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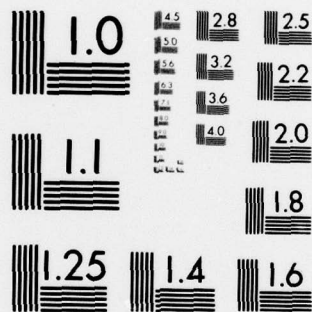
NATIONAL DAM SAFETY PROGRAM. STONY BROOK DAM NUMBER 4

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RARITAN RIVER BASIN
STONY BROOK, TRIBUTARY
MERCER COUNTY
NEW JERSEY

LEVEL II

STONY BROOK DAM NO. 4

NJ 00390

**PHASE 1 INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM**



DEPARTMENT OF THE ARMY

Philadelphia District
Corps of Engineers
Philadelphia, Pennsylvania

DDC

SEP 27 1979

June, 1979

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report.		

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PHILADELPHIA, PENNSYLVANIA 19106

17 SEP 1979

Honorable Brendan T. Byrne
Governor of New Jersey
Trenton, NJ 08621

Dear Governor Byrne:

Inclosed is the Phase I Inspection Report for Stony Brook Dam No. 4 in Mercer County, New Jersey which has been prepared under authorization of the Dam Inspection Act, Public Law 92-367. A brief assessment of the dam's condition is given in the front of the report.

Based on visual inspection, available records, calculations and past operational performance, Stony Brook Dam No. 4, initially listed as a high hazard potential structure but reduced to a significant hazard potential structure as a result of this inspection, is judged to be in good overall condition and the spillway is considered adequate. To insure adequacy of the structure, the following remedial actions are recommended to be undertaken within one year from the date of approval of this report:

- a. Clear the debris which has collected in and around the intake riser.
- b. Study the feasibility of installing a cover screen on the trash bars.
- c. Replace and lock the wheel for the gate stem which operates the low level drain.
- d. Seed or protect with small stone the eroded areas on the upstream berm and the area surrounding the outlet structure.
- e. Fill all animal burrows.

NAPEN-D

Honorable Brendan T. Byrne

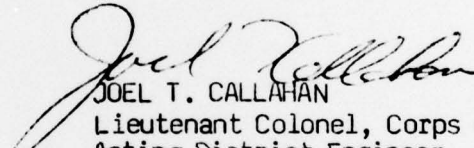
A copy of the report is being furnished to Mr. Dirk C. Hofman, New Jersey Department of Environmental Protection, the designated State Office contact for this program. Within five days of the date of this letter, a copy will also be sent to Congressman James A. Courter of the Thirteenth District. Under the provision of the Freedom of Information Act, the inspection report will be subject to release by this office, upon request, five days after the date of this letter.

Additional copies of this report may be obtained from the National Technical Information Services (NTIS), Springfield, Virginia 22161 at a reasonable cost. Please allow four to six weeks from the date of this letter for NTIS to have copies of the report available.

An important aspect of the Dam Safety Program will be the implementation of the recommendations made as a result of the inspection. We accordingly request that we be advised of proposed actions taken by the State to implement our recommendations.

Sincerely,

1 Incl
As stated


JOEL T. CALLAHAN
Lieutenant Colonel, Corps of Engineers
Acting District Engineer

Copies furnished:
Dirk C. Hofman, P.E., Deputy Director
Division of Water Resources
N.J. Dept. of Environmental Protection
P.O. Box CN029
Trenton, NJ 08625

John O'Dowd, Acting Chief
Bureau of Flood Plain Management
Division of Water Resources
N.J. Dept. of Environmental Protection
P.O. Box CN029
Trenton, NJ 08625

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STONY BROOK DAM NO. 4 (NJ00390)

CORPS OF ENGINEERS ASSESSMENT OF GENERAL CONDITIONS

This dam was inspected on 25 April 1979 by Louis Berger and Associates, Inc. under contract to the State of New Jersey. The State, under agreement with the U.S. Army Engineer District, Philadelphia, had this inspection performed in accordance with the National Dam Inspection Act, Public Law 92-367.

Stony Brook Dam No. 4, initially listed as a high hazard potential structure but reduced to a significant hazard potential structure as a result of this inspection, is judged to be in good overall condition and the spillway is considered adequate. To insure adequacy of the structure, the following remedial actions are recommended to be undertaken within one year from the date of approval of this report:

- a. Clear the debris which has collected in and around the intake riser.
- b. Study the feasibility of installing a cover screen on the trash bars.
- c. Replace and lock the wheel for the gate stem which operates the low level drain.
- d. Seed or protect with small stone the eroded areas on the upstream berm and the area surrounding the outlet structure.
- e. Fill all animal burrows.

APPROVED:

Joel T. Callahan
JOEL T. CALLAHAN

Lieutenant Colonel, Corps of Engineers
Acting District Engineer

DATE:

13 September 1979

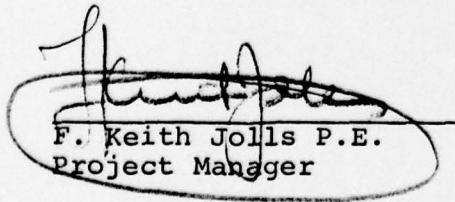
PHASE I REPORT
NATIONAL DAM INSPECTION PROGRAM

Name of Dam Stony Brook Dam No. 4 Fed ID# NJ 00390
NJ ID# 526

State Located New Jersey
County Located Mercer
Coordinates Lat. 4019.6 - Long. 7446.3
Stream Stony Brook Tributary
Date of Inspection 25 April 1979

ASSESSMENT OF
GENERAL CONDITIONS

Stony Brook Dam No. 4 is in a good overall condition and has sufficient spillway capacity to accommodate the 100-year design flood. It is recommended that its hazard classification be downgraded to significant. No detrimental findings were uncovered to merit further study. Recommended remedial actions to be undertaken in the future include repair and seeding of the eroded areas of all slopes, installation of a trash screen around the intake riser, filling in rodent burrows and replace and lock the gate wheel.


F. Keith Jolls P.E.
Project Manager





OVERVIEW OF STONY BROOK WATERSHED SITE #4

MAY, 1979

TABLE OF CONTENTS

	<u>Page</u>
Assessment of General Conditions	
Overall View of Dam	
Table of Contents	
Preface	
Section 1 - Project Information	1-5
Section 2 - Engineering Data	6-7
Section 3 - Visual Inspection	8-9
Section 4 - Operational Procedures	10
Section 5 - Hydraulic/Hydrologic	11-12
Section 6 - Structural Stability	13-14
Section 7 - Assessment/Recommendations/ Remedial Actions	15-16

FIGURES

- Figure 1 - Regional Vicinity Map
- Figure 2 - General Plan
- Figure 3 - Section Thru Principal Spillway
- Figure 4 - Riser Details

APPENDIX

Check List - Visual Inspection	
Check List - Engineering Data	
Photographs	
Check List - Hydrologic and Hydraulic Data	
Computations	A1-A14

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 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. 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 continued care and inspection can there be any chance that unsafe conditions be detected.

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. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM
NAME OF DAM: STONY BROOK DAM NO. 4 FED# NJ 00390

SECTION 1 - PROJECT INFORMATION

1.1 GENERAL

a. Authority

This report is authorized by the Dam Inspection Act, Public Law 92-367, and has been prepared in accordance with Contract FPM-36 between Louis Berger & Associates, Inc. and the State of New Jersey and its Department of Environmental Protection, Division of Water Resources. The State, in turn, is under agreement with the U.S. Army Engineer District, Philadelphia, to have this inspection performed.

b. Purpose of Inspection

The purpose of this inspection is to evaluate the structural and hydraulic condition of the Stony Brook Watershed Dam No. 4 and appurtenant structures, and to determine if the dam constitutes a hazard to human life or property.

1.2 DESCRIPTION OF PROJECT

a. Description of Dam and Appurtenances

Stony Brook Watershed Dam No. 4 (a.k.a. Curlis Lake) is a 340-foot long earthen structure with an impermeable cutoff key. The dam crest is at elevation 162.6 and creates a multi-purpose reservoir on an unnamed tributary of Stony Brook. The upstream face of the dam is protected by a 20 foot wide layer of riprap between elevations 153.5 and 159. A rock toe drain with a graded gravel chimney-filter extends along the toe of the embankment. The principal discharge outlet consists of a drop inlet structure containing a reinforced concrete riser, a 78-inch diameter concrete encased steel outlet pipe, and a low level,

24-inch, gated drain. A 60-foot wide trapezoidal auxiliary spillway with a negative approach slope is located at the left abutment. The embankment has a maximum height of 24 feet.

b. Location

Stony Brook Dam No. 4 is located about 1 mile east of the Borough of Pennington in Hopewell Township, Mercer County, New Jersey. It is constructed across a tributary of Stony Brook approximately 750 feet south of Federal City Road.

c. Size Classification

The maximum height of the dam is 24 feet and the maximum storage is estimated to be 285 acre-feet. Therefore, the dam is in the small size category as defined by the Recommended Guidelines for Safety Inspection of Dams (storage capacity less than 1,000 acre-feet).

d. Hazard Classification

There are several residences about 400 feet downstream of the dam but all appear to be situated well above flood elevation. The Federal City Road bridge located 750 feet downstream is at elevation 147 or about 10 feet above the stream channel bottom and could possibly sustain appreciable damage from a dam break flood. Three homes located along the banks of the Stony Brook between Federal City Road and Old Mill Road to the north might also be endangered by a collapse although two of the homes lie beyond a marsh which would tend to absorb the initial flood impact. A thousand feet below the dam is an abandoned and breached 340 foot long weir across the Stony Brook (at elevation 141) which could also be further damaged by a dam break flood. Based on the foregoing, it is recommended that this dam be downgraded from high to a significant hazard classification.

e. Ownership

The dam is maintained by the Stony Brook-Millstone Watershed Association, Pennington, New Jersey,

under the terms of an agreement with the Mercer County Soil Conservation District. The Association does not own the reservoir or damsite property since the dam was constructed under an easement granted by the owner, Mr. W.C. Hart, Federal City Road, Pennington, N.J.

f. Purpose of Dam

Stony Brook Watershed Dam No. 4 is used for sediment/storm water retention.

g. Design and Construction History

The dam was designed by the Department of Agriculture Soil Conservation Service and was built in 1959-60 by Hess Bros. of Parlin, New Jersey. Detailed as-built plans were available from the SCS.

h. Normal Operating Procedures

The dam is maintained and operated by the Watershed Association with technical assistance from the SCS.

1.3 PERTINENT DATA

a. Drainage Area

The drainage area is 1.7 square miles and consists mainly of open woodland with some residential development.

b. Discharge at Dam Site

Total spillway capacity at top of dam elevation - 2,900 cfs.

c. Elevations (ft. above MSL)

Top of dam - +162.6
Full flood control pool - 160.3 (SCS design)
Recreation pool (spillway crest) - 155.5
Upstream portal invert diversion pipe - 139
Downstream portal invert diversion pipe - 139
Streambed at centerline of dam - 137.9

d. Reservoir

Length of maximum pool - 4,900 feet
Length of flood control pool - 4,490 feet
Length of recreation pool - 3,630 feet

e. Storage (acre-feet)

Top of dam - 285
Flood control pool - 211
Recreation pool - 100

f. Reservoir Surface (acres)

Top dam - 34.0
Flood-control pool - 29.0
Recreation pool - 17.5

g. Dam

Type - Earth with drop inlet and auxiliary
spillway

Length - 340 feet

Height - 24 feet (at spillway)

Top Width - 12 feet

Side Slopes - Upstream 2.5H:1V
Downstream 2.5H:1V

Zoning - None

Cutoff - Impervious earth cutoff wall to
bedrock

h. Diversion and Regulating Tunnel

None

i. Spillway

Type - Auxiliary channel excavated at left
abutment

Channel width - 60 feet (2H:1V sideslopes)

Crest elevation - 160.3 MSL

Gates - None

U/S Channel - Negatively sloped inlet channel
approach

D/S Channel - Positively sloped outlet channel

j. Regulating Outlets

Principal spillway is a drop inlet structure
with a 78" diameter concrete-encased steel
outlet pipe and a low water 24" diameter gated
drain at elevation 139.

SECTION 2 - ENGINEERING DATA

2.1 DESIGN

Complete details of the SCS design and hydraulic determinations, structural analyses and subsurface information were available at the Soil Conservation Service offices in Somerset. All design was done in accordance with SCS criteria and was discussed with their engineering personnel who recapitulated the design parameters and operational features of the dam. The design of the spillway is straightforward and of a conservative nature.

2.2 CONSTRUCTION

The construction closely followed the contract plans as determined by as-built plans available from the SCS. There have been no major structural modifications since the initial construction.

2.3 OPERATION

The principal purpose of the dam is to reduce downstream sedimentation. The dam appears to perform this function satisfactorily. It appears there is no regulation of the water level and the dam essentially operates as an uncontrolled structure.

2.4 EVALUATION

a. Availability

Sufficient engineering data was obtained to fully assess the structural stability of the embankment. The foundation stability analysis was delineated on the plans prepared by the SCS. This dam site lies on the Brunswick formation which is Triassic in age. Bedrock consists of interbedded layers of hard, red, silty shale and siltstone. The overburden rarely exceeds a thickness of 8 feet and generally consists of 3 to 5 feet of silty loam overlying 1 to 3 feet of dense silty gravel. The overlying residual soil was utilized as compacted fill throughout the dam embankment.

However, the drain filter material and the riprap were imported from nearby quarries. The cutoff trench extends to bedrock along the entire length of the dam. Stability analyses by the SCS indicated that the upstream slope of the embankment has a minimum safety factor of 6.57 (with full drawdown considered).

b. Adequacy

The field inspection and review of the available design plans reveal that the dam is structurally sound and well-built. It is believed that the data available is adequate to render this assessment without recourse to gathering additional information.

c. Validity

The validity of the engineering data available is not challenged and is accepted without recourse to further investigations.

SECTION 3 - VISUAL INSPECTION

3.1 FINDINGS

a. General

Visual inspection of Stony Brook Dam No. 4 was conducted on April 27, 1979. Weather conditions at the time of the inspection were inclement. The overall appearance of the dam and appurtenant structures was satisfactory with water level in the lake at the time of the inspection at normal pool elevation 155.5 and the tailwater at elevation 139+. The land surrounding the lake is essentially wooded and undeveloped as is most of the downstream area.

b. Dam

The dam is in good condition with a uniform vertical and horizontal alignment. A thick grass stand is well established on the embankment slopes and only a few small animal burrows and tracks mar the surface. Some minor erosion was noted on the upstream face of the embankment and around the outer wall of the auxiliary spillway. There are some vehicle tracks on the dam crest but are now covered with a thick growth of grass. A narrow footpath has been worn into the berm along the edge of the lake and minor soil displacement was noted on both faces due to pedestrian traffic. A 20-foot wide riprap blanket opposite the drop inlet is being overgrown by vegetation which is also growing out onto the inlet crest.

c. Appurtenant Structures

The algae-covered, concrete inlet riser appears to be in satisfactory condition although some light spalling was noted on the outer edges. A long timber has fallen into the riser and is now protruding above the trash bars. The trash rack itself appears to consist of only a single pipe railing around the inlet and is of little use in preventing debris from entering the box

riser. The gate wheel for the low level drain is missing which precludes the possibility of lowering the lake in an emergency situation. The 78-inch diameter discharge conduit and headwall appear in satisfactory condition although there is light erosion around the pipe exit. The rock drain along the downstream toe is no longer uniform in appearance but seems to be functioning as designed since no seepage or moisture was noted beyond the toe.

d. Reservoir

The reservoir is about 200' wide and is surrounded by gently sloping, undeveloped terrain. Beyond the woods to the south and east are pastures and cultivated land while to the west, there are some developed residential areas.

e. Downstream Channel

The channel immediately below the outlet is about 30 feet wide, 3 feet deep and located toward the right side of a flat 300 foot wide flood plain. The channel is partially choked with sand and gravel deposits from which brush is now growing. The downstream bridge forms a minor constriction as it has an opening of approximately 8' x 20'. Downstream of the bridge the channel enters the Stony Brook at an old mill pond created by an abandoned dam across the river.

SECTION 4 - OPERATIONAL PROCEDURES

4.1 PROCEDURES

Operational procedures were discussed with personnel of the Stony Brook-Millstone Watershed Association who conduct the maintenance under an agreement with the Mercer County Soil Conservation District. The only regulatory feature is the sluice gate on the 24" drain which has never been opened. At the present time, there are no formalized operational procedures but the dam is inspected annually by the SCS who make recommendations for its upkeep to the Watershed Association.

4.2 MAINTENANCE OF DAM

Routine maintenance is limited to groundskeeping, mowing and rodent control. In addition, the lake is periodically treated with lime to raise the pH level (as suggested by the Soil Conservation Service). No major repairs have been required since the dam's installation.

4.3 MAINTENANCE OF OPERATING FACILITIES

There are no formalized maintenance procedures for care of the 24-inch gate. As previously stated, the gate wheel could not be located.

4.4 DESCRIPTION OF WARNING SYSTEM IN EFFECT

There is no formal warning system for monitoring or inspecting the dam during or after heavy storms.

4.5 EVALUATION

While the dam appeared to be adequately maintained, it is believed a regular monitoring program could be developed to augment the annual inspection. Records of any inspections of the dam after unusually heavy storms should be maintained. In summary however, the operational procedures are deemed to be adequate in view of the hazard classification.

SECTION 5 - HYDRAULIC/HYDROLOGIC

5.1 EVALUATION OF FEATURES

a. Design Data

Based on the criteria in the Recommended Guidelines for Safety Inspection of Dams, the 100-year frequency event was selected as the design storm by the inspecting engineer. Precipitation data was obtained from Technical Paper 40 and NOAA TM NWS Hydro 35. Storage data and time of concentration were obtained from the Soil Conservation Service design calculations and reviewed in the context of the recommended inspection criteria. Inflow to the reservoir for the design storm was computed utilizing the HEC-1 computer program. This gave a peak inflow into the reservoir of 2,462 cfs with subsequent routing through the reservoir reducing the peak to 1,723 cfs. The spillway has a maximum discharge capacity of approximately 2,900 cfs before overtopping occurs and can therefore accommodate the design flood.

b. Experience Data

The dam was originally designed for a 100-year frequency storm using a time of concentration of 1.5 hours. The dam and reservoir were designed utilizing SCS design procedures.

c. Visual Observations

The lake level was at low stage at the time of inspection, with a small amount of water flowing over the spillway crest. Visual observations confirmed all the aspects and assumptions of the original design. There is some debris in the drop inlet which should be removed (see Section 7).

d. Overtopping Potential

There are no records of the dam having been overtopped and the main and auxiliary spillway can accommodate the design flood.

e. Drawdown Potential

Using the 24" sluice gate at the bottom of the spillway apron (at El. +139), it would take approximately $1\frac{1}{2}$ days to draw the reservoir down.

SECTION 6 - STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations

In view of the modest age of the dam embankment, the well-designed and supervised construction and the continuous maintenance, the dam at Stony Brook Site No. 4 is deemed to be in a good overall condition. The riprap protection shows little evidence of subgrade subsidence and the main embankment crest and adjoining cut slopes along the auxiliary spillway are at correct design line and grade. The inspection team noted little evidence of slope erosion or seepage at the downstream toe and the chimney drain and rock filter at the toe appear to function as designed. In summary, nothing was visually noted which could create a hazardous condition that cannot be readily maintained or corrected. The only drainage element not visible for inspection was the lower portions of the intake riser.

b. Design and Construction Data

From the review of the soils report recommendations and contract plans for the initial construction, the design appears to be well-engineered, reflect a conservative approach and employ conventional analytical techniques. Based upon the condition of the dam and the hazard classification, it is believed that additional design studies are unnecessary under the purview of PL 92-367.

c. Operating Records

The performance of this structure has been satisfactory since its completion.

d. Post Construction Changes

There have been no major modifications since the dam was constructed.

e. Seismic Stability

The dam is located in Zone 1 and has negligible potential vulnerability to seismic loadings. Experience indicates that dams in this zone will have adequate stability under dynamic loading conditions if stable under static loading conditions. As indicated by the SCS stability analyses, the dam is stable under static loading conditions.

SECTION 7 - ASSESSMENTS/RECOMMENDATIONS/
REMEDIAL ACTIONS

7.1 DAM ASSESSMENT

a. Safety

Subject to the inherent limitations of the Phase I visual inspection, Stony Brook Dam No. 4 is judged to be in a good overall condition. Overtopping of the dam is unlikely and no seriously detrimental conditions were observed. The dam is recommended to be reclassified in a significant hazard category for reasons described in Section 1, Part 1.2d.

b. Adequacy of Information

The information made available by the Soil Conservation Service is deemed to be adequate regarding the analyses and evaluation of safe operation and structural stability.

c. Urgency

No immediate urgency is attached to implementing the remedial measures set forth below.

d. Necessity for Further Study

In view of the overall condition of this dam and the fact that it is monitored by watershed personnel, additional inspections under the purview of P.L. 92-367 are deemed to be unnecessary. The Stony Brook-Millstone Watershed Assoc., in conjunction with SCS engineers, maintain an internal system of annual inspections and emergency action plans which basically reflect the requirements mandated under P.L. 92-367.

7.2 RECOMMENDATIONS/REMEDIAL MEASURES

a. Recommended Action

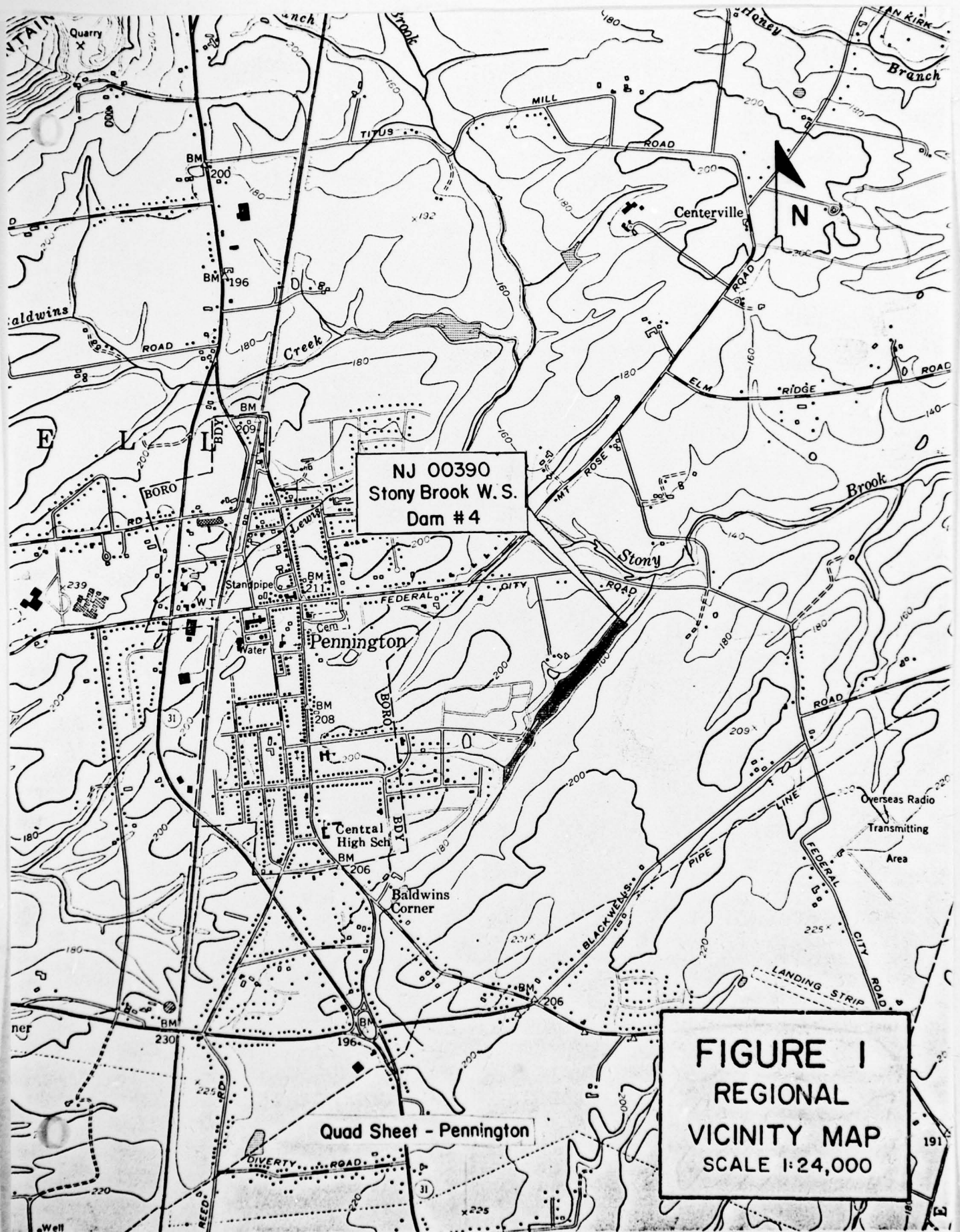
Under the current Stony Brook-Millstone Watershed Association maintenance program, it is recommended

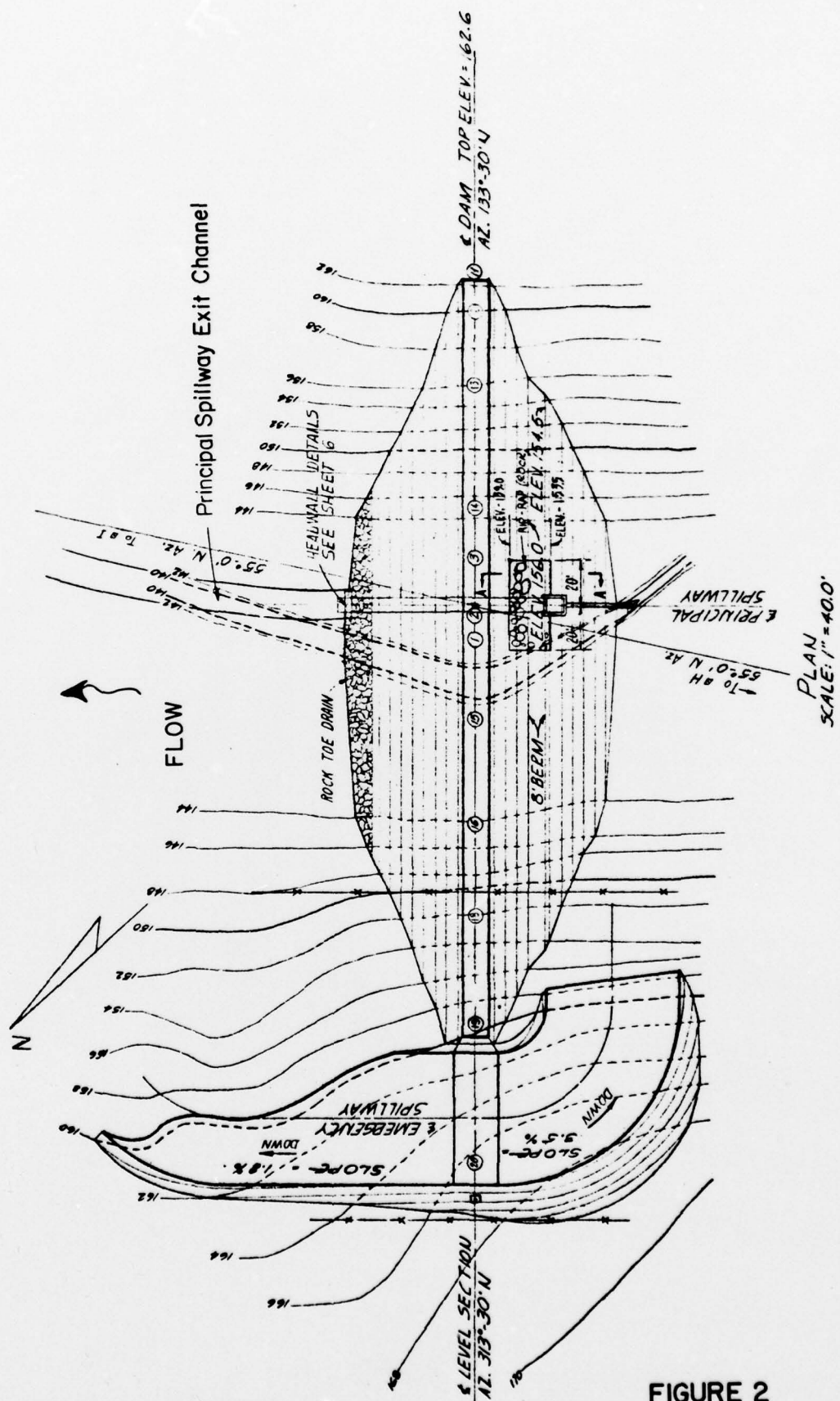
that the following be taken under advisement in the future:

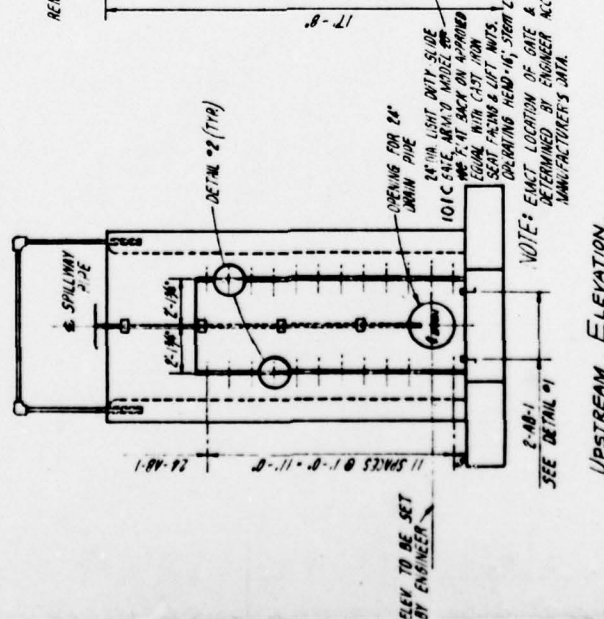
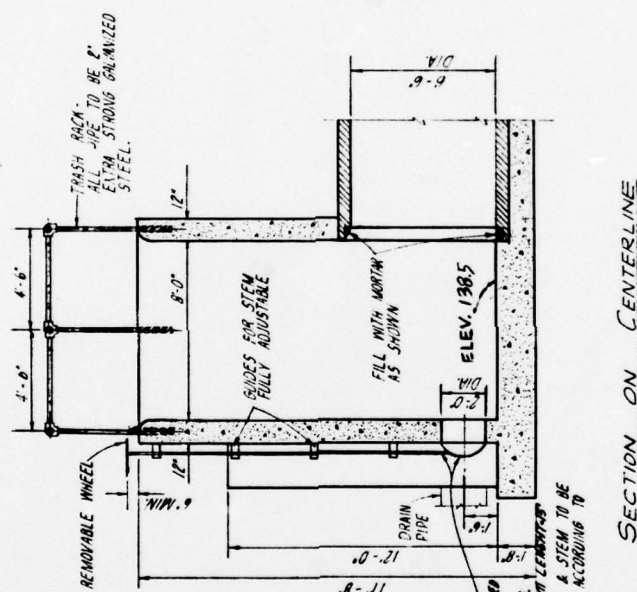
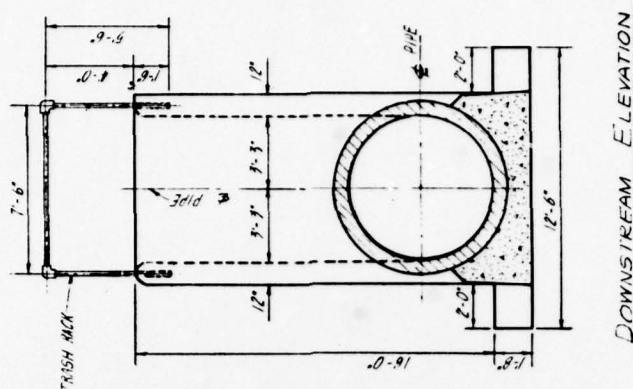
- Clear the debris which has collected in and around the intake riser;
- Study the feasibility of installing a cover screen on the trash bars;
- Replace and lock the wheel for the gate stem which operates the low level drain;
- Seed or protect with small stone the eroded areas on the upstream berm and area surrounding the outlet structure; and
- Fill the animal burrows.

b. O&M Maintenance and Procedures

In view of the assessment contained herein, no additional procedures other than those presently in effect appear to be required.







RISER DETAILS

FIGURE 4

Check List
Visual Inspection
Phase 1

Name Dam Stony Brook Dam #4 County Mercer State New Jersey Coordinators NJDEP

Date(s) Inspection 4/27/79 5/7/79 Overcast & raining Weather Temperature 60°F

Pool Elevation at Time of Inspection 155.5 M.S.L. Tailwater at Time of Inspection 139 M.S.L.

Inspection Personnel:

T. Chapter Lee Holt (SCS) K. Greenfield
D. Mulligan K. Jolls
L. Baines

T. Chapter Recorder

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	None observed. Deer tracks causing minor erosion and cracking along backslope. At least 3 large groundhog holes on backtoe.	Heavy grassed slopes. Grass cover about 12" - 14" long.
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	None observed.	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	Footpath along upstream shoreline.	Light sloughing caused by pedestrian traffic over soft rich topsoil.
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	Satisfactory; light vehicle tracks on crest overgrown with grass cover.	Mowed prior to reinspection. Excellent stand of spring grass.
RIPRAP FAILURES	None noted.	Appears to have been an up-stream riprap "wave" blanket which has since been overgrown.

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
EXCESSIVE SHRUB, GROWTH, TREES, ETC.	No heavy growth on dam or spillway channel.	Some Sumac on outer wall of auxiliary spillway which should be cut.
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	Right side grades into pasture land and wooded area. Left side of spillway rises more steeply to wooded and developed areas.	
ANY NOTICEABLE SEEPAGE	Damp ground in junction of left embankment and auxiliary spillway and right embankment and abutment.	Dark green, lush vegetation at both junctures.
STAFF GAGE AND RECORDER	None.	
DRAINS	Rocktoe drain with graded filter.	

OUTLET WORKS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	NONE. Concrete relatively clean.	Satisfactory condition.
INTAKE STRUCTURE	Satisfactory although trash gates gone, timber debris in riser, grass impinging on edges of riser.	Trash racks are only 2" dia. pipe railing. Some concrete deterioration.
OUTLET STRUCTURE	Some sloughing above and at sides of wall and conduit: several animal burrows at this location.	
OUTLET CHANNEL	30' wide - gentle slopes to both sides. Constricted with silt, stone and growth. Heavy sedimentation in center of channel.	
EMERGENCY GATE	NONE	

UNGATED AUXILIARY SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	NONE	Flat crest of spillway on red shale bedrock which appears firm.
APPROACH CHANNEL	Light grass growth; cut into red shale bedrock at flat crest control section.	Negative slope. Sumac on left wall should be cut.
DISCHARGE CHANNEL	Light grass growth.	Positive slope.
BRIDGE AND PIERS	Bridge 750 feet downstream (see photo) 20'x 10' opening.	

INSTRUMENTATION

VISUAL EXAMINATION MONUMENTATION/SURVEYS	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
	BM 5109 NJT&GS EL. 146.93 MSL at Federal City Road Bridge.	
OBSERVATION WELLS	None.	
WEIRS	None.	
PIEZOMETERS	None.	
OTHER	None.	

RESERVOIR

REMARKS OR RECOMMENDATIONS

OBSERVATIONS

VISUAL EXAMINATION OF

SLOPES

Gentle wooded slopes (secondary growth) undeveloped in vicinity of dam.

SEDIMENTATION

None visible.

Plans indicate reservoir designed as sediment retention pond.

DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
* CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	(See Below) Bridge 750 feet downstream. Channel widens into main stream.	The homes on the left bank are above flood plain. One home below bridge.
SLOPES	Flat to edge of flood plain.	
APPROXIMATE NO. OF HOMES AND POPULATION	1 home on left bank 35' above channel, 100 yards away. 1 home below bridge and closer to stream.	Homes on south bank (1) and north bank (1) might be damaged if SB#4 failed.
* Below bridge a 340 ft. weir across the Stony Brook forms another pond in what was once a swamp. Rest of channel mostly undeveloped with flood absorption swamps. Further downstream at Old Mill Road, 3 span masonry bridge and abandoned concrete dam with 40' breach (about 7' high). The old dam is no restriction to flooding due to wide breach. Old raceway at left abutment. Old dam immediately above bridge.		

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION

ITEM	REMARKS
PLAN OF DAM	Available - Soil Conservation Service, 1370 Hamilton Ave., Somerset, New Jersey
REGIONAL VICINITY MAP	Available - USGS Quad., Pennington, New Jersey
CONSTRUCTION HISTORY	Available - SCS
TYPICAL SECTIONS OF DAM	" "
HYDROLOGIC/HYDRAULIC DATA	" "
OUTLETS - PLAN	" "
- DETAILS	" "
- CONSTRAINTS	" "
- DISCHARGE RATINGS	" "
RAINFALL/RESERVOIR RECORDS	" "

ITEM	REMARKS
------	---------

SPILLWAY PLAN

SECTIONS

DETAILS

OPERATING EQUIPMENT
PLANS & DETAILS

Available - SCS

" "

" "

" "

ITEM	REMARKS
DESIGN REPORTS	Available - SCS
GEOLOGY REPORTS	"
DESIGN COMPUTATIONS	"
HYDROLOGY & HYDRAULICS	"
DAM STABILITY	"
SEEPAGE STUDIES	"
MATERIALS INVESTIGATIONS	Available - SCS
BORING RECORDS	"
LABORATORY	"
FIELD	"
POST-CONSTRUCTION SURVEYS OF DAM	Available - SCS
BORROW SOURCES.	"

ITEM	REMARKS
MONITORING SYSTEMS	None
MODIFICATIONS	As-builts Available - SCS
HIGH POOL RECORDS	None Available
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	Available - SCS
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	None N/A N/A
MAINTENANCE OPERATION RECORDS	Available " Available



View of Crest Looking West

May, 1979



View of Downstream Channel

May, 1979



May, 1979

View of Intake Structure



April, 1979

View of Outlet Structure

CHECK LIST
HYDROLOGIC AND HYDRAULIC DATA
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: 1.7 sq. mi.

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): 155.5 (100 Ac. Ft.)

ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): 160.3 (211 Ac. Ft.)

ELEVATION MAXIMUM DESIGN POOL: 160.3 (SCS records)

ELEVATION TOP DAM: 162.6 (285 Ac. Ft.)

CREST: _____

- a. Elevation 160.3
- b. Type Auxiliary Spillway Channel
- c. Width 60 foot wide channel
- d. Length 200 foot long channel
- e. Location Spillover Left abutment
- f. Number and Type of Gates None

OUTLET WORKS: Principal Spillway (crest el. 155.5)

- a. Type Drop inlet with 78" dia., concrete wrapped steel pipe
- b. Location 145 feet from right abutment
- c. Entrance inverts 138.5
- d. Exit inverts 138.5
- e. Emergency draindown facilities 2' Ø drain at elev. 139.0

HYDROMETEOROLOGICAL GAGES: None

- a. Type _____
- b. Location _____
- c. Records _____

MAXIMUM NON-DAMAGING DISCHARGE: 2900 cfs

BY D.J.M. DATE 5-79

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. A1 OF

CHKD. BY _____ DATE _____

STONY BROOK #4 DAMPROJECT C234SUBJECT UNIT HYDROGRAPH DATA

Time of concentration from S.C.S. = 1.5 hours

$$\therefore T_p = \frac{0.25}{2} + 0.6 \times 1.5 = 1.025 \text{ hrs}$$

$$\therefore Q_p = \frac{484 \times A \times 1}{1.025} = \frac{484 \times 1.7}{1.025}$$

$$= \underline{802.7 \text{ cfs}}$$

Unit Hydrograph:

<u>T</u> <u>hours</u>	<u>T/T_p</u>	<u>Dimensionless</u> <u>ordinate (D₀)</u>	<u>Q (cfs)</u> <u>(= Q_p × D₀)</u>
0.25	0.24	0.10	80
0.50	0.49	0.41	329
0.75	0.73	0.81	650
1.00	0.98	0.99	795
1.25	1.22	0.90	722
1.50	1.46	0.697	559
1.75	1.71	0.47	377
2.00	1.95	0.34	273
2.25	2.20	0.31	249
2.50	2.44	0.168	135
2.75	2.68	0.116	93
3.00	2.93	0.082	66
3.25	3.17	0.059	47
3.50	3.41	0.041	33
3.75	3.66	0.029	23
4.00	3.90	0.022	18

BY D.J.M. DATE 5-79
CHKD. BY _____ DATE _____
SUBJECT _____

LOUIS BERGER & ASSOCIATES INC.

STONY BROOK SITE 4 DAM

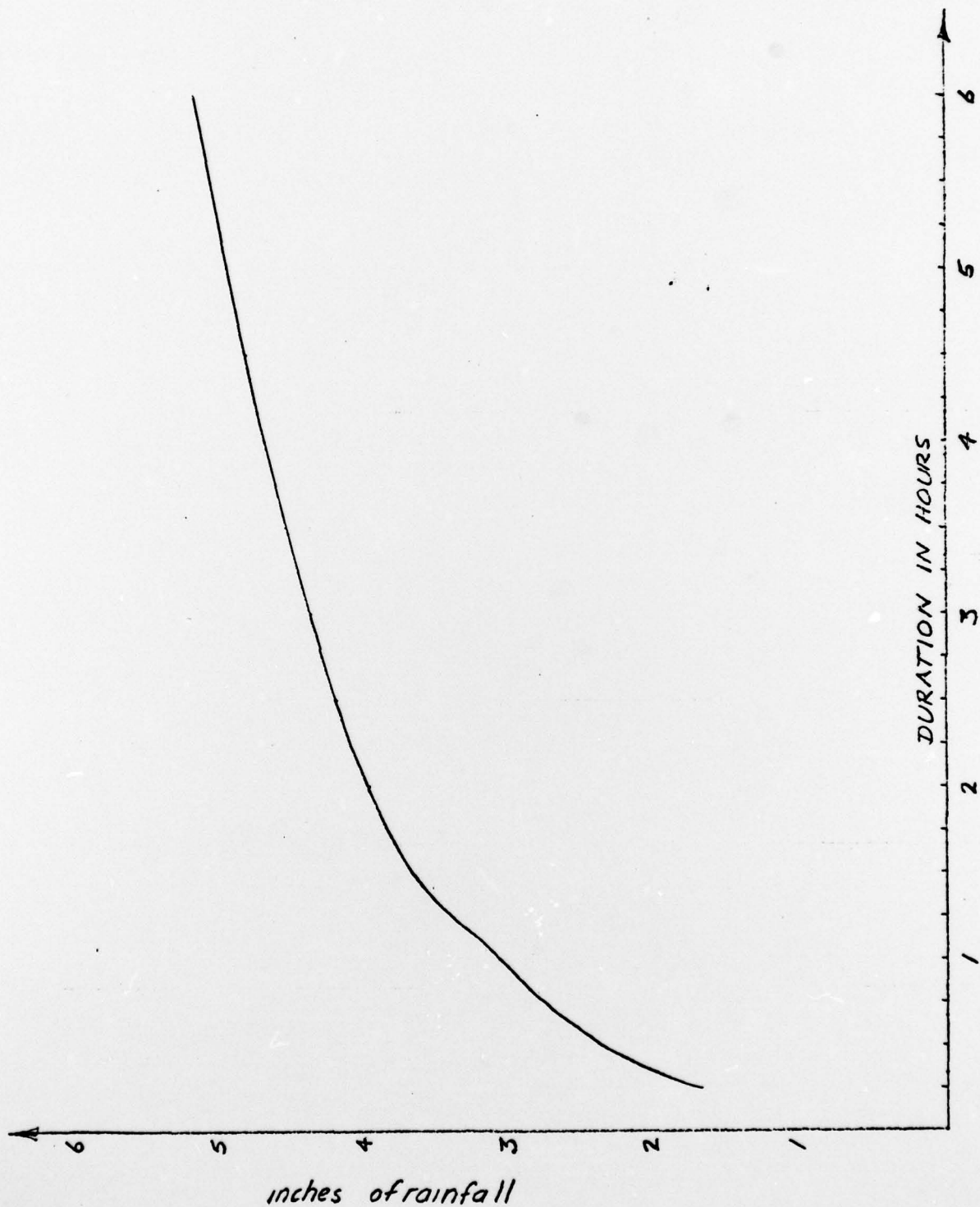
SHEET NO. A2 OF _____
PROJECT C234

Precipitation data from T.P. 40 & NOAA Technical Memo
N.W.S. Hydro -35 . (See depth duration curve overleaf)

Time	Precipitation	Δ	Rearrange Δ
0.25	1.7	1.7	0.06
0.50	2.4	0.7	0.06
0.75	2.8	0.4	0.07
1.00	3.1	0.3	0.07
1.25	3.4	0.3	0.09
1.50	3.7	0.3	0.09
1.75	3.86	0.16	0.11
2.00	4.00	0.14	0.14
2.25	4.11	0.11	0.30
2.50	4.22	0.11	0.30
2.75	4.31	0.09	0.70
3.00	4.40	0.09	1.70
3.25	4.49	0.09	0.40
3.50	4.57	0.08	0.30
3.75	4.64	0.07	0.16
4.00	4.71	0.07	0.11
4.25	4.78	0.07	0.09
4.50	4.84	0.06	0.08
4.75	4.90	0.06	0.07
5.00	4.96	0.06	0.06
5.25	5.02	0.06	0.06
5.50	5.08	0.06	0.06
5.75	5.14	0.06	0.06
6.00	5.20	0.06	0.06

(hours) (inches) (inches) (inches)

BY D. J. M DATE 1-79 SUBJECT _____ SHEET NO. A3 OF _____
CHKD. BY _____ DATE _____ DEPTH DURATION CURVE JOB NO. C227
T.P. 40 & NOAA TECHNICAL MEMO. NWS HYDRO-35



BY D.J.M. DATE 5-79

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. A4 OF

CHKD. BY _____ DATE _____

STONY BROOK SITE #4 DAMPROJECT C234SUBJECT Spillway discharge calculationsDrop inlet.
L(eff.) = 22'Emergency Spillway
by manningsOver Dam
L = 340'

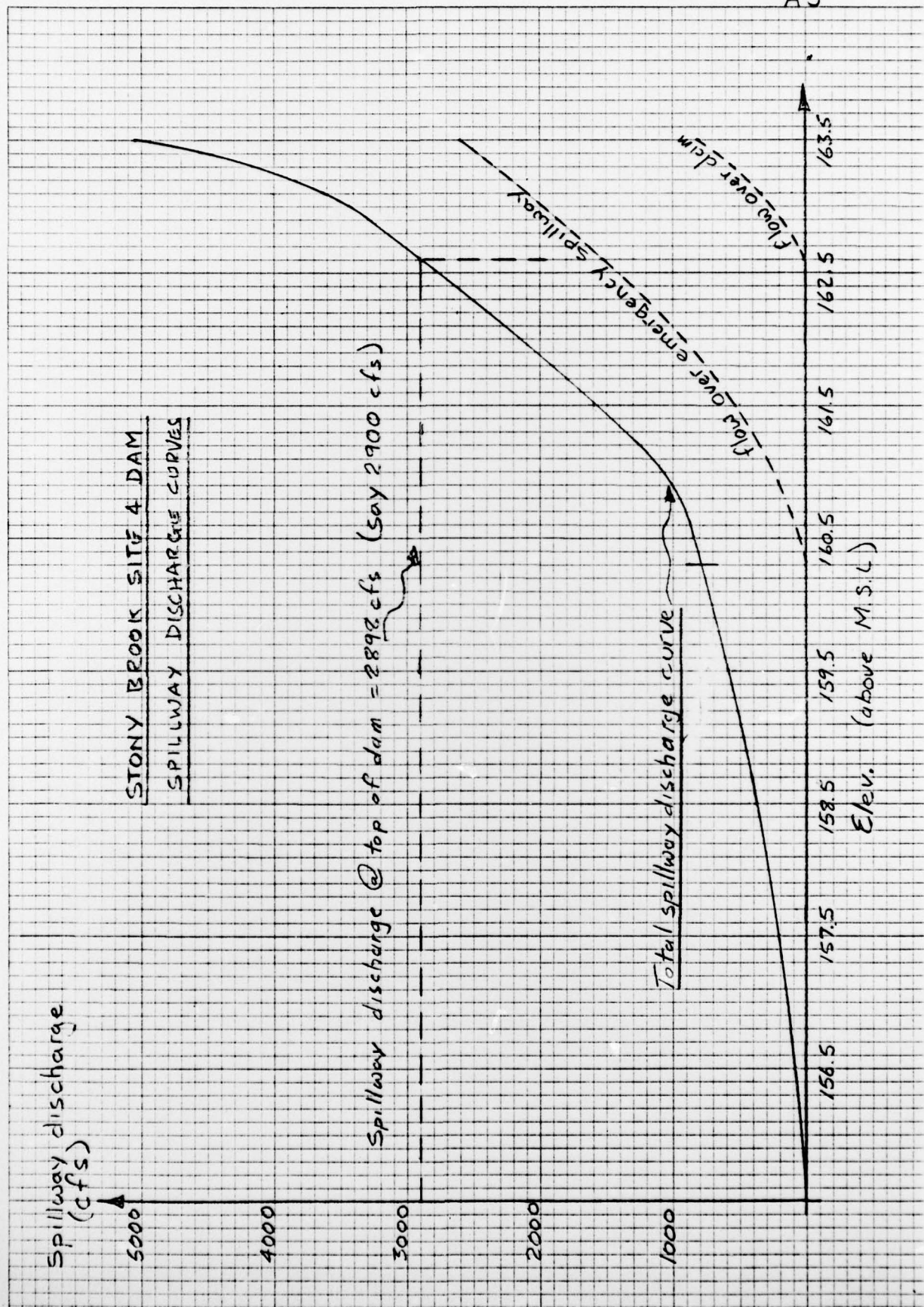
n = 0.03 S = 0.018

El.	H	C	Q	H	Q	H	C	Q
155.5	0	3.3	0					
156.5	1	3.3	73					
157.5	2	3.3	205					
158.5	3	3.3	377					
159.5	4	3.3	581					
160.5	5	3.3	812	0.2	27			
161.5	6	3.3	1067	1.2	528			
162.6	7.1	3.3	1373	2.3	1525			
163.1	7.6	3.3	1521	2.8	2095			
163.5	8.0	3.3	1643	3.2	2597	0.9	2.8	813

Σ Q

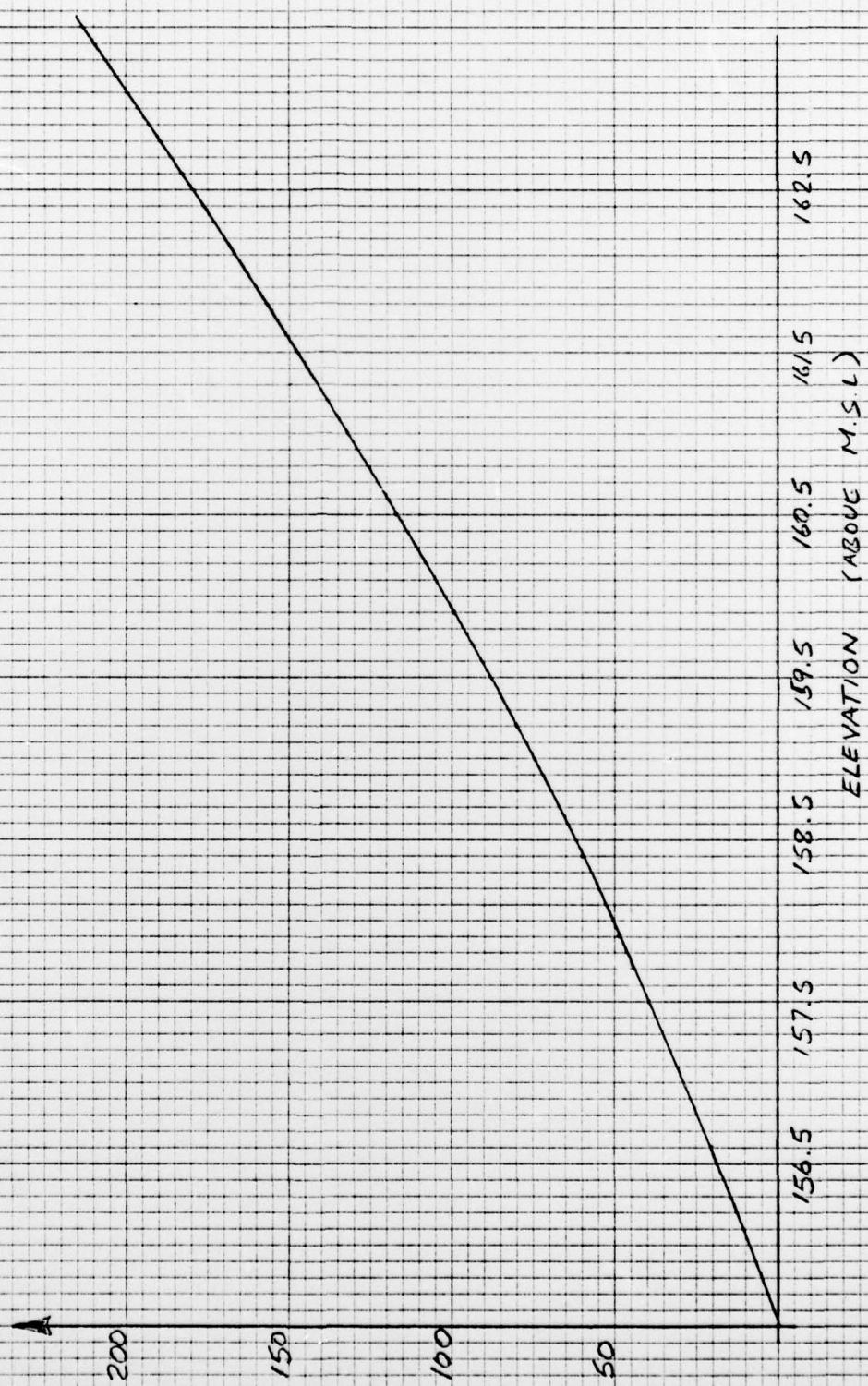
assume for emergency spillway
that sides are vertical and
that the channel is 60' wide

El	Q
155.5	0
156.5	73
157.5	205
158.5	377
159.5	581
160.5	839
161.5	1595
162.6	2898 * top of dam
163.1	3616
163.5	5053



STORAGE
(ACRE FEET)

STONYBROOK SITE 4 DAM
STAGE - SURCHARGE STORAGE CURVE
FROM SOIL CONSERVATION SERVICE



BY D. J. M. DATE 5-79

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. A7 OF

CHKD. BY _____ DATE _____

STONY BROOK SITE 4 DAMPROJECT C234

SUBJECT _____

Summary of storage and discharge data
for HEC-1 computer program:

Elevation (above M.S.L.)	Surcharge Storage (acre feet)	Discharge (cfs)
155.5	0	0
156.5	18	73
157.5	40	205
158.5	62	377
159.5	88	581
160.5	117	839
161.5	147	1595
* 162.6	185	2898
* 163.1	200	3616
* 163.5	214	5053

* These storage values obtained by interpolation of
S.C.S. Stage storage curve.

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BY D.J.M. DATE 5-79

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. A8 OF

CHKD. BY _____ DATE _____

STONY BROOK SITE 4 DAM

PROJECT C234

SUBJECT _____

General Summary: (of variables used in this appendix)

length of dam = 340'

Effective length of spillway = 22' @ E1. 155.5

Auxillary spillway width = 60' @ E1. 160.5

Total spillway capacity @ top of dam $\approx$ 2900 cfs

Surcharge storage @ top of dam $\approx$ 185 acre feet

Storage @ normal pool $\approx$ 100 acre feet

$\therefore$ Total storage @ top of dam = 285 acre feet

lake area @ normal pool = 17.5 acres

lake area @ top of dam = 34 acres

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LOUIS BERGER & ASSOCIATES INC.

SHEET NO. 19 OF

CHKD. BY _____ DATE _____

STONY BROOK SITE 4 DAM

PROJECT C-234SUBJECT Approximate drawdown calculation

Volume of lake @ normal pool = 100 Ac. ft.

Assume for drawdown calculation that the sides of the lake are vertical. No inflow or tailwater assumed

Invert Elev. of pipe = 139 ±

take head from elev. 141 to El. 155.5

∴ ΔH = 14.5' drawdown in 3 stages

i) Head = 12.08' Q = 57 cfs

$$\text{time} \approx \frac{100 \times 43560}{3 \times 57 \times 3600} = 7.1 \text{ hrs}$$

ii) Head = 7.25' Q = 44 cfs

$$\text{time} \approx \frac{100 \times 43560}{3 \times 44 \times 3600} = 9.2 \text{ hrs}$$

iii) Head = 2.42' Q = 25 cfs

$$\text{time} \approx \frac{100 \times 43560}{3 \times 25 \times 3600} = 16.13 \text{ hrs}$$

$$\Sigma \text{time} = 16.1 + 9.2 + 7.1 \approx 32.4 \text{ hrs}$$

Q in the above determined by the following:

$$Q = \sqrt{\frac{100 H_T}{\left(\frac{2.5204(1+K_e)}{D^4} + \frac{466.18 n^2 L}{D^{16/3}} \right)}}$$

where L = 30' K_e = 0.5

n = 0.02

and H_T is as indicated above
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BY D. J. M. DATE 6-79

CHKD. BY _____ DATE _____

SUBJECT _____

LOUIS BERGER & ASSOCIATES INC.

STONY BROOK #4SHEET NO. A-10 OF _____PROJECT C-234

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METAC	IPLT	IPRT	NSTAN
150	0	15	0	0	0	0	0	0	0
JOPER					NWT				
3					0				

SUB-AREA RUNOFF COMPLETION

INFLOW HYDROGRAPH FOR 100-YEAR FREQUENCY EVENT

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
2	0	0	0	0	0	1

HYDROGRAPH DATA

IHYOG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
0	-1	1.70	0.0	1.70	0.0	0.0	0	0	0

PRECIP DATA

MP	STORM	DAJ	CAK
24	0.0	0.0	0.0

PRECIP PATTERN

0.06	0.06	0.07	0.07	0.09	0.09	0.11	0.14	0.30	0.30
0.70	1.70	0.40	0.30	0.16	0.11	0.09	0.08	0.07	0.06
0.06	0.06	0.06	0.06						

LOSS DATA

STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0.0	0.0	1.00	0.0	0.0	1.00	0.50	0.10	0.0	0.0

GIVEN UNIT GRAPH, NUPGG= 16

80.	329.	650.	795.	722.	559.	377.	273.	249.	135.
9.	66.	47.	33.	23.	18.				

UNIT GRAPH TOTALS 4449. CFS OR 1.01 INCHES OVER THE AREA

RECESSION DATA

STRTG= 0.0 ORCSN= 0.0 RTIOR= 1.00

END-OF-PERIOD FLOW

TIME	RAIN	EXCS	COMP Q
1	0.06	0.00	0.
2	0.06	0.00	0.
3	0.07	0.00	0.
4	0.07	0.00	0.
5	0.09	0.00	0.
6	0.09	0.00	
7	0.11	0.04	3.
8	0.14	0.11	22.
9	0.30	0.27	85.

BY DJM DATE 6-79
CHKD. BY _____ DATE _____
SUBJECT _____

LOUIS BERGER & ASSOCIATES INC.
STONY BROOK N.Y. SITE 4

SHEET NO. A11 OF _____
PROJECT C-234

10	0.30	0.27	218.
11	0.70	0.67	443.
12	1.70	1.67	858.
13	0.40	0.37	1516.
14	0.30	0.27	2177.
15	0.16	0.13	2462.
16	0.11	0.08	2327.
17	0.09	0.06	1564.
18	0.08	0.05	1531.
19	0.07	0.05	1222.
20	0.06	0.04	1007.
21	0.06	0.04	726.
22	0.06	0.04	563.
23	0.06	0.04	441.
24	0.06	0.04	356.
25	0.0	0.0	291.
26	0.0	0.0	236.
27	0.0	0.0	180.
28	0.0	0.0	113.
29	0.0	0.0	77.
30	0.0	0.0	52.
31	0.0	0.0	36.
32	0.0	0.0	25.
33	0.0	0.0	15.
34	0.0	0.0	10.
35	0.0	0.0	7.
36	0.0	0.0	4.
37	0.0	0.0	3.
38	0.0	0.0	1.
39	0.0	0.0	1.
40	0.0	0.0	0.
41	0.0	0.0	0.
42	0.0	0.0	0.
43	0.0	0.0	0.
44	0.0	0.0	0.
45	0.0	0.0	0.
46	0.0	0.0	0.
47	0.0	0.0	0.
48	0.0	0.0	0.
49	0.0	0.0	0.
50	0.0	0.0	0.
51	0.0	0.0	0.
52	0.0	0.0	0.
53	0.0	0.0	0.
54	0.0	0.0	0.
55	0.0	0.0	0.
56	0.0	0.0	0.
57	0.0	0.0	0.
58	0.0	0.0	0.
59	0.0	0.0	0.
60	0.0	0.0	0.
61	0.0	0.0	0.
62	0.0	0.0	0.
63	0.0	0.0	0.
64	0.0	0.0	0.
65	0.0	0.0	0.
66	0.0	0.0	0.
67	0.0	0.0	0.
68	0.0	0.0	0.
69	0.0	0.0	0.
70	0.0	0.0	0.

BY DJM DATE 6-79
 CHKD. BY _____ DATE _____
 SUBJECT _____

LOUIS BERGER & ASSOCIATES INC.
 STONY BROOK N.Y. #4

SHEET NO. A-2 OF
 PROJECT C-234

SUM									
		5.20	4.24	18572.					
PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME					
2462.	788.	198.	126.	18969.					
CFS	4.31	4.32	4.32	4.32					
INCHES	391.	392.	392.	392.					
AC-FT									

HYDROGRAPH ROUTING									

ROUTING THROUGH RESERVOIR									
ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPR7	INAME			
22	1	0	0	0	0	1			
ROUTING DATA									
GLOSS	CLOSS	AVG	IRCS	ISAME					
0.0	0.0	0.0	1	0					

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA			
1	0	0	0.0	0.0	0.0	0.			
STORAGE=	0.	18.	40.	62.	88.	117.	147.	185.	200.
OUTFLOW=	0.	73.	205.	377.	581.	839.	1595.	2898.	3616.

TIME EOP STOR									
1	0.	0.	0.	0.	0.	0.			
2	0.	0.	0.	0.	0.	0.			
3	0.	0.	0.	0.	0.	0.			
4	0.	0.	0.	0.	0.	0.			
5	0.	0.	0.	0.	0.	0.			
6	0.	0.	0.	0.	0.	0.			
7	0.	0.	0.	0.	0.	0.			
8	0.	0.	0.	0.	0.	0.			
9	0.	0.	0.	0.	0.	0.			
10	0.	0.	0.	0.	0.	0.			
11	0.	0.	0.	0.	0.	0.			
12	0.	0.	0.	0.	0.	0.			
13	0.	0.	0.	0.	0.	0.			
14	0.	0.	0.	0.	0.	0.			

BY DJM DATE 6-79
CHKD. BY _____ DATE _____
SUBJECT _____

LOUIS BERGER & ASSOCIATES INC.

STONY BROOK W.S. #1

SHEET NO. A-12 OF _____
PROJECT C-232

15	109.	2320.	771.
16	137.	2395.	1344.
17	150.	2146.	1696.
18	151.	1747.	1723.
19	145.	1376.	1553.
20	138.	1114.	1372.
21	130.	866.	1163.
22	121.	644.	949.
23	114.	502.	808.
24	106.	398.	739.
25	98.	323.	669.
26	90.	263.	601.
27	83.	208.	540.
28	75.	147.	481.
29	68.	95.	423.
30	61.	65.	369.
31	55.	44.	321.
32	49.	30.	277.
33	44.	20.	239.
34	40.	13.	205.
35	36.	8.	182.
36	33.	5.	161.
37	30.	3.	143.
38	27.	2.	126.
39	24.	1.	112.
40	22.	0.	99.
41	20.	0.	87.
42	19.	0.	77.
43	17.	0.	70.
44	16.	0.	64.
45	15.	0.	59.
46	13.	0.	54.
47	12.	0.	50.
48	11.	0.	46.
49	10.	0.	42.
50	10.	0.	39.
51	9.	0.	36.
52	8.	0.	33.
53	7.	0.	30.
54	7.	0.	28.
55	6.	0.	25.
56	6.	0.	23.
57	5.	0.	22.
58	5.	0.	20.
59	4.	0.	18.
60	4.	0.	17.
61	4.	0.	15.
62	3.	0.	14.
63	3.	0.	13.
64	3.	0.	12.
65	3.	0.	11.
66	2.	0.	10.
67	2.	0.	9.
68	2.	0.	9.
69	2.	0.	8.
70	2.	0.	7.
71	2.	0.	7.
72	2.	0.	6.
73	1.	0.	6.
74	1.	0.	5.
75	1.	0.	5.

BY D.J.M. DATE 6-77
CHKD. BY _____ DATE _____
SUBJECT _____

LOUIS BERGER & ASSOCIATES INC.
STONY BROOK SITE #4

SHEET NO. A14 OF _____
PROJECT C-234

	SUM				
				18968.	
	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1723.	721.	198.	126.	18968.
INCHES		3.94	4.32	4.32	4.32
AC-FT		357.	392.	392.	392.

RUNOFF SUMMARY, AVERAGE FLOW						
		PEAK	6-HOUR	24-HOUR	72-HOUR	AREA
HYDROGRAPH AT	2	2462.	788.	198.	126.	1.70
ROUTED TO	22	1723.	721.	198.	126.	1.70