = 200' - 2(3') = 200 \text{ ft}^2 \quad \checkmark \]

\[ Q_c = \sqrt{\frac{32.2(203\text{ ft}^2)}{200}} = 1144 \text{ cfs} \quad \checkmark \]
\[
K = \frac{149 \cdot \text{AR}^{3/2}}{11} = \frac{149 \cdot (203.4^2) / (203.4^2)}{0.03} = 9974
\]

\[n = 0.030 \text{ for Earth, fairly uniform section of grass or soil} \]

\[S_c = \left( \frac{Q_e}{K} \right) \left( \frac{1144}{9974} \right)^2 = 0.013 \]

Spillway slope > critical slope

\[0.035 > 0.013 \]

Flow passes through the critical depth for \(y > 10\) and also for \(y > 10\). Use Table 8-7.

\[Q_e = C_e \cdot 6 \cdot H_m^{1.5} \]

<table>
<thead>
<tr>
<th>Elev</th>
<th>H_{m}</th>
<th>H_{m}^{3/6}</th>
<th>(C_e)</th>
<th>(Q_e)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1352.7</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1357.0</td>
<td>1.2</td>
<td>0.018</td>
<td>3.13</td>
<td>823</td>
</tr>
<tr>
<td>1359.0</td>
<td>2.2</td>
<td>0.033</td>
<td>3.15</td>
<td>2,056</td>
</tr>
<tr>
<td>1360.0</td>
<td>3.2</td>
<td>0.049</td>
<td>3.19</td>
<td>3,652</td>
</tr>
<tr>
<td>1361.0</td>
<td>4.2</td>
<td>0.063</td>
<td>3.21</td>
<td>5,526</td>
</tr>
<tr>
<td>1362.0</td>
<td>5.2</td>
<td>0.077</td>
<td>3.25</td>
<td>7,709</td>
</tr>
<tr>
<td>1363.0</td>
<td>6.2</td>
<td>0.093</td>
<td>3.27</td>
<td>10,930</td>
</tr>
</tbody>
</table>

13.1.6 \(0.072 \cdot 3.33 \cdot 6794 \)

D-16
Davis Brook Dam

SA = RAREA RESERVOIR SURFACE AREA in ACRES
SE = RELEV RESERVOIR ELEVATION in FEET.


SCALE 1" = 200 ('/2 REDUCTION SCALE 1" = 400')

Eq. \( \frac{in^2 \times 400 ft^2 \times 1 \text{AC.}}{in^2 \times 43560 \text{A}^2} = \text{AC.} \)

ELEV. 1337.7 = 4.1 AC. GIVEN DESIGN REPORT SH. 4

ELEV. 1345 = 2.40 \( \frac{in^2 \times 400 ft^2 \times 1 \text{AC.}}{in^2 \times 43560 \text{A}^2} = 8.82 \text{AC.} \)

ELEV. 1351.4 = 13.0 AC. GIVEN DESIGN REPORT SH. 4

ELEV. 1356.5 = 17.8 AC. GIVEN DESIGN REPORT SH. 4

ELEV. 1358.9 = 20.0 AC. GIVEN DESIGN REPORT SH. 4

ELEV. 1361.4 = 22.8 AC. GIVEN DESIGN REPORT SH. 4

ELEV. 1365 = 7.40 \( \frac{in^2 \times 400 ft^2 \times 1 \text{AC.}}{in^2 \times 43560 \text{A}^2} = 27.18 \text{AC.} \)

NOTE: The stage-storage from the SCS design report was used.
Total Spillway Discharge ($Q + Q_e$)

<table>
<thead>
<tr>
<th>Elev.</th>
<th>$Q + Q_e$</th>
<th>Reservoir Surface Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>1337.7</td>
<td>0</td>
<td>4.1</td>
</tr>
<tr>
<td>1345.0</td>
<td></td>
<td>8.8</td>
</tr>
<tr>
<td>1357.4</td>
<td>23</td>
<td>13.8</td>
</tr>
<tr>
<td>1358.8</td>
<td>126</td>
<td>17.8</td>
</tr>
<tr>
<td>1358.9</td>
<td>960</td>
<td></td>
</tr>
<tr>
<td>1359.0</td>
<td></td>
<td>20.0</td>
</tr>
<tr>
<td>1360.0</td>
<td>2201</td>
<td></td>
</tr>
<tr>
<td>1361.0</td>
<td>3805</td>
<td></td>
</tr>
<tr>
<td>1361.6</td>
<td>5687</td>
<td></td>
</tr>
<tr>
<td>1362.0</td>
<td>6989</td>
<td>22.8</td>
</tr>
<tr>
<td>1363.0</td>
<td>7876</td>
<td></td>
</tr>
<tr>
<td>1365.0</td>
<td>10270</td>
<td>27.2</td>
</tr>
</tbody>
</table>
Spillway Rating Curve - Dan 564

Service Spillway (Qs)

Emergency Spillway (Qe)

Elevation (ft)

Q (cfs)
Overtopping Data

Damm Height = 1361.6
Discharge Coefficient (C) = 2.7
Exponent (E) = 1.5
Length of Damm Crest = 564.6
## Integrated Spillway Capacity & Test Find (E7: 1359.7)

<table>
<thead>
<tr>
<th>Elevation</th>
<th>Q</th>
<th>Q Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principal</td>
<td>1359.0</td>
<td>145</td>
</tr>
<tr>
<td>Emergency</td>
<td>1360.0</td>
<td>2,052</td>
</tr>
</tbody>
</table>

### Principal Cap @ 1359.7

$$\frac{10}{8} = \frac{0.7}{x} \quad x = 5.6$$

Capacity = 145 + 5.6 = 150.6 cfs  Say 151 cfs

### Emergency Cap @ 1359.7

$$\frac{10}{1359.6} = \frac{0.7}{x} \quad x = 1117.2$$

Capacity = 2,052 + 1117.2 = 3,173.2  Say 3,173 cfs

### Q Total (from HEC 1) = 3,254 cfs

- Q Principal = 151 cfs
- Q Emergency = 3,103 cfs
Reservoir Surface Area @ Test Flood (E1 1354.1)

<table>
<thead>
<tr>
<th>Elec</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1357.9</td>
<td>20.0</td>
</tr>
<tr>
<td>1361.0</td>
<td>22.1</td>
</tr>
</tbody>
</table>

\[
\frac{2.7}{2.8} = \frac{0.9}{x} \quad x = 0.83
\]

\[SA = 20.83 \text{ acres} \checkmark\]
Emergency Spillway Capacities

<table>
<thead>
<tr>
<th>Flood</th>
<th>Qtotal</th>
<th>Elev</th>
<th>Qes</th>
<th>A</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>MF</td>
<td>3254</td>
<td>1358</td>
<td>3103</td>
<td>446</td>
<td>7.0</td>
</tr>
<tr>
<td>MF</td>
<td>1626</td>
<td>1358</td>
<td>1489</td>
<td>284</td>
<td>5.2</td>
</tr>
</tbody>
</table>

MF

Assume \( \gamma_{w} < 0.02 \). Then:

\[ \gamma_{w} = 0.789 \left( \frac{Q}{b_{n}} \right)^{0.6} \]

\[ \gamma_{w} = 0.789 \left( \frac{3103}{200(0.03)^{0.6}} \right)^{0.6} = 2.16 \quad \gamma_{w} = \frac{2.16}{200} = 0.01 < 0.02 \quad \text{ok} \]

\[ A = (2.16)(200) + 2 \left( \frac{2}{3} (2.16)(3)(2.16) \right) = 446 \, ft^{2} \quad \checkmark \]

\[ \sqrt{V} = \frac{Q}{A} = \frac{3103}{446} = 7 \, ft/sec \quad \checkmark \]

PMF

Elev | Qes | Qres = 1258 |
--- | --- | --- |
1258 | 823 | 1358 |
1358 | 2050 |

Assuming \( \gamma_{w} < 0.02 \):

\[ \gamma_{w} = 0.789 \left( \frac{1489}{200(0.03)^{0.6}} \right)^{0.6} = 1.39 \quad \gamma_{w} = 0.007 < 0.02 \quad \text{ok} \]

\[ A = (1.39)(200) + 2 \left( \frac{2}{3} (1.39)(3)(1.39) \right) = 284 \, ft^{2} \quad \checkmark \]

\[ \sqrt{V} = \frac{Q}{A} = \frac{1489}{284} = \frac{5.2 \, ft}{sec} \quad \checkmark \]

D-23
**Davis Brooke Dam - Stage vs Storage Relationship**

<table>
<thead>
<tr>
<th>Elevation</th>
<th>Storage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1337.7</td>
<td>23.3'</td>
</tr>
<tr>
<td>1351.4</td>
<td>65.8</td>
</tr>
<tr>
<td>1356.8</td>
<td>174.8</td>
</tr>
<tr>
<td>1358.9</td>
<td>213.5'</td>
</tr>
<tr>
<td>1361.6</td>
<td>273.0</td>
</tr>
</tbody>
</table>

Ref: SCS design report
**DAM DATA FROM AS BUILT PLAN**

- **DAM TOP ELEV.**: 136.7
- **DAM INV.**: 136.2

<table>
<thead>
<tr>
<th>Reach Length</th>
<th>Cross Sect</th>
<th>Slope: ( \frac{\text{DAM INV - REACH INV}}{L} = \text{Slope} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,600'</td>
<td>136.3</td>
<td>136.2 - 129.8 = 0.3: 1600' = 0.0400</td>
</tr>
<tr>
<td>1,100'</td>
<td>130.5</td>
<td>130.0 - 127.9 = 0.3: 1100' = 0.010</td>
</tr>
<tr>
<td>1,700'</td>
<td>129.0</td>
<td>126.2 - 125.5 = 0.3: 1700' = 0.015</td>
</tr>
<tr>
<td>0.475'</td>
<td>126.9</td>
<td>125.5 - 125.5 = 0.3: 475' = 0.015</td>
</tr>
</tbody>
</table>

**REACH 1**

- **Length**: 1,600'
- **Cross Sect**: 136.3
- **Slope**: 0.3: 1600' = 0.0400

**REACH 2**

- **Length**: 1,100'
- **Cross Sect**: 130.5
- **Slope**: 0.3: 1100' = 0.010

**REACH 3**

- **Length**: 1,700'
- **Cross Sect**: 129.0
- **Slope**: 0.3: 1700' = 0.015

**REACH 4**

- **Length**: 0.475'
- **Cross Sect**: 126.9
- **Slope**: 0.3: 475' = 0.015

**Notes**

- Project Name: DAM INSPECTION
- Sheet 14 of 15
- Date: 3/24/81
- Subject: CAM 564 Routing
- Sub-Sheet No.: 1
DAM 564 - CHANNEL SECTIONS

SECTION 1:
\( n = 0.045 \)  \( \rightarrow \)  \( n = 0.05 \)  \( \rightarrow \)  \( n = 0.045 \)

SECTION 2:
\( n = 0.05 \)  \( \rightarrow \)  \( n = 0.075 \)  \( \rightarrow \)  \( n = 0.075 \)

SECTION 4:
\( n = 0.045 \)  \( \rightarrow \)  \( n = 0.05 \)  \( \rightarrow \)  \( n = 0.045 \)
APPENDIX E

INFORMATION AS CONTAINED IN
THE NATIONAL INVENTORY OF DAMS
## INVENTORY OF DAMS

**FORM 4974**

**ITEM NOMENCLATURE** | **DATA**
--- | ---
1 | ID: WY05A8
2 | DIVISION: NY
3 | STATE: NY
4 | COUNTY: CHEROKEE (CATTARAUGUS)
5 | CONG. DIST.: 00
6 | 2ND STATE: NY
7 | 2ND COUNTY: CHEROKEE
8 | 2ND CONGR.
9 | DEF. DAM NAME: DAVIS BROOK DAM
10 | LATITUDE: 42°09.7'
11 | LONGITUDE: 72°30.1'
12 | REPORT DATE: 06/09/14
13 | POPULAR NAME: DAVIS BROOK
14 | IMPOUND. NAME: UNKNOWN
15 | REGION: 03
16 | RASIN: 01
17 | RIVER/STREAM: PRE-NUMERO CREEK AND DAVIS BROOK
18 | R/A CITY-TOWN: NONE
19 | DISTANCE: 000
20 | POPULATION: 0000000
21 | TYPE OF DAM: RE
22 | YEAR COMPLETED: 1969
23 | PURPOSES: C
24 | STR. HEIGHT: 000-48
25 | NYD. HEIGHT: 000-43
26 | MAX CAPACITY: 000000-273
27 | NORMAL CAP.: 0000008
28 | TIA COORD. DIST.: ORP
29 | TIA POWER CODE: N
30 | TIC FDD, REGULATED: N
31 | TND PVT. ON FER.: 4
32 | TCE AAA AT: T
33 | VT FESS FUE DATE: 06/09/25

---

**NOTE:**

**REMARK:** 1-10-08A-3580 10/20-UNKNOWN

**REMARK:** 56 EMERGENCY SPILLWAY, PRINCIPAL SPILLWAY IS A 30 IN. CONDUIT WITH 7.5' X 2.5' RISER.

**INSPECTION REMARKS:**

33 TOTAL OF EMERGENCY AND PRINCIPAL SPILLWAYS