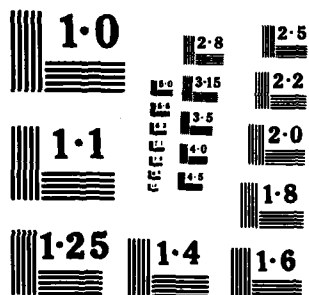


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BLACKSTONE RIVER BASIN  
NO. SMITHFIELD RHODE ISLAND

SLATERSVILLE RESERVOIR UPPER DAM

RI 02501

PHASE I INSPECTION REPORT  
NATIONAL DAM INSPECTION PROGRAM

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19. KEY WORDS (Continue on reverse side if necessary and identify by block number) DAMS, INSPECTION, DAM SAFETY, Blackstone River Basin No. Smithfield, Rhode Island Branch River		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) -The dam is an ashlar-faced masonry dam consisting of a 170 ft. downstream over-flow section and ashlar faced masonry right abutment about 20 ft. long. The overall length of the dam is about 256 ft. The test flood for the dam is 1/2 the PMF. The dam is judged to be in fair condition owing to the absence of an operating dewatering facility. A capstone on the toe of the dam has been dislodged. There are various remedial measures which must be implemented by the owner.		

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424 TRAPELO ROAD  
WALTHAM, MASSACHUSETTS 02154

REPLY TO  
ATTENTION OF:  
NEDED

FEB 1 1980

Honorable J. Joseph Garrahy  
Governor of the State of Rhode Island  
and Providence Plantations  
State House  
Providence, Rhode Island 02903

Dear Governor Garrahy:

Inclosed is a copy of the Slatersville Reservoir Dam Phase I Inspection Report, which was prepared under the National Program for Inspection of Non-Federal Dams. This report is presented for your use and is based upon a visual inspection, a review of the past performance and a brief hydrological study of the dam. A brief assessment is included at the beginning of the report. I have approved the report and support the findings and recommendations described in Section 7 and ask that you keep me informed of the actions taken to implement them. This follow-up action is a vitally important part of this program.

A copy of this report has been forwarded to the Department of Environmental Management, the cooperating agency for the State of Rhode Island. In addition, a copy of the report has also been furnished the owner, Dudley Development Corp., 58 Hamlet Avenue, Woonsocket, Rhode Island 02895.

Copies of this report will be made available to the public, upon request, by this office under the Freedom of Information Act. In the case of this report the release date will be thirty days from the date of this letter.

I wish to take this opportunity to thank you and the Department of Environmental Management for your cooperation in carrying out this program.

Sincerely,

*Max B. Scheider*  
MAX B. SCHEIDER  
Colonel, Corps of Engineers  
Division Engineer

Incl  
As stated

SLATERSVILLE RESERVOIR UPPER DAM

RI 02501

BLACKSTONE RIVER BASIN  
NORTH SMITHFIELD, RHODE ISLAND

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PHASE I INSPECTION REPORT  
NATIONAL DAM INSPECTION PROGRAM

NATIONAL DAM INSPECTION PROGRAM  
PHASE I INSPECTION REPORT

Identification No.: RI 02501  
Name of Dam: Slatersville Reservoir Upper Dam  
Town: North Smithfield  
County and State: Providence County, Rhode Island  
Stream: Branch River  
Date of Inspection: 23 April and 10 May 1979

BRIEF ASSESSMENT

Slatersville Reservoir Upper Dam is an ashlar-faced masonry dam consisting of a 170 ft. downstream overflow section, an ashlar-faced masonry left abutment 66 ft. long containing two inoperative gated sluiceways, and an ashlar-faced masonry right abutment about 20 ft. long. The entire length of the dam is about 256 ft. It is a run-of-the-river dam and is the upper dam of three dams forming the Slatersville Reservoirs, which once furnished the water needs for a mill located downstream but which no longer serve that purpose. There is a toe dam of similar construction about 85 ft. below the Upper Dam.

The pond behind the dam is about 7,500 ft. long and has a surface area at spillway level of about 195 acres. The drainage area above the dam is 85.0 sq.mi. and the maximum storage to the top of dam is estimated at about 3,640 acre-ft. The height of the dam is about 27 ft.; the size classification is governed by storage and is thus intermediate. A breach of the dam would affect part of an industrial complex, three homes, a restaurant and two local roads. The dam has been classified as having a significant hazard potential. Based on intermediate size and significant hazard, the range for the test flood is  $\frac{1}{2}$  PMF to PMF. The selected test flood for the project is  $\frac{1}{2}$  PMF.

The dam is judged to be in fair condition owing to the absence of an operating dewatering facility. Water was flowing to a depth of about 2 in. over the crest of the spillway at the time of the inspection, so it was not possible to observe the condition of the downstream ashlar face. Nevertheless, the water appeared to be flowing uniformly along the downstream face with no evidence of turbulence or missing or eroded elements. There was some vegetation growing on the right abutment and the channel containment walls. A capstone on the toe dam has been dislodged.

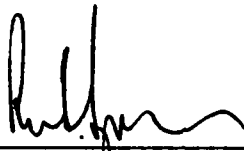
The test flood inflow equals 18,500 cfs. The routed test flood outflow of 18,000 overtops the non-overflow section. The test flood would overtop the abutments by about 2.1 ft. The spillway can pass 11,925 cfs or about 66 percent of the routed test flood outflow without overtopping the abutments.

Within one year after receipt of this Phase I Inspection Report, the owner, the Dudley Development Corp., should retain the services of a registered professional engineer and implement the results of his evaluation of the following: (1) assess

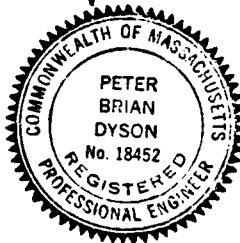


further the potential for overtopping and the adequacy of the spillway; (2) inspect the spillway during periods of low flow or no flow conditions; and, (3) study the feasibility of putting the sluiceway gates back into operating condition and using these facilities as a means for safely draining the ponded water above the dam.

The owner should also implement the following operating and maintenance measures: (1) remove trees from the right abutment and grasses from the channel containment walls; (2) replace the dislodged capstone in the toe dam; (3) monitor on a monthly basis possible seepage points at the north abutment wall, the downstream side of the gate structure, and other areas downstream of the rubble retaining wall; (4) develop a formal surveillance and flood warning plan; and (5) institute procedures for an annual periodic technical inspection of the dam.



Peter B. Dyson  
Project Manager



This Phase I Inspection Report on Slatersville Reservoir Upper Dam has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgement and practice, and is hereby submitted for approval.

*Joseph W. Finegan*  
JOSEPH W. FINEGAN, JR., MEMBER  
Water Control Branch  
Engineering Division

*Joseph A. McElroy*

JOSEPH A. MCELROY, MEMBER  
Foundation & Materials Branch  
Engineering Division

*Carney M. Terzian*

CARNEY M. TERZIAN, CHAIRMAN  
Chief, Structural Section  
Design Branch  
Engineering Division

APPROVAL RECOMMENDED:

*Joe B. Fryar*  
JOE B. FRYAR  
Chief, Engineering Division

## PREFACE

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

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

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through 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. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

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APPENDIX D - HYDROLOGIC AND HYDRAULIC COMPUTATIONS

APPENDIX E - INFORMATION AS CONTAINED IN THE NATIONAL  
INVENTORY OF DAMS

Flood Magnitude	Max. Routed Outflow cfs	Max. Res. El. Ft. NGVD	Max. Head Over Dam Ft.	Max. Disch. Over Dam cfs
½ PMF (Test Flood)	18,500	261.6	2.1	18,000
PMF	37,000	266.40	6.9	35,200

From the table, it can be seen that the project will not pass the routed test flood outflow without overtopping the dam by 2.1 ft. The project, however, can handle 66 percent of the routed test flood outflow without overtopping the dam. The spillway capacity at the top of the dam is 11,925 cfs.

f. Dam Failure Analysis. As discussed above, the dam would be overtopped by the routed test flood outflow. Also, a breach of the dam owing to structural failure by piping is a possibility. For this analysis a breach was assumed with the water level at top of dam. The "rule of thumb" criteria suggested in the NED March 1978 Guidance Report was used. With a breach width of 40 percent of the dam length, or about 68 ft., an outflow of about 23,200 cfs, which includes 7,155 cfs from the intact portion of the spillway, would be realized (see Sheets D-12 thru D-21, Appendix D).

In reaches below the dam the outflow first passes through the Slatersville Middle Reservoir and then the Lower Reservoir. Beyond the reservoirs the outflow passes under the Providence Turnpike through a masonry, twin-arch bridge. Beyond the bridge a mill is located high on the left bank and an industrial complex occupies the right bank at a lower elevation. The flow is then confined to a narrow ravine as it threads its way to another mill dam and pond. This lower dam is located about 2 miles below Slatersville Reservoir Upper Dam. Below this dam the river again is confined to a steep ravine until it reaches the vicinity of the Smithfield Expressway and the Louisquisset Pike. In this area the river valley widens but no structures exist in the valley. Beyond the Louisquisset Pike the river narrows and is confined until it reaches its confluence with the Blackstone River at a point about 3.67 miles below the Slatersville Reservoir Upper Dam.

It is estimated that flows over the Slatersville Middle Dam and Lower Dam will rise about 2 feet due to a breach in the Upper Dam. The most significant area to be impacted as a result of a breach of the dam would be the area extending immediately downstream of the Lower Dam for a distance of about one-half mile. The Providence Pike and a few industrial buildings located within this reach would sustain significant damage if a breach should occur. The only other structures that would sustain damage are three homes and a restaurant which are located about 8,600 ft. downstream of the Slatersville Reservoir Upper Dam. At this location the river stage would increase in depth on the order of 2 ft. to 5 ft. River valley routing downstream would produce discharges and stages as shown in the following table. Also shown are the river stages and discharges just prior to failure of the dam.

## SECTION 5 - HYDRAULIC/HYDROLOGIC

### 5.1 Evaluation of Features

a. General. The Slatersville Reservoir Upper Dam is a run-of-the-river type project, originally constructed to furnish the water needs of a mill located downstream. It is the upper dam of three dams which retain three ponds forming the reservoir system. It is basically a low storage-high spillage dam. It consists of an ashlar masonry overflow dam and two ashlar faced granite abutments.

b. Design Data. No hydrologic or hydraulic design data was retrieved for Slatersville Reservoir Upper Dam.

c. Experience Data. No records are available in regard to past operation of the dam. There is one plan available which shows a high water mark recorded at the dam site during the November 4, 1927 flood. The plan indicates that the water was 4.67 ft. above the crest of the dam on that date, which would correspond to a discharge of about 5,400 cfs. U.S.G.S. gaging Station 01111500 at Forestdale, R.I. is located about 2.08 miles downstream of the dam. According to U.S.G.S. Water Supply Papers, the maximum discharge at the site since 1886 was about 5,800 cfs occurring on March 19, 1936, by computation of flow over a dam located 1 mile upstream of the gage. The highest discharge recorded at the gage itself was 5,470 cfs, occurring on January 25, 1979. The drainage area for the gage is 91.2 sq.mi., compared with a drainage area above Slatersville Reservoir Upper Dam of about 85.0 sq.mi.

d. Visual Observations. No evidence which would indicate possible high flows through the reservoir area or in the downstream channel was noted.

e. Test Flood Analysis. Slatersville Reservoir Upper Dam is about 27 ft. high and impounds about 3,640 acre-ft. to top of dam; therefore, it is classified as intermediate in size. Because of downstream conditions, the hazard potential is classified as significant. In accordance with Recommended Guidelines for Safety Inspection of Dams, the recommended test flood is one half the probable maximum flood to a full maximum flood (PMF). A test flood of a magnitude corresponding to  $\frac{1}{2}$  PMF was selected for the evaluation.

The NED March 1978 Preliminary Guidance Memorandum for Estimating Probable Discharges was used for estimating the maximum probable flood peak flow rate; the PMF was then divided by two to arrive at the test flood value. The test flood inflow for Slatersville Reservoir Upper Dam, having a drainage area of 88.0 sq.mi., was determined to be about 210 CSM, or about 18,500 cfs. Flood routings through the reservoir were performed for both the  $\frac{1}{2}$  and the full PMF in the analysis. Results of these routings are shown on Sheets D-9, D-10, and D-11, and are summarized as follows:



## SECTION 4 - OPERATIONAL PROCEDURES

### 4.1 Procedures

The Dudley Development Corp. is the owner and operator of the dam. There is a low level outlet for the dam which at the present time is not in an operating condition. There are no documented operating procedures for the dam.

### 4.2 Maintenance of Dam

There is no specific maintenance program in effect at Slatersville Reservoir Upper Dam.

### 4.3 Maintenance of Operating Facilities

The existing low level facilities for emptying the reservoir are at the present time not maintained. There are no other operating facilities for the dam.

### 4.4 Description of any Warning System in Effect

No warning system is in effect at Slatersville Reservoir Upper Dam.

### 4.5 Evaluation

The dam serves no useful purpose at the present, though the owner has shown interest recently in installing a small hydroelectric facility. Maintenance involves surveillance regarding seeps, repair of ashlar masonry, keeping the spillway crest clear of debris, and repairing and keeping the low level outlet in an operating condition. The owner should establish a formal warning system for the dam in the event of an emergency.

7

The dam was inspected from both abutments. In general, it may be said that the dam and its supplementary toe dams are in excellent condition, being well founded and with almost all masonry remaining intact and tightly joined. However, just below the left abutment on its downstream facing stone there is some evidence of moisture and probable seepage, although there is no definite flow. In the center of the toe dam there is at least one cap-stone which has been dislodged. Also on the left abutment there is evidence of under-cutting the abutment wall, and dislodging of masonry. On the south abutment there is evidence of fairly recent re-pointing of abutment walls. On the south abutment there are also some trees, mostly conifers growing from the thin overburden, downstream of the dam. Local root networks seem to be invading rock joints, increasing vulnerability to the intrusion of ice. The downstream slope on the north side is characterized by frequent blocky rock outcrops (see Photo Nos. 7 and 8, Appendix C).

d. Reservoir Area. The reservoir behind the dam is a ponding of the Branch River. The upper reaches of the ponded area extend nearly to the tail waters of an old mill dam located about 2.5 miles upstream. The fairly steep slopes in the immediate vicinity of the dam are of rock, generally foliated gneisses, and lightly wooded. Further upstream, slopes are flatter and several abandoned borrow-pit operations indicate the prevalence of stable granular soils.

e. Downstream Channel. Immediately downstream of the dam, another ponding of the Branch River is formed by the Slatersville Reservoir Middle Dam. In the immediate area of the upper dam there are no obstructions by tree growth or vegetation. Immediately below the middle dam is another ponding of the river formed by the Slatersville Reservoir Lower Dam. The river beyond the lower dam is contained in a generally deep valley with little valley storage available. About 400 ft. downstream of the lower dam a masonry twin-arch bridge carries the Providence Pike roadway over the river. Just beyond the bridge, a historic mill complex is located high on the left bank and an industrial development is located at lower elevations on the right bank. From this point the river follows a steep ravine until it empties into a mill pond about 2,500 ft. below the Providence Pike. Here the river channel widens until it reaches another dam. Beyond this dam the valley is narrow until it reaches its confluence with the Blackstone River, about 3.67 miles below the Slatersville Reservoir Upper Dam.

### 3.2 Evaluation

In general, the visual inspection of the dam adequately revealed key characteristics of the project as they may relate to its stability and integrity, permitting an assessment to be made of those features affecting the safety of the structure. The only exception to the above was that, due to the flow over the crest of the dam, it was not possible to observe the condition of the ashlar face of the overflow section at the time of the inspection. However, water appeared to be flowing uniformly with no evidence of turbulence or missing or eroded elements. There was some evidence of seepage, but no definite flow, just below the left abutment. There was a small amount of growth on the right abutment. The Slatersville Reservoir Upper Dam was judged to be in fair condition owing to the absence of an operating dewatering facility.

## SECTION 3 - VISUAL INSPECTION

### 3.1 Findings

a. General. The visual inspection of Slatersville Reservoir Upper Dam took place on 23 April and 10 May 1979. On 23 April the water was about 2 inches above the spillway crest. The discharge over the spillway was estimated to be about 25 cfs. There was no evidence of any major maintenance problems, but a few items require attention (see Section 7.3). The dam was judged to be in fair condition owing to the absence of an operating dewatering facility.

b. Dam. The dam is a run-of-the-river dam with an overall length of 256 ft. It is the upper dam of three dams which retain a series of ponds making up the Slatersville Reservoir complex. The reservoirs were formerly used for retaining water for processing in the mill community of Slatersville. All three dams are of the same general construction. The upper dam has a 170 ft. long, gently arched upstream spillway, between two ashlar faced stone abutments. The southerly or right abutment is about 20 ft. long and the north or left abutment is about 66 ft. long. The left abutment contains a gate structure which once controlled the release of water to a canal that connected the entire reservoir system to the mill complex downstream. At the present time the gates are not in an operating condition and the canal has been filled in along most of its length. If the gates were in an operating condition they could be used for dewatering the reservoir in the event of an emergency.

c. Appurtenant Structures. The overflow portion or spillway of the dam is an ashlar faced masonry gravity structure. The downstream face has a slight batter, and it is estimated that the upstream slope is  $2\frac{1}{2}$  horizontal to 1 vertical. The top of the spillway is about 3 ft. wide with a capstone sill. The coping, or capstone, is a carefully shaped, 20 in. thick granite slab about 3 ft. wide, with provision for flashboards. A plan of the dam indicated that the capstone or coping is set on the granite masonry with a rubble interface between the capstone and the gravel backfill. Sections on the drawing indicate that the upstream side of the masonry spillway has been filled with granular material on a slope of  $2\frac{1}{2}$  horizontal to 1 vertical from coping to base. The dam is keyed to rock at the southern abutment and to the masonry gate structure on the north abutment. The gate structure contains two sluiceways 3.5 ft. wide and 6.0 ft. high. The sluices are controlled by wooden gates which at the present time are not in working order. On the downstream side of the gate structure and locally on the rough hewn masonry retaining walls there is frequent evidence of heavy grass growth in the unmortared joints, and light scrub growth appears on the dividing works between the canal and the main run of stream. About 85 ft. downstream of the dam proper is a supplementary toe dam, approximately 100 ft. long, of the same fitted masonry construction, which is also keyed to rock on the right abutment. The toe dam produces a plunge pool for the overflow from the main dam. On the left of the toe dam there is an earth filled, rubble masonry faced, divider separating the main run of the river from the rock trench canal. North (left) of the divider, there is another masonry dam or weir, of simpler construction, approximately 70 ft. long, to transfer overflows from the canal to the main run of river (see Photo Nos. 1 thru 6, Appendix C).

## SECTION 2 - ENGINEERING DATA

### 2.1 Design Data

One drawing has been located for the Slatersville Upper Reservoir Dam which is dated 1886. The plan shows plan view and elevation view of the dam, one section view, a detail of the cap-stone, and lists specifications for the dam. The plan can be found in Appendix B. No other engineering data was located for this 19th century dam.

### 2.2 Construction Data

No records or correspondence regarding construction have been found. The Rhode Island Department of Environmental Management, Division of Land Resources, has made available a set of 3 drawings showing plan views of the dams in the Slatersville Reservoir Complex. These plans show the dams as they existed in 1941. Copies of these plans are included in Appendix B.

### 2.3 Operation Data

No records or correspondence regarding operation of the dam have been found. At the present time the operating devices for the dam are not in an operating condition.

### 2.4 Evaluation of Data

a. Availability. Since little engineering data is available, it is not possible to make an assessment of the safety of the dam. The basis of the information presented in this report is principally the visual observations of the inspection team.

b. Adequacy. The lack of in-depth engineering data did not allow for a definitive review. Therefore, the adequacy of this dam could not be assessed from the standpoint of reviewing design and construction data, but is based primarily on visual inspection, past performance history and sound engineering judgement.

c. Validity. Not applicable.

(3) Description - Two rectangular sluiceways in left granite abutment.

(4) Control Mechanism - Hand operated, geared, sluice gates.

(3) Spillway crest El. 251.5 - 195

(4) Top of non-overflow abutment El. 259.5 - 268

(5) Test flood pool El. 261.6 - 282

g. Dam

(1) Type - Gravity overflow with downstream masonry section and upstream earth fill

(2) Length - 256 ft.

(3) Height - 27 ft. ±

(4) Top width - Varies

(5) Side slopes - overflow section - Downstream slight batter, Upstream 2½ horizontal to 1 vertical

(6) Zoning - Unknown

(7) Impervious core - Unknown

(8) Cutoff - Unknown

(9) Grout curtain - Unknown

h. Diversion and Regulating Tunnel - Not applicable

i. Spillway

(1) Type - Overflow gravity dam

(2) Length of weir - 170 ft.

(3) Crest elevation - 251.5 NGVD

(4) Gates - None

(5) Upstream channel - Natural river channel

(6) Downstream channel - Natural river channel

(7) General - Spillway flows directed into Slatersville Middle Reservoir

j. Regulating Outlets

(1) Invert - 231.5 NGVD

(2) Size - Two 3'-6" x 6' rectangular openings

(7) Total Spillway Capacity at Test Flood Elevation. The total spillway capacity at the test flood elevation is the same as (4) above, 16,900 cfs at elevation 261.6 NGVD.

(8) Total Project Discharge at Test Flood Elevation. The total project discharge at test flood is 18,000 cfs at elevation 261.6 NGVD.

c. Elevations (Ft. above NGVD)

- (1) Streambed at centerline of dam - 332.4
- (2) Maximum tailwater - Not available
- (3) Upstream portal invert diversion tunnel - Not applicable
- (4) Recreation pool - Not applicable
- (5) Full flood control pool - Not applicable
- (6) Ungated spillway crest - 251.5
- (7) Design surcharge (original design) - Unknown
- (8) Top of non-overflow abutment - 259.5
- (9) Test flood design surcharge - 261.6

d. Reservoir

- (1) Length of maximum pool - 7,500 ft.
- (2) Length of recreation pool - Not applicable
- (3) Length of flood control pool - Not applicable

e. Storage (acre-ft.)

- (1) Recreation pool - Not applicable
- (2) Flood control pool - Not applicable
- (3) Spillway crest pool El. 251.5 - 1970
- (4) Top of non-overflow abutment El. 259.5 - 3640
- (5) Test flood pool El. 261.6 - 4150

f. Reservoir Surface (acres)

- (1) Recreation pool - Not applicable
- (2) Flood control pool - Not applicable

h. Design and Construction History. Very little information is available regarding design of the dam and no information is available regarding construction of the dam. One plan exists which shows elevation and plan views of the proposed dam dated 1886, by J. W. Ellis, C.E., Woonsocket, R.I. The plan also shows a section through the dam and a detail of the cap-stone crest; specifications for the dam are also listed on the plan. The plan is shown in Appendix B.

i. Normal Operating Procedure. There are no operational procedures for Slatersville Upper Dam.

### 1.3 Pertinent Data

a. Drainage Area. The drainage area above Slatersville Reservoir Upper Dam consists of about 85.0 sq.mi., described in general as flat and coastal area. It is located in the northeast corner of Rhode Island and its northern reaches extend into the State of Massachusetts. In the upper reaches of the drainage area the topography is generally heavily wooded, rolling terrain. The lower reach is more urbanized and tends to be flatter. The area contains numerous power plants and reservoirs, the largest being Pascoag located about 10 miles upstream of Slatersville Upper Reservoir Dam.

#### b. Discharge at Damsite

(1) Outlet Works Conduit. Low level discharge from Slatersville Reservoir Upper Dam is provided by two 6 ft. high x 3.5 ft. wide sluiceways controlled by hand operated wooden slide gates. At the present time the gates are not in an operating condition because of missing parts. However, if the gates were operational they would be capable of discharging about 1,200 cfs when wide open and the reservoir water surface level was at test flood level. With the water level at top of dam the discharge capacity would be about 1,170 cfs with both gates wide open.

(2) Maximum Known Flood at Damsite. The maximum discharge at the damsite is unknown. An old plan of the dam showing stages recorded in November, 1927 indicates that the stage at the damsite was about 4.67 ft. above the crest of the dam on November 4, 1927. A stage of 4.67 would correspond to a discharge of about 5,400 cfs. U.S.G.S. Station 01111500 at Forestdale, R.I., having a drainage area of 91.2 sq.mi., is located about 2.08 miles downstream of the dam. According to U.S.G.S. Water Supply Papers, the maximum discharge at the site since 1886 was about 5,800 cfs on March 19, 1936, by computation of flow over a dam located 1 mile upstream of the gage. The highest discharge recorded at the gage was 5,470 cfs on January 25, 1979.

(3) Ungated Spillway Capacity at Top of Dam. The total spillway capacity at top of abutments, elevation 259.5, is 11,925 cfs.

(4) Ungated Spillway Capacity at Test Flood Elevation. The ungated spillway capacity is about 16,900 cfs at test flood elevation 261.6 NGVD.

(5) Gated Spillway Capacity at Normal Pool Elevation. Not applicable

(6) Gated Spillway Capacity at Test Flood Elevation. Not applicable



the overflow section has a slight batter and the upstream face is made up of a gravel fill at a slope of about  $2\frac{1}{2}$  horizontal to 1 vertical. About 85 ft. downstream of the main dam is located a toe dam which is approximately 6 ft. high. To the north of this toe dam there is another toedam, or weir, along the outlet canal, which permits overflows from the canal to enter the main run of the river. An old plan of the dam indicates that the entire dam rests on bedrock. A capstone sill along the spillway crest serves as a control. The total length of the dam is about 256 ft.

c. Size Classification. Slatersville Reservoir Upper Dam has a hydraulic height of about 27 ft. above downstream river level, and impounds a normal storage of about 1,970 acre-ft. to spillway crest level and a maximum of about 3,640 acre-ft. to the top of dam. In accordance with the size and capacity criteria given in Recommended Guidelines for Safety Inspection of Dams, capacity governs, and the project falls into the intermediate category and therefore is classified accordingly.

d. Hazard Classification. The Branch River below Slatersville Upper Reservoir first flows over the Slatersville Middle Dam and Lower Dam and then enters a rather narrow ravine before entering the Blackstone River about 3.67 miles downstream of the Upper Dam. About 1.38 miles downstream of the dam the valley widens somewhat and an industrial complex is located on the right bank. It is estimated that the stage of the river in this reach, due to a breach of the dam, would be about 15.6 ft. high and cause severe flooding of a portion of the industrial complex. Beyond this point the valley is narrow until it reaches an old mill pond site. It is anticipated a local road, three houses and a restaurant would sustain damage in this area. Beyond the pond site the river valley again narrows up and no significant damage is anticipated beyond this point.

A sudden breach of the dam would probably cause the loss of a few lives and result in appreciable community and industrial economic losses. Consequently, Slatersville Upper Dam has been classified as having a significant hazard potential, in accordance with the Recommended Guidelines for Safety Inspection of Dams.

e. Ownership. Slatersville Reservoir Upper Dam is owned by the Dudley Development Corp., 58 Hamlet Avenue, Woonsocket, R.I. 02895.

State of Rhode Island records indicate that the dam was owned by the Slatersville Finishing Company in 1939. The dam was constructed in about 1886 for John W. Slater for use in his textile milling operation.

f. Operator. Mr. Herbert Sturgis, General Manager, Holliston Sand Company, c/o Dudley Development Corp., 58 Hamlet Avenue, Woonsocket, R.I. 02895. Telephone: (401) 766-5010.

g. Purpose of Dam. The dam was originally constructed to create industrial water storage for John W. Slater's milling operations. At the present time the reservoir is not utilized, except for fishing and possibly boating.

## PHASE I INSPECTION REPORT

SLATERSVILLE RESERVOIR UPPER DAM RI 02501

### SECTION 1 - PROJECT INFORMATION

#### 1.1 General

a. Authority. Public Law 92-367, August 8, 1972, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a national program of dam inspection throughout the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. Louis Berger & Associates, Inc. has been retained by the New England Division to inspect and report on selected dams in the State of Rhode Island. Authorization and notice to proceed was issued to Louis Berger & Associates, Inc. under a letter of 14 August 1979 from William E. Hodgson, Jr., Colonel, Corps of Engineers. Contract No. DACW33-79-C-0051, Job Change No. 1, has been assigned by the Corps of Engineers for this work.

#### b. Purpose

(1) Perform technical inspection and evaluation of non-Federal dams to identify conditions which threaten the public safety and thus permit correction in a timely manner by non-Federal interests.

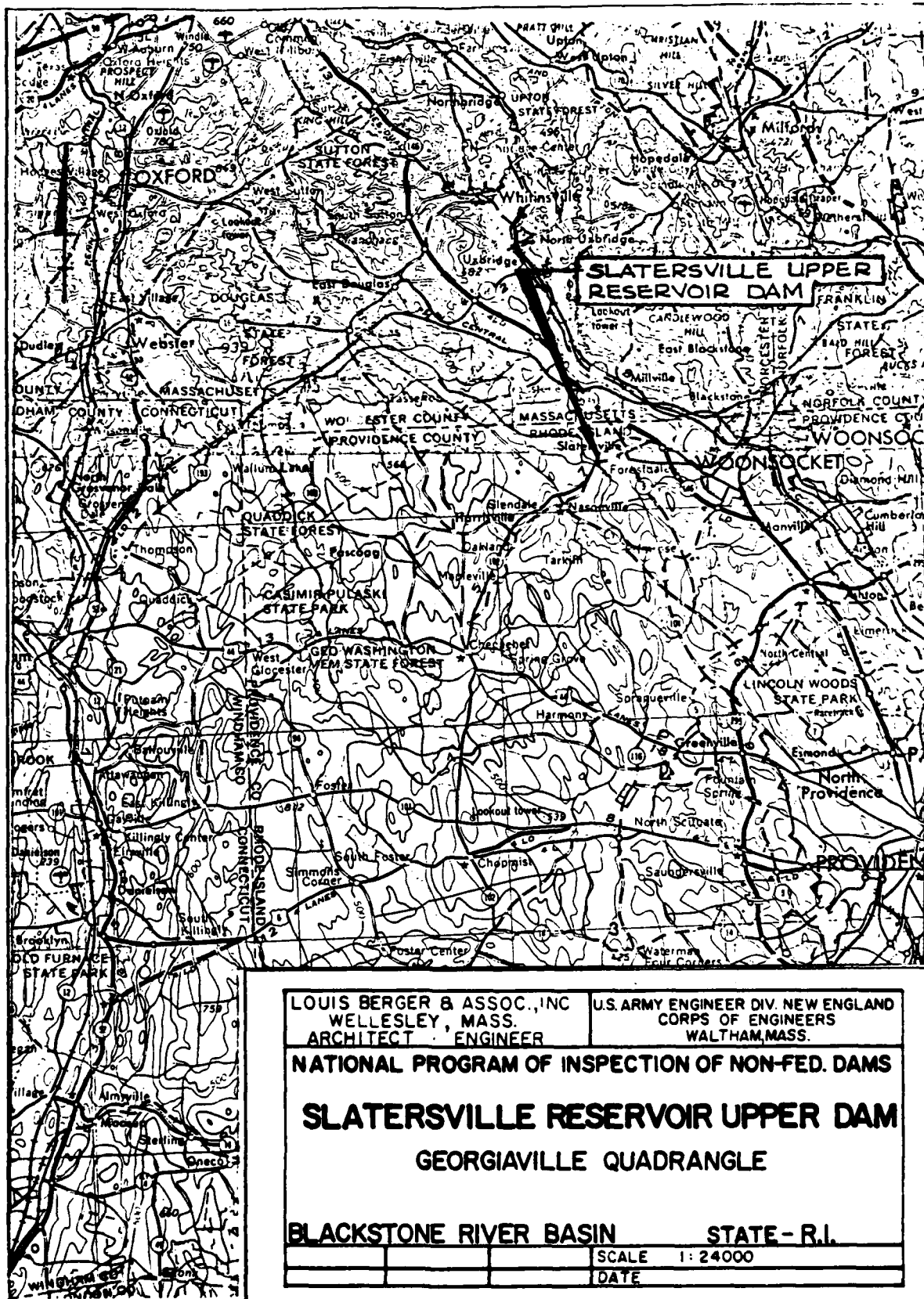
(2) Encourage and assist the States to initiate quickly effective dam safety programs for non-Federal dams.

(3) Update, verify and complete the National Inventory of Dams.

#### 1.2 Description of Project

a. Location. The Slatersville Reservoirs and Dams are located on the Branch River near the community of Slatersville in the town of North Smithfield, Providence County, Rhode Island. The Slatersville Reservoir Upper Dam is one of three dams located along the river forming the reservoirs. The Slatersville Reservoir Upper Dam is located about 3.67 miles upstream from the Branch River's confluence with the Blackstone River. The dam site is shown on U.S.G.S. Quadrangle, Georgiaville, Rhode Island, with coordinates approximately at N 41° 59' 39", W 71° 35' 43".

b. Description of Dam and Appurtenances. Slatersville Reservoir Upper Dam is a run-of-the-river dam constructed about 1886 as part of a mill complex. The use of the dams and reservoirs for the mill has been abandoned and the dam no longer serves its original intent. Essentially the dam consists of a 170 ft. long ashlar masonry arched overflow section, with left and right ashlar faced masonry abutments. At the foot of the left abutment is an old canal. This canal once extended from the upper reservoir to the mill site located below the lower dam. The canal was filled in for most of its length in recent years. Through the left abutment are located two sluiceways measuring 3.5 ft. wide and 6.0 ft. high which are controlled by wooden slide gates. The gates are not in an operating condition due to missing parts. On the dam proper, the downstream slope of



SLATERSVILLE RESERVOIR UPPER DAM



Overview from Left Abutment



Overview from Right Abutment

Results of Dam Failure

Reservoir @ Elev. 259.5'  
Before Breach of Structure

Reservoir @ Elev. 259.5' After  
Breach of Main Overflow Section

River Section ****	Discharge cfs	River Stage Ft.	Discharge cfs	River Stage Ft.
46+00	11,900	*8.0	20,200	*10.0
62+00	11,900	10.3	19,200	15.6
92+00	11,900	**8.0	18,200	**9.5
114+00	11,900	10.3	17,800	12.2
137+00	11,900	10.4	17,000	11.4
***192+00	11,900	13.0	16,200	15.1

\*Estimated Stage above Crest of Slatersville Middle Dam

\*\*Estimated Stage above Crest of Dam at Old Mill Pond

\*\*\*Confluence with Blackstone River

\*\*\*\*Dam at Sta. 0+00

In summary, about two industrial buildings, three homes, a restaurant and two roadways are within the area of potential flooding (see Appendix D, Sheet D-23).

## SECTION 6 - STRUCTURAL STABILITY

### 6.1 Evaluation of Structural Stability

a. Visual Observation. There are no design calculations available for review of the structural stability of the dam and appurtenant structures. However, the investigations and findings described herein do not indicate any displacement and/or distress which would warrant the preparation of structural stability calculations. The dam is now stable, but deficiencies described under Section 7 should be corrected.

b. Design and Construction of Dam. No plans or calculations of value to stability assessment are available for the dam.

c. Operating Records. There are no records which indicate the manner in which the dam has been operated.

d. Post-Construction Changes. There are no known records of any post-construction changes. A local resident interviewed during the inspection said that some repairs were carried out in 1956. It is unlikely that this work, of whatever scope, could have affected adversely the stability of the dam.

e. Seismic Stability. The dam is located in Seismic Zone No. 1 and in accordance with Phase I guidelines does not warrant seismic analyses.

SECTION 7  
ASSESSMENT, RECOMMENDATIONS & REMEDIAL MEASURES

7.1 Dam Assessment

a. Condition. On the basis of the Phase I visual examination, Slatersville Reservoir Upper Dam appears to be in fair condition, owing to inoperability of its dewatering facilities. The deficiencies revealed indicate that a further investigation should be carried out and that some remedial work is needed. The major concerns with the overall integrity of the dam are as follows:

(1) The spillway will only pass about 66 percent of the routed test flood outflow.

(2) The lack of an operating facility for drawing down the reservoir.

b. Adequacy of Information. The lack of in-depth engineering data did not allow for a definitive review. Therefore, the adequacy of this dam could not be assessed from the standpoint of reviewing design and construction data, but is based primarily on visual inspection, past performance history and sound engineering judgement.

c. Urgency. The recommendations and remedial measures enumerated below should be implemented by the owner within one year after receipt of this Phase I Inspection Report.

d. Need for Additional Investigations. Additional investigations are required as recommended in Para. 7.2.

7.2 Recommendations

It is recommended that the owner, Dudley Development Corp., should retain the services of a competent registered professional engineer to make further investigations of the following, and should implement the results:

(1) Make a thorough study of the hydrology of the drainage basin and evaluate further the potential for overtopping and the inadequacy of the spillway.

(2) Inspect the spillway during a period of low or no flow conditions.

(3) Study the feasibility of putting the sluice gates back into an operating condition and using them as a means to safely drain the reservoir.

7.3 Remedial Measures

(1) Remove trees from the right abutment and grasses from the channel containment walls.

- 7
- (2) Replace the dislodged capstone in the center of the toe dam to avert further raveling.
  - (3) Monitor on a monthly basis possible seepage points at: the north abutment wall; downstream side of the gate structure; and other areas on the downstream side of the rubble retaining walls where grass growth in joints indicates the passage of moisture.
  - (4) Develop a formal surveillance and flood warning plan, including round-the-clock monitoring during heavy precipitation.
  - (5) Institute procedures for an annual periodic technical inspection of the dam and its appurtenant structures.

#### 7.4 Alternatives

The only practical alternative would be to breach the dam under the auspices of a registered professional engineer with due consideration of environmental effects.



APPENDIX A  
INSPECTION CHECKLIST

VISUAL INSPECTION CHECKLIST  
PARTY ORGANIZATION

PROJECT Slatersville Reservoir Upper Dam

DATE 23 APR & 10 MAY, 1979

TIME 11:00 AM

23 APR - Clear, Warm  
WEATHER 10 MAY - Clear, Hot

W.S. ELEV. 251.7 U.S. 232.8 D.N.S.

PARTY:

- |                                |                            |
|--------------------------------|----------------------------|
| 1. <u>Peter B. Dyson</u>       | 6. <u>Herbert Sturgess</u> |
| 2. <u>Pasquale E. Corsetti</u> | 7. <u>Phyllis Dorr</u>     |
| 3. <u>Roger F. Berry</u>       | 8. _____                   |
| 4. <u>Carl J. Hoffman</u>      | 9. _____                   |
| 5. <u>James Reynolds</u>       | 10. _____                  |

PROJECT FEATURE	INSPECTED BY	REMARKS
1. <u>Hydrologic</u>	<u>Roger F. Berry</u>	
2. <u>Hydraulic/Structural</u>	<u>Carl J. Hoffman</u>	
3. <u>Soils and Geology</u>	<u>James Reynolds</u>	
4. <u>General Features</u>	<u>Peter B. Dyson</u>	
5. <u>General Features</u>	<u>Pasquale E. Corsetti</u>	
6. _____		
7. _____		
8. _____		
9. _____		
10. _____		

PERIODIC INSPECTION CHECKLIST

PROJECT Slatersville Reservoir Upper Dam DATE 23 APR & 10 MAY 1979  
 PROJECT FEATURE Ashlar Masonry Dam NAME Carl Hoffman  
 DISCIPLINE Structures NAME \_\_\_\_\_

AREA EVALUATED	CONDITIONS
<u>DAM EMBANKMENT</u>	
Crest Elevation	251.5
Current Pool Elevation	251.7
Maximum Impoundment to Date	Not known
Surface Cracks	N/A
Pavement Condition	N/A
Movement or Settlement of Crest	None observed
Lateral Movement	None observed
Vertical Alignment	Good
Horizontal Alignment	Good
Condition at Abutment and at Concrete Structures	Good
Indications of Movement of Structural Items on Slopes	None
Trespassing on Slopes	Moderate on abutments
Sloughing or Erosion of Slopes or Abutments	None observed
Rock Slope Protection - Riprap Failures	N/A
Unusual Movement or Cracking at or near Toes	Inaccessible, could not observe
Unusual Embankment or Downstream Seepage	None observed
Piping or Boils	None observed
Foundation Drainage Features	None evident
Toe Drains	None evident
Instrumentation System	None evident

PERIODIC INSPECTION CHECKLIST

PROJECT Slatersville Reservoir Upper Dam DATE 23 APR & 10 MAY 1979  
 PROJECT FEATURE Outlet Channel NAME J. Reynolds  
 DISCIPLINE Geology NAME \_\_\_\_\_

AREA EVALUATED	CONDITIONS
----------------	------------

OUTLET WORKS - OUTLET STRUCTURE AND  
OUTLET CHANNEL

General Condition of Concrete	Hewn Ledge Channel
Rust or Staining	N/A
Spalling	N/A
Erosion or Cavitation	None
Visible Reinforcing	N/A
Any Seepage or Efflorescence	N/A
Condition at Joints	N/A
Drain Holes	None
Channel	Good
Loose Rock or Trees Overhanging Channel	None
Condition of Discharge Channel	Some vegetation on walls

# PERIODIC INSPECTION CHECKLIST

PROJECT Slatersville Reservoir Upper Dam DATE 23 APR & 10 MAY 1979

PROJECT FEATURE Spillway NAME C. Hoffman

DISCIPLINE Structures NAME \_\_\_\_\_

AREA EVALUATED	CONDITIONS
----------------	------------

## OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS

### a. Approach Channel

General Condition	Good
Loose Rock Overhanging Channel	None observed
Trees Overhanging Channel	None observed
Floor of Approach Channel	Inaccessible

### b. Weir and Training Walls

General Condition of Concrete	Granite Block - Good
Rust or Staining	Weir not accessible N/A
Spalling	N/A
Any Visible Reinforcing	N/A
Any Seepage or Efflorescence	None observed
Drain Holes	None evident

### c. Discharge Channel

General Condition	Good
Loose Rock Overhanging Channel	None observed
Trees Overhanging Channel	A few
Floor of Channel	Not observed
Other Obstructions	Not observed

NOTE: Capstone dislodged from toe dam, which is located 85 ft. below spillway.

Two 3.5 ft. wide by 6.0 ft. high sluiceway gates not in an operating condition due to missing parts.

# PERIODIC INSPECTION CHECKLIST

PROJECT Slatersville Reservoir Upper Dam DATE 23 APR & 10 MAY 1979

PROJECT FEATURE \_\_\_\_\_ NAME \_\_\_\_\_

DISCIPLINE \_\_\_\_\_ NAME \_\_\_\_\_

AREA EVALUATED	CONDITIONS
Outlet Works - Control Tower	N/A
Outlet Works - Intake Channel and Intake Structure	N/A
Outlet Works - Transition and Conduit Channel	N/A
Outlet Works - Service Bridge	N/A

APPENDIX B  
ENGINEERING DATA

DEPARTMENT OF NATURAL RESOURCES

DAM INSPECTION REPORT

DAM: 43 RIVER: Branch WATERSHED: Blackstone/  
NAME: Slatersville Res/ TOWN: N. Smithfield Branch  
OWNER: Upper  
Dudley Development Corp.  
58 Hamlet Avenue  
Woonsocket, RI 02895

REPORT ON: General Conditions

REASON FOR INSPECTION: N.P.S.I.D. - Significant/Intermediate Hazard  
Annual Inspection

INSPECTION BY:  
Earle Prout  
Carmin Asprinio

DATE OF INSPECTION: April 10, 1978

REPORT: Existing Conditions:

Stone spillway crest shows no signs of erosion or irregularities.

Draw-off gates closed--both gates appear to be inoperable because of condition of gate mechanisms. Bracket missing on gate nearest bank and entire mechanism missing on gate nearest spillway. See photo #1

No signs of erosion or leakage through earth-filled masonry block lined embankment (west side) and none on earth embankment on east side.

No signs of scouring of concrete/masonry block abutment walls.

Lower spillway (dam #45) no obvious signs of damage or erosion.

Comments

Dams in good condition. Only recommendation would be to have gate mechanisms repaired if it is considered necessary to be capable of lowering level of reservoir.

E.J.P.



DATA #43

PHOTO #1



LOOKING FROM WEST SIDE OF SPILLWAY. BOTH  
GATE MECHANISMS APPARENTLY INOPERABLE DUE  
TO MISSING PARTS OF GEARS, ETC

B-2

R.I. DEPARTMENT OF PUBLIC WORKS  
DIVISION OF HARBORS AND RIVERS  
SPECIAL INSPECTION REPORT

DAM NO. 43-44-45

INSPECTED BY JOHN V. KELLY

W. H. FILKINS, P.E.

WATERSHED BLACKSTONE

TOWN - NORTH SMITHFIELD  
DAM NO. 43-44-45 NAME SLATERSVILLE (JUNIOR)  
OWNER KENDALL CO. (SLATERSVILLE BRANCH)

~~WATER~~  
ON RIVER BRANCH  
~~TRENCH~~

ADDRESS c/o SLATERSVILLE FINISHING CO., SLATERSVILLE, R. I., TEL. WOOD. 130

REPORT ON—NEW CONSTRUCTION

REPAIRS

INSPECTION ONLY X

PLANS BY

APPROVED

CONTRACTOR

INSPECTION REPORT BY JOHN V. KELLY REASON ROUTINE

DATE 9/20/46

TICKLER

EMERGENCY:

1. K. H. FILKINS, PLANT ENGR., SLATERSVILLE, REG. TEL. WOOD. 3192 JK
2. ED. WILKES, JR., PLANT MANAGER, SLATERSVILLE

SPILLWAY

TYPE

CONDITION

DRAW-OFF GATES

NUMBER

CONDITION

TRENCHES & WHIRLS

EMBANKMENT

TYPE

CONDITION

APPROACHES

EROSION

BRUSHES & TREES

RIPRAP

PRESENT USE

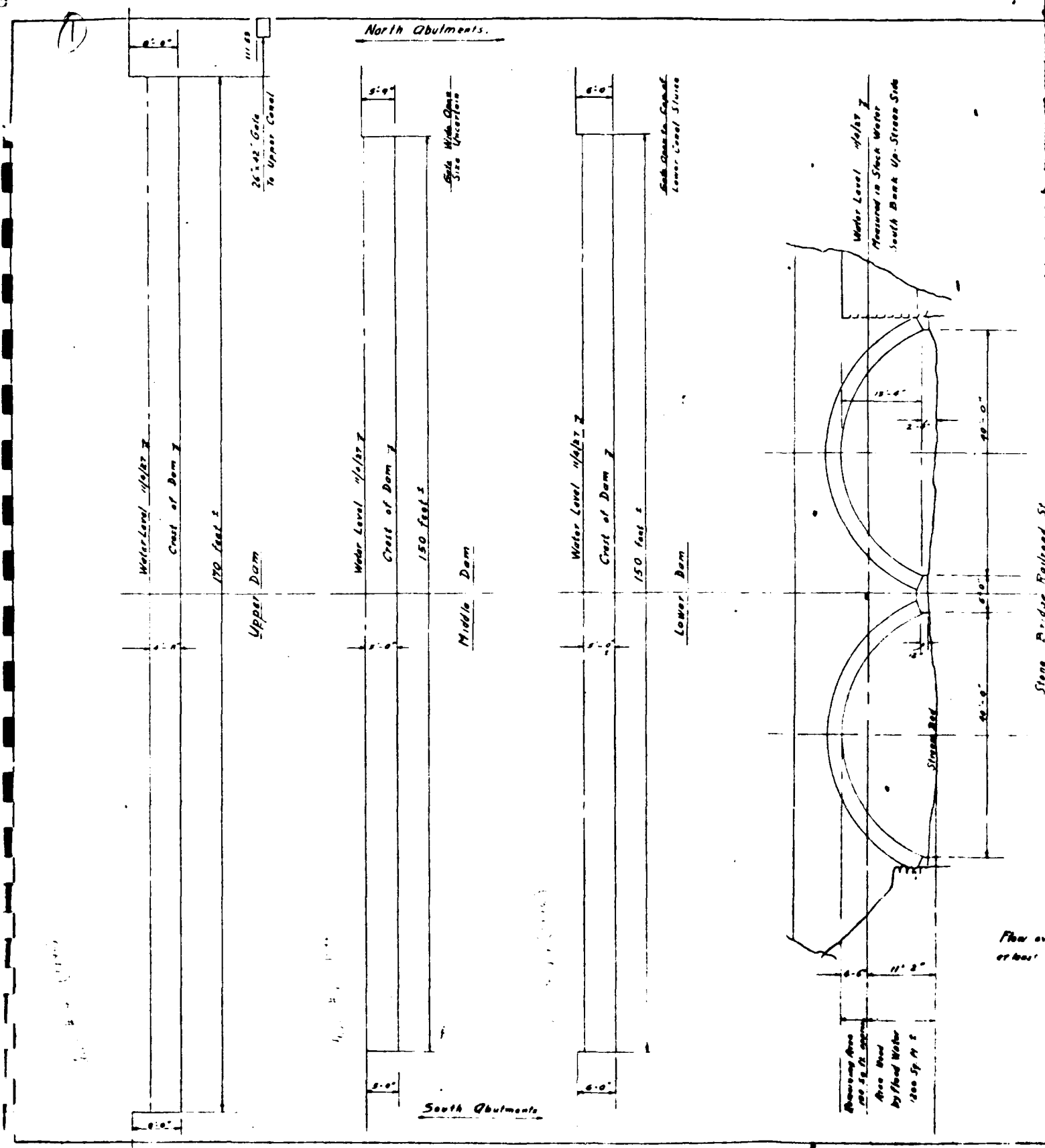
WHO CONTROLS

WHO CONTACTED  
AT SITE

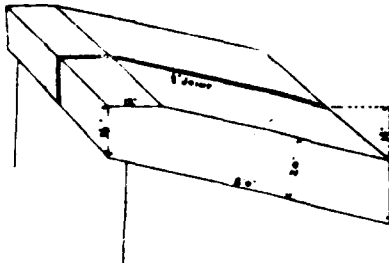
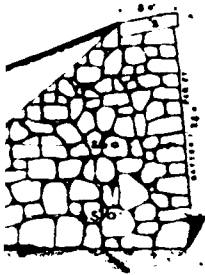
INSTRUCTIONS LEFT

IN EMERGENCY  
CALL

9/20/46 CONDITION GOOD. MASSIVE CURVED MASONRY DAM BETWEEN HEAVY MASONRY ABUTMENTS EXTENDING ACROSS RIVER. DROPS IN TWO LEVELS TO MIDDLE POND FROM LONG DEEP POND. TRENCH ON NORTH END OF SPILLWAY RELEASES WATER TO MILL AT SLATERSVILLE. DRAW-OFF GATE AND 1 TRENCH GATE IN GOOD WORKING ORDER. REQUEST MADE TO POINT UP AROUND ABUTMENTS AND CUT SMALL TREES ON LONG TRENCH TO MILL. MILL (NOW OPERATING). THIRD SPILLWAY AT THIS POINT RELIEVES WATER ON TRENCH AND SPILLS INTO MIDDLE POND. CONDITION FAIR. WEEDS AND TREES NEED CLEANING <sup>9/20/46</sup> ABOVE SPILLWAY. SO REQUESTED OF FILKINS, PLANT ENGINEER.



4



on through A. A.

Section of Cap-stone

Scale 1"=10.

### Specification

Specification for a Stone Dam to be built for John H. Slater North Smithfield, R.I.

It is to be located in the Branch River so called about one mile above Waterbury  
 and approaches shall be thoroughly cleaned of all rubble loose stone roots etc. to the solid rock or ledge  
 foundations for the dam shall extend down the surface of the ledge to such depth as may be directed by the  
 owner and shall be built to the form and dimensions as shown on plan and shall consist of small  
 stone masonry with the exception of the bulkhead to be laid close in cement mortar and bedded  
 side faces and all interior faces to be thoroughly tamped and finished up with cement mortar a bed  
 shall be laid at top of dam of not less than eighteen (18) inches in thickness to receive coping  
 of the bulkhead to be of granite or cover at center work pointed on beds and built with rock face and 6 by  
 6 coping on half 6 inch m. course shall be of less than eighteen (18) inches in thickness The horizontal joints  
 and vertical joints perpendicular thereto shall be laid with regard to breaking joints on the adjoin-  
 ing with 6" of face to be headless of well set four (4) feet high the face work herein described shall be  
 laid with the masonry true joints the backing so as to make a perfect piece of work  
 to be pointed with Portland Cement  
 coping or outside stone of the dam shall be cut to the dimensions given on the plan to fit out on beds and  
 6 by 6 joints not exceeding on half 6 inch and shall project six (6) inches over the face of the dam  
 to dovetail with at least two (2) dovetails into the course below said dovetails being thoroughly  
 being set into the lower course to be cut in Portland Cement and vertical joints to be carefully jointed  
 cement used to be of the best quality Hydraulics Cement subject to the test and approval of the Engineer  
 to be mixed in 1:1 proportions of one part cement to two parts clean sharp sand mixed fresh for  
 hand and used immediately after  
 word Engineer is used it is to be considered as meaning John H. Slater or his duly authorized

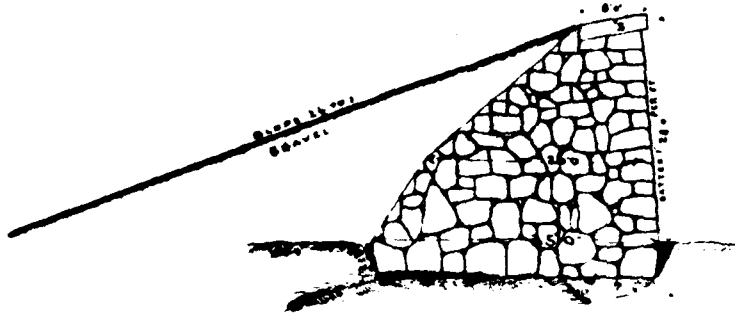
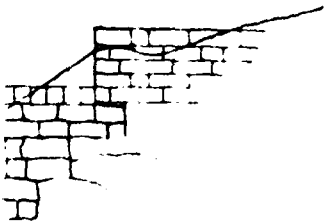
B-13

DAM #43

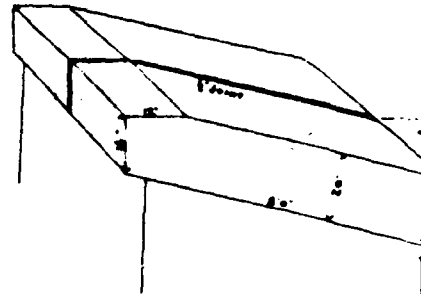
B  
3-19

50

(3)



Section through A. A.



Section of Cap-stone

Scale 1"=10'

## Specification

Specification for a Stone Dam to be built for John H. Blau, North Carolina

The dam is to be located on the Branch River, so called, about one mile above the mouth of the river. The foundation and approaches shall be thoroughly cleaned of all water borne sand and gravel.

The foundations for the dam shall extend below the surface of the ledge to such depth as the Engineer in charge shall determine and shall be built to the form and dimensions as shown on plan and section. The masonry (with the exception of the bulkhead) to be laid close in courses on their broadest faces and all interstices to be thoroughly filled and flushed with mortar. The courses will be laid at top of dam of not less than eighteen (18) inches in thickness.

The face of the bulkhead to be of granite or covered ashlar work, pointed on beds and in joints not exceeding one half (1/2) inch. The courses shall be of less than eighteen (18) inches in thickness and vertical joints perpendicular thereto shall be laid with regard to the courses one fifth (1/5) of face to be headers of full size four (4) feet high. The face will be thoroughly bedded with the masonry that forms the backing so as to ensure a perfect fit.

The faces to be pointed with Portland Cement.

The coping or roofers stone of the dam shall be cut to the dimensions given on plan and shall project not exceeding one half (1/2) inch and shall project as 6 inches.

They shall be dovetailed with at least two (2) dovetails set into the course below, and bedded after being set into the lower course, to be set in Portland Cement and vertical joints with the same.

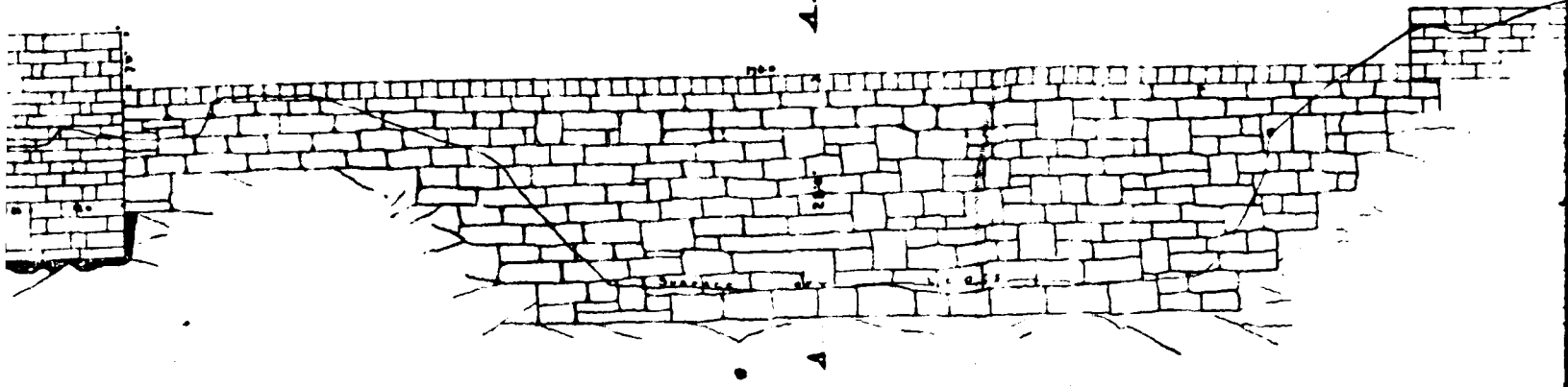
The cement used to be of the best quality Hydraulic Cement subject to the test in charge, to be mixed in the proportions of one part cement to two parts clean sand. The work to be hand and used immediately after.

When the word Engineer is used it is to be considered as meaning John H. Blau, agent.

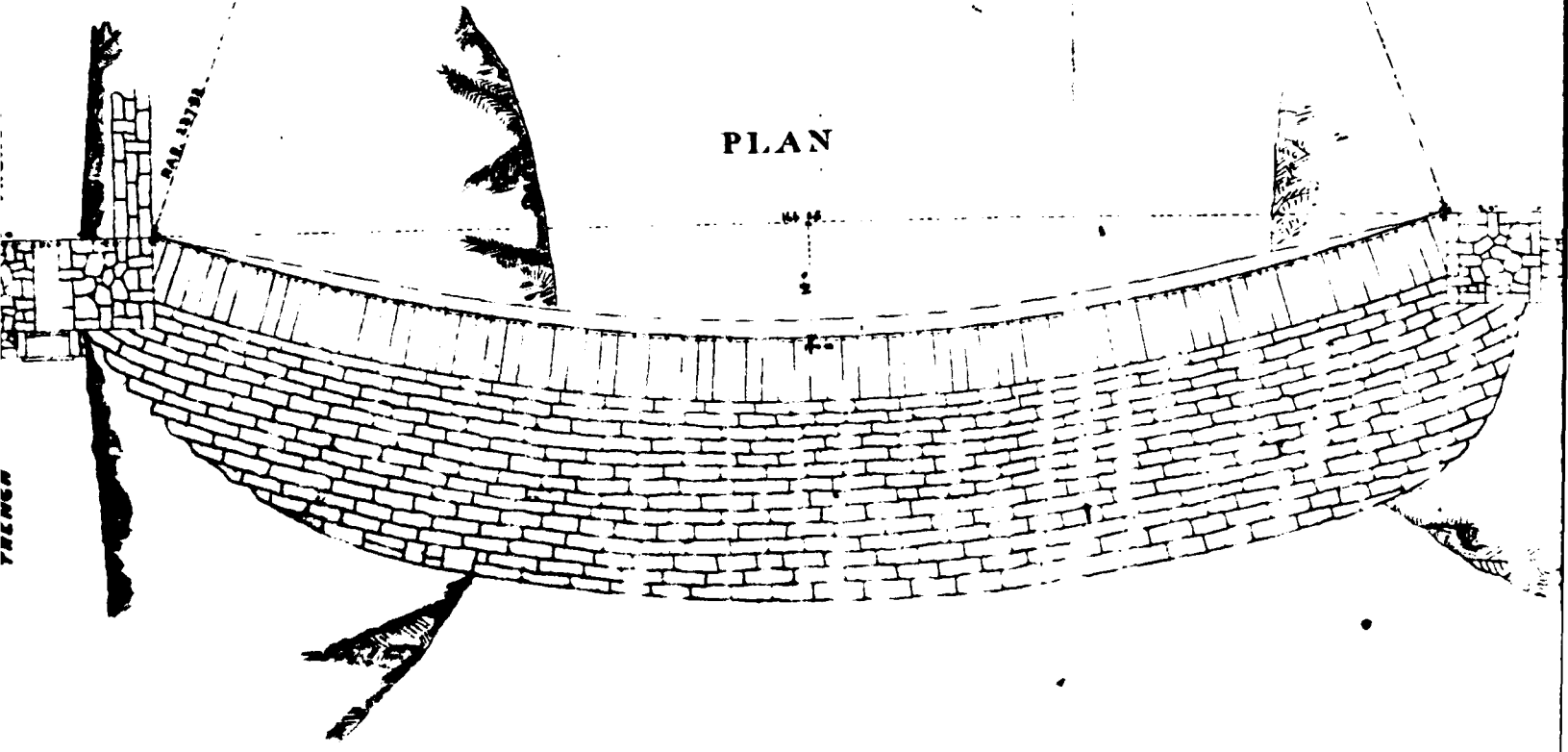


②

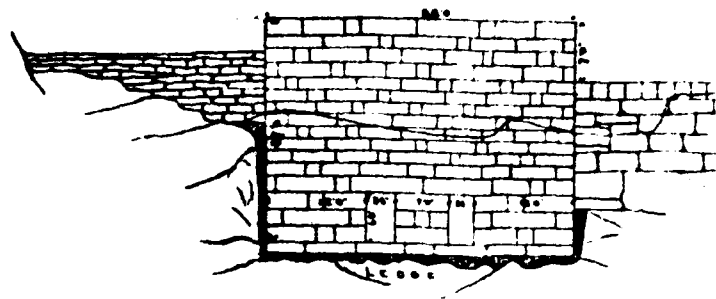
# Elevation



# PLAN



①



# PLAN of PROPOSED DAM

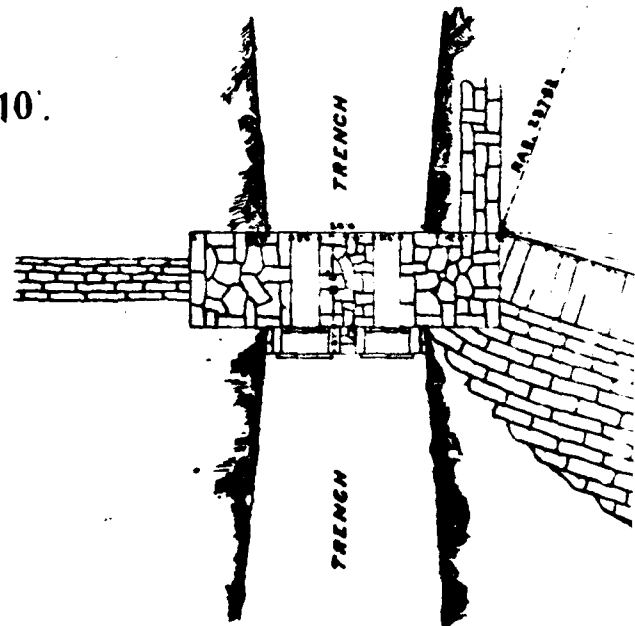
for  
JOHN W. SLATER.

SLATERSVILLE, R.I.

1886

J.W. Ellis C.E.  
Woonsocket R.I.

Scale 1" = 10'





State of Rhode Island and Providence Plantations

DEPARTMENT OF PUBLIC WORKS  
STATE OFFICE BUILDING

OFFICE OF THE DIRECTOR

DIVISION OF HARBORS & RIVERS

DIVISION OF ROADS AND BRIDGES  
DIVISION OF PUBLIC BUILDINGS  
DIVISION OF STATE AIRPORTS  
DIVISION OF HARBORS AND RIVERS

PROVIDENCE, March 24, 1939

RECEIVED  
March 29 1939  
ANSWERED

MAR 27 1939	
APR 1 1939	FILE
APR 1 1939	FILE
APR 1 1939	FILE
APR 1 1939	FILE
APR 1 1939	FILE

Slatersville Finishing Co.  
Slatersville,  
No. Smithfield, R. I.

Dear Sir:-

Will you kindly furnish this office with any data or plans you may have; also the name, address and telephone number, if any, of the person in charge of the Slatersville Res. Dam #1; Pond #1 or gates located on the Branch River (Slatersville Res.) at Slatersville, North Smithfield, R. I. in order that we may notify him in case of any emergency.

Kindly return this letter with the information thereon as a means of identification.

If possible, also furnish us with date when said dam or gates were built or rebuilt.

Very truly yours,

Lynch

R. Robert Lynch  
CHIEF DIVISION HARBORS & RIVERS.

CRL/T

B-12



- 3 -

Dept. of Public Works  
Div. of Harbors & Rivers

March 28, 1939

the pond at Forestdale.

The age of these canals is not known, but the first ones were put in about 1806. Since that time there have been a number of alterations and reconstructions of which we have no record, practically all of them taking place before 1880. The small spillway on the upper canal was reconstructed about 1924. 47A

The above is a summary of the data which we have on these dams and canals. We should, however, be very glad to go over any other minor details with your representative at any time. However, as mentioned above we do not have reliable construction drawings.

In case of emergency we suggest that you keep on file the following names:-

F. A. Chiffelle	Telephone Woonsocket	4094J
Samuel Bentley	"	1129-J-1
Sheldon Eggleston	"	768-J-3

The above mentioned persons all reside in Slatersville.

Yours very truly,

SLATERSVILLE FINISHING CO.

FAC  
C

*F. A. Chiffelle*  
F. A. Chiffelle.

P.S. The elevations given refer to our own bench-mark and are relative only.

B-11

Dept. of Public Works  
Div. of Harbors & Rivers

3/28/39

charges into our middle reservoir. The crest is somewhat shorter than that of the upper dam, but we have no measurements at present upon same.

#46

MIDDLE DAM

This dam is at elevation 106.54 feet, has a crest 150 feet long, with wing-walls about 5 feet high. This dam has one gate which is permanently closed. The spill from this dam goes into a small pond, which is retained by the lower dam. There is evidence that this dam was built in front of an existing timber crib dam, and that this timber crib work with its fill is still in place back of the stone dam.

#47

LOWER DAM

This dam is similar in construction and length of crest to the above, the wing-walls vary in height from about four feet six inches to six feet. The dam is equipped with gates which can discharge into our lower canal, but are very rarely used. The lower dam evidently was built on the down-stream side of a timber crib dam, and originally formed a diversion dam only. There is evidence of the timber crib being in place.

The elevation of the crest of this dam is 96.76. The river at the toe of our lower dam is approximately, elevation 88.00 feet.

The age of the three last mentioned dams is not known. It is, however, known that they were built prior to the construction of the upper dam.

There are two canals and a tail-race located on our property as follows:-

UPPER CANAL

#44

This receives water from the upper dam, and carries a normal elevation of 113.80 feet. It has two spillways, one near its source and discharges into a middle reservoir, and the second near its termination and discharges into the lower canal. The first is of stone construction and is approximately 60 feet long. The second is somewhat shorter of concrete and stone construction with a set of boards which can be removed in order to drain the canal.

#47 A

LOWER CANAL

#47 B

This canal is located within the mill yard, elevation 97.20 feet. It has one spillway 50 feet long which discharges into the river.

TAIL-RACE

This has an elevation at its highest point of 76.40 feet, and discharges without spillways directly into the river just above

Br # 44-50A



SLATERSVILLE FINISHING COMPANY  
SLATERSVILLE, R.I.

DIVISION OF THE KENBALL COMPANY

March 28, 1939

BOSTON OFFICE  
140 FEDERAL STREET  
NEW YORK OFFICE  
40 NORTH STREET

Dept. of Public Works  
Div. of Harbors & Rivers  
State Office Bldg.  
Providence, R.I.

RECEIVED

March 29 39

ANSWERED

Attention: Mr. C. Robert Lynch

Gentlemen:

We are returning herewith series of letters dated March 24th and March 27th regarding the dams and spillways located on the Branch River within our property. We have no reliable construction plan showing the details of these dams, nor have we any method of checking your designating numbers with the location of the dams on our property.

The following data is presented for what it is worth and is taken from our records during the flow at flood times, etc.

All dams are of granite construction with solid earth fill in the back, and none have been raised beyond their original designed level. The only drawings which we possess shows a heavy gravity type of dam, with out granite cap stones about 4 feet wide, with a vertical down stream face and the usual gravity dam section at the base. We understand that all of these dams are of this construction. Beginning at the extreme west or up-stream end of our property, the dams in order are as follows:-

#43 UPPER DAM

This dam was built about 1886 and has a crest of 170 feet, with wing-walls 8 feet high at each end. The elevation of the crest of this dam is 125.60 feet. This dam discharges thru two gates into our upper canal.

#45 Immediately below the above dam and forming a sort of toe-dam for same is a small low dam of stone construction which was originally a diversion dam to supply the upper canal. It no longer has any specific use, but has not been removed. It has an elevation of 113.80 feet, without gates and dis-

B-9

DIVISION OF HARBORS AND RIVERS

SURVEY OF DAMS IN RHODE ISLAND

Branch River Basin      #43 Slatersville (Upper) Dam #1

Drainage Area      88.6 Sq. Mi.

February 1948

Pond Area      156 acres

Spillway      170' X 8' deep, capacity 12,118 c.f.s.

One gate      3.5' X 6'      "      525 "

"      3.5' X 3'      "      263 "

Total capacity for discharge      12,906 c.f.s.

Estimated Extreme Freshet      5796 c.f.s.

*FEBRUARY 1948*

B-8



Frederick V. Waterman  
DIRECTOR

State of Rhode Island and Providence Plantations

DEPARTMENT OF PUBLIC WORKS  
STATE OFFICE BUILDING

OFFICE OF THE DIRECTOR

RECEIVED

March 29 1939

AIR MAIL

DIVISION OF HARBORS & RIVERS

DIVISION OF ROADS AND BRIDGES  
DIVISION OF PUBLIC BUILDINGS  
DIVISION OF STATE AIRPORTS  
DIVISION OF HARBORS AND RIVERS

PROVIDENCE, March 24, 1939

Slatersville Finishing Co.  
Slatersville,  
No. Smithfield, R. I.

MAR 27 1939		
An. 4		
Referred to	Report to	File

Dear Sir:-

Will you kindly furnish this office with any data or plans you may have; also the name, address and telephone number, if any, of the person in charge of the Slatersville Res. Mill Trench dam or gates located on the Branch River (Slatersville Res.) at Slatersville, No. Smithfield, R. I. in order that we may notify him in case of any emergency.

Kindly return this letter with the information thereon as a means of identification.

If possible, also furnish us with date when said dam or gates were built or rebuilt.

Very truly yours,

*R. Robert Lynch*

CHIEF DIVISION HARBORS & RIVERS.

CRL/T

ATT: John V. Kelly

File

# 43

7/22/46

Division of Harbors and Rivers

Information for Slatersville Finishing Co

Att: R. H. Breyden, Slatersville, R. I.

Waterstage recorder at Forestdale, R. I.

What is the discharge of the Branch River at this station  
July 1, 1946 to present date (Or as close to present date  
as possible?) *latest records on file - June 20, 1946.*

Is there a waterstage recorder above on the west of  
Slatersville Reservoirs; private or State? *No recording Station  
possibly private Mill record.*

Has the rating table changed on this Forestdale station  
since 1941-1942? *Yes, latest curve 8/23/44*

Thank you for any information you may be able to give me  
on the above.

R. H. Breyden

(Called Breyden. Referred him to Mr. Kinnison for un-  
received reports. Our last chart only went to June 20, 1946  
at Forestdale. <sup>Gage height</sup> ^

JVK

see also #47 +  
gaging, etc. - #1

B-6

File #43

October 9, 1946

Slatersville Finishing Company,  
Slatersville, R. I.

Att: K. H. Filkins, Plant Engr.

Dear Mr. Filkins:-

I wish to acknowledge receipt of  
two blueprints giving details of your dams  
and trenches at Slatersville and thank you  
for same.

I will appreciate receiving dimen-  
sions and elevations on the various gates  
and structures recently rebuilt, when you  
get them on paper.

Yours very truly,

Frank M. O'Donnell,  
Chief, Division Harbors and Rivers

By John V. Kelly, Engineer.

B-5

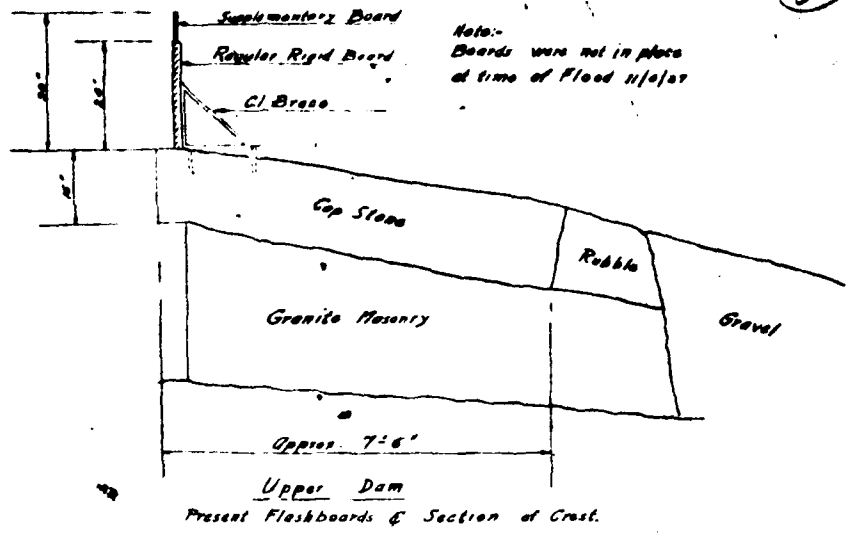
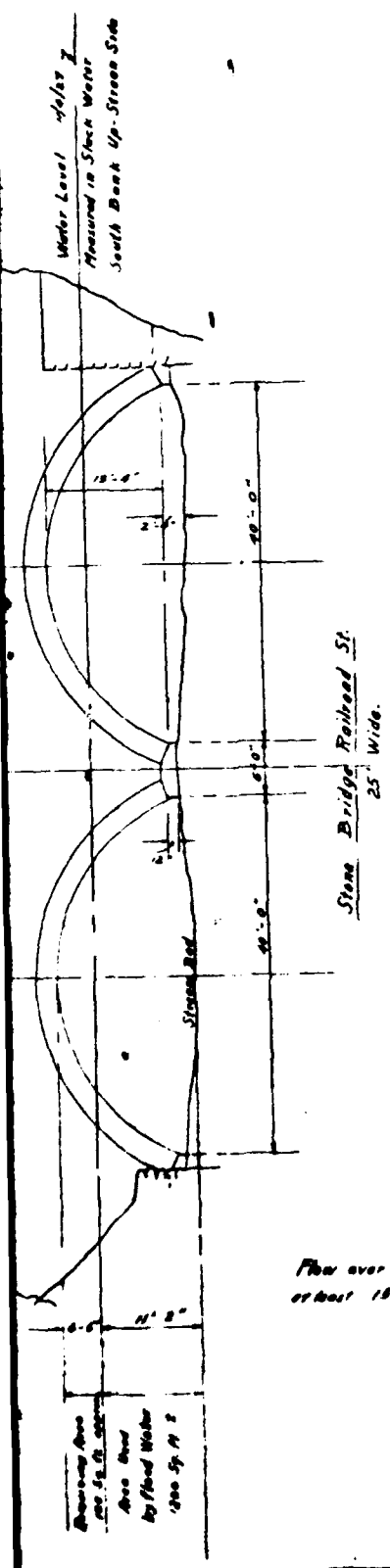
COPY OF FULL REPORT AS CONTAINED IN YEARLY REPORTS

OF COMMISSIONERS OF DAMS AND RESERVOIRS.

- 1883 - Upper dam built of stone and appearing in good condition and safe. A long trench conveys the water to the mills. 882-52 Total fall at Slatersville is 37 feet.
- 1889 - This dam has been constructed during the year embraced in this report. It is composed entirely of stone laid in cement, practically forming a monolith, the entire structure, both bulkhead and dam, resting upon, and abutting against, a ledge of solid rock. The rollway extends over the entire length of the dam, whose alignment of 170 feet, forms the arc of a circle whose radius is 237.82 feet, the chord 166.25 feet, and versed sine 15 feet. The structure is 35 feet wide at the base, and 28 feet high from foundation to crest of rollway, and the top of the dam at the abutments is 7 feet above the crest of the rollway. The two draw-off gates at the bulkhead are each 3x6 feet opening dimensions. Plates Nos. 173, 174 and 175 represent the form of structure. They are reduced from the working plans of J. W. Ellis, C. E. to whose charge the engineering of the work was confided. 1887 - P-139
- 1928 - A plan showing the flow of the stream at this privilege on the Branch River during the flood of November, 1927, was furnished this Department by the owners and is shown herewith. The company has a plan of their entire reservoir system which comprises some four dams and an effort is being made to secure a copy of it for office use as an aid toward studying the habits of the Branch River in the future. The four dams mentioned are structures of solid masonry of ample proportions with spillways the entire width of the river and the whole work is in excellent condition being constantly repaired and kept up when necessary. P-33

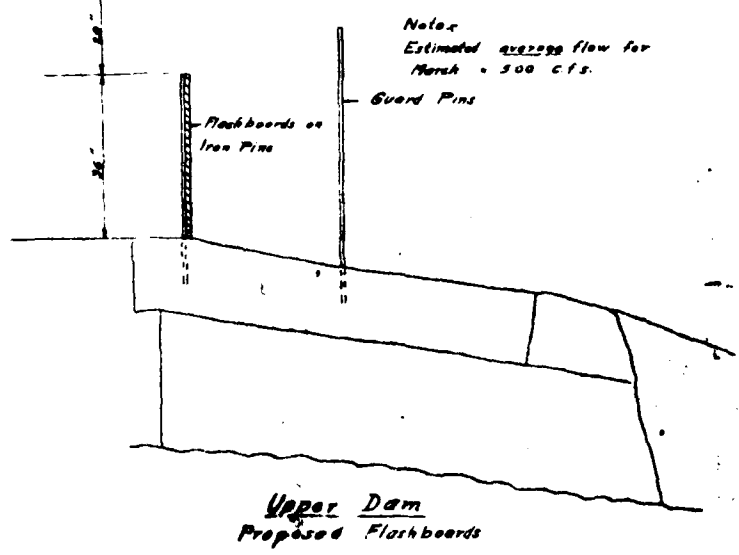


2



Note:-  
Boards were not in place  
at time of Flood 11/6/27

30" Above Board - 2000 cfs Probable Usual Spring Flow  
24" Above Board - 1800 cfs  
Flood Level - 11/6/27 (No Boards) Limit on Lower Dams.



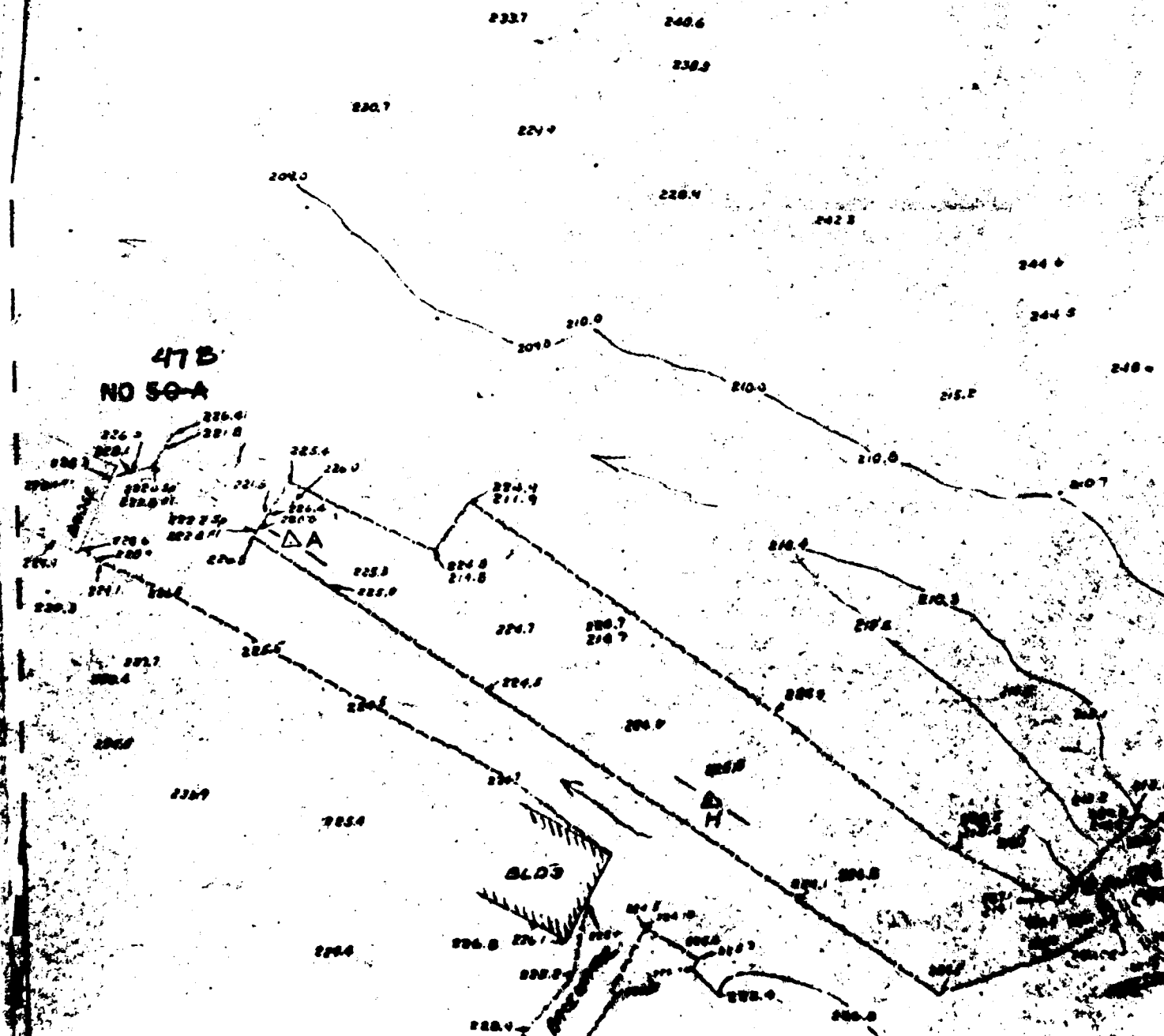
Note:  
Estimated average flow for  
March - 500 cfs.

Flow = 400 + 40 + 47 (400)

SLATERSVILLE FINISHING CO.  
NOV. 8, 1927.

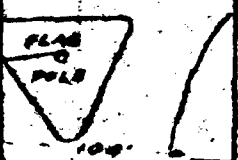
B-14

DAM No. 43-47



BM 90  
ELEV 269.87

SLIVERSVILLE

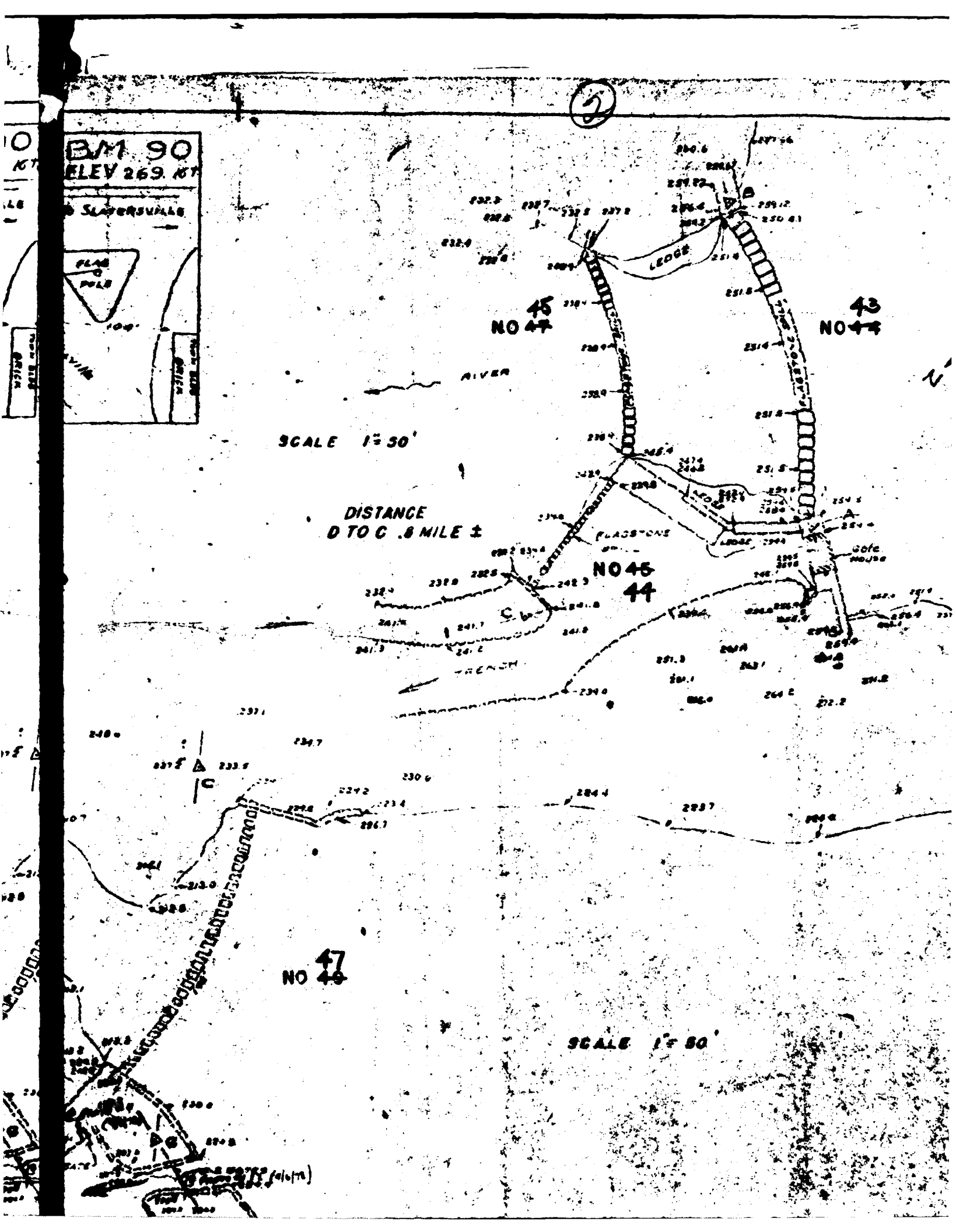


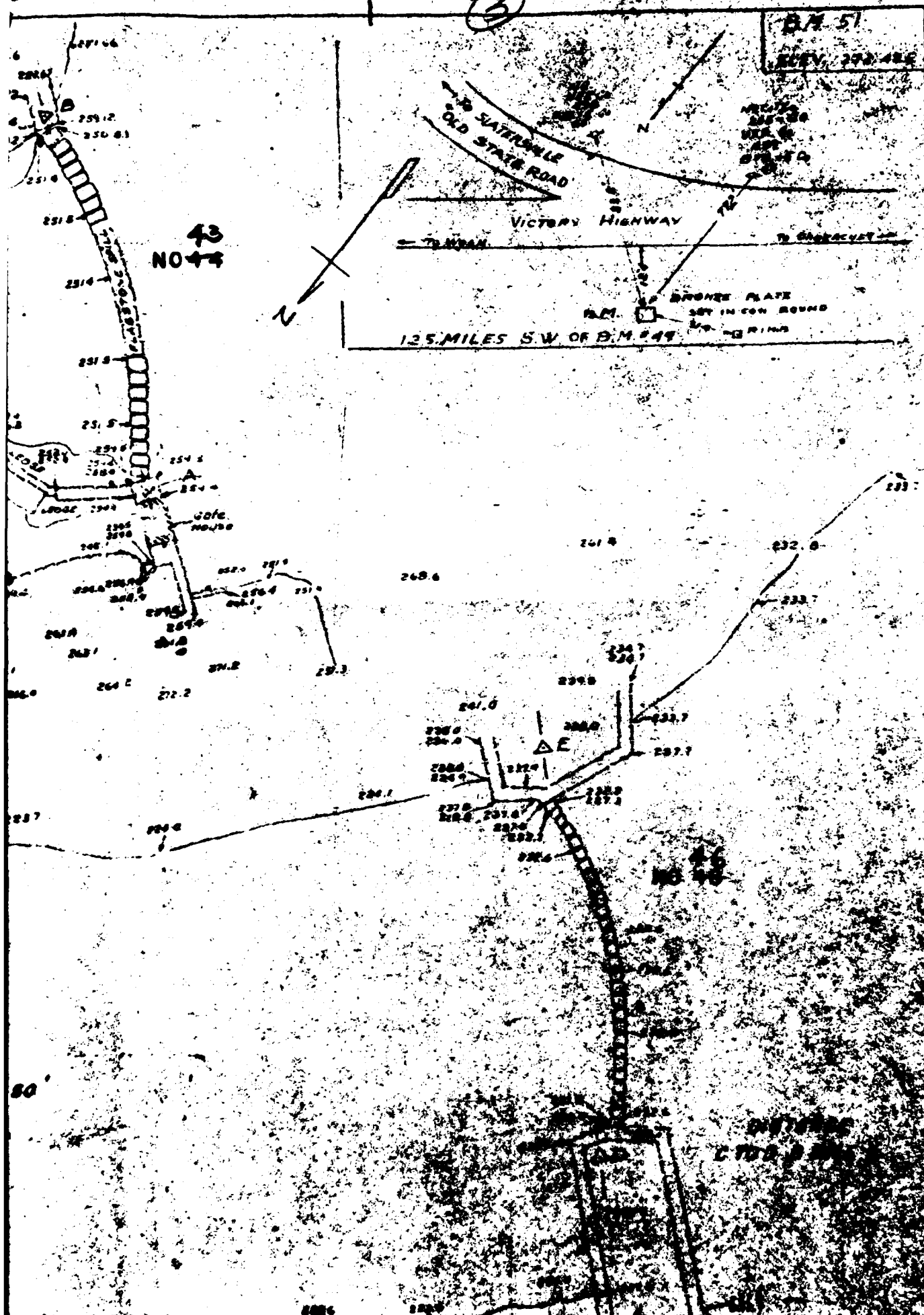
FLAG  
POLE

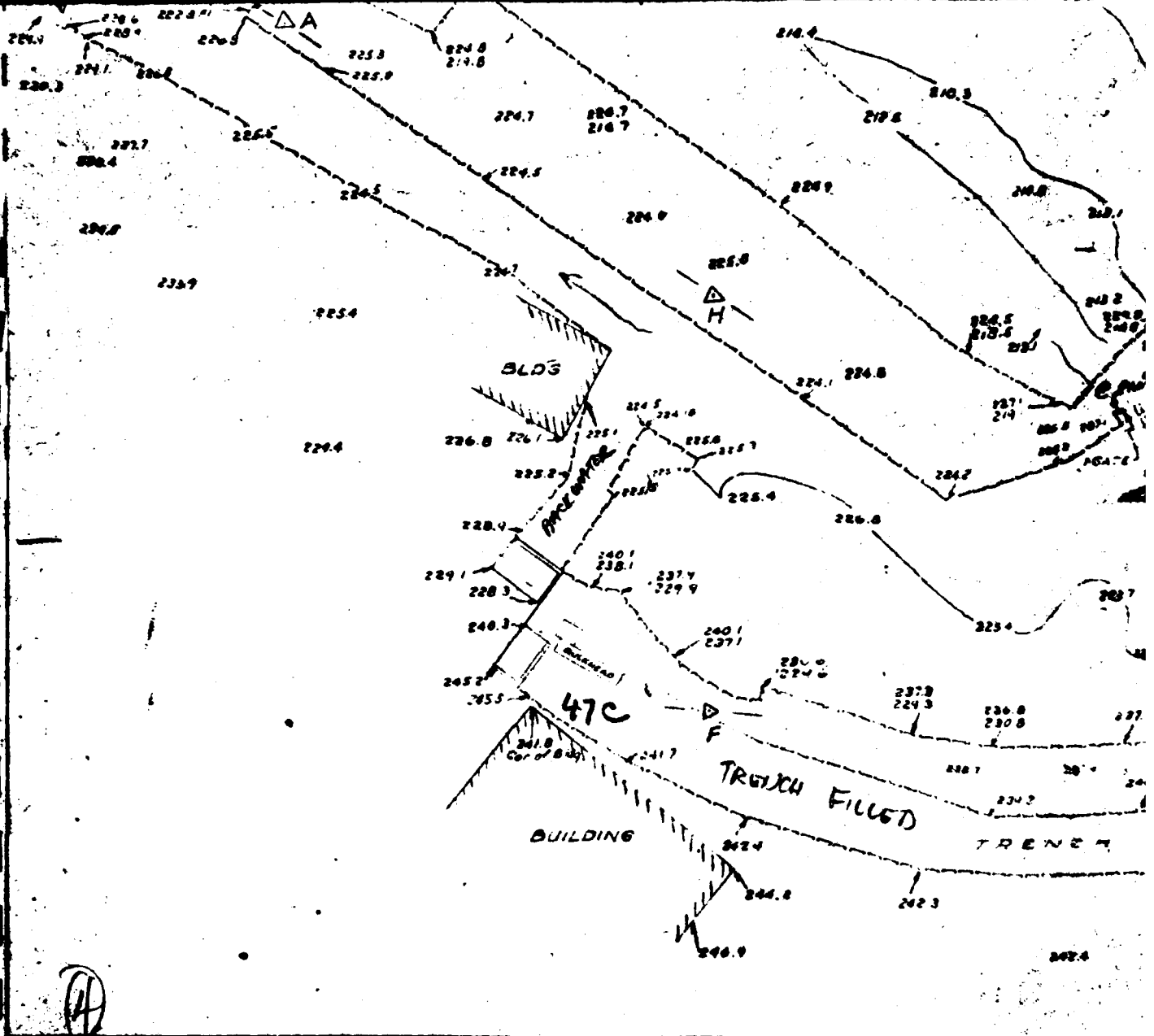
SCALE 1" = 30'

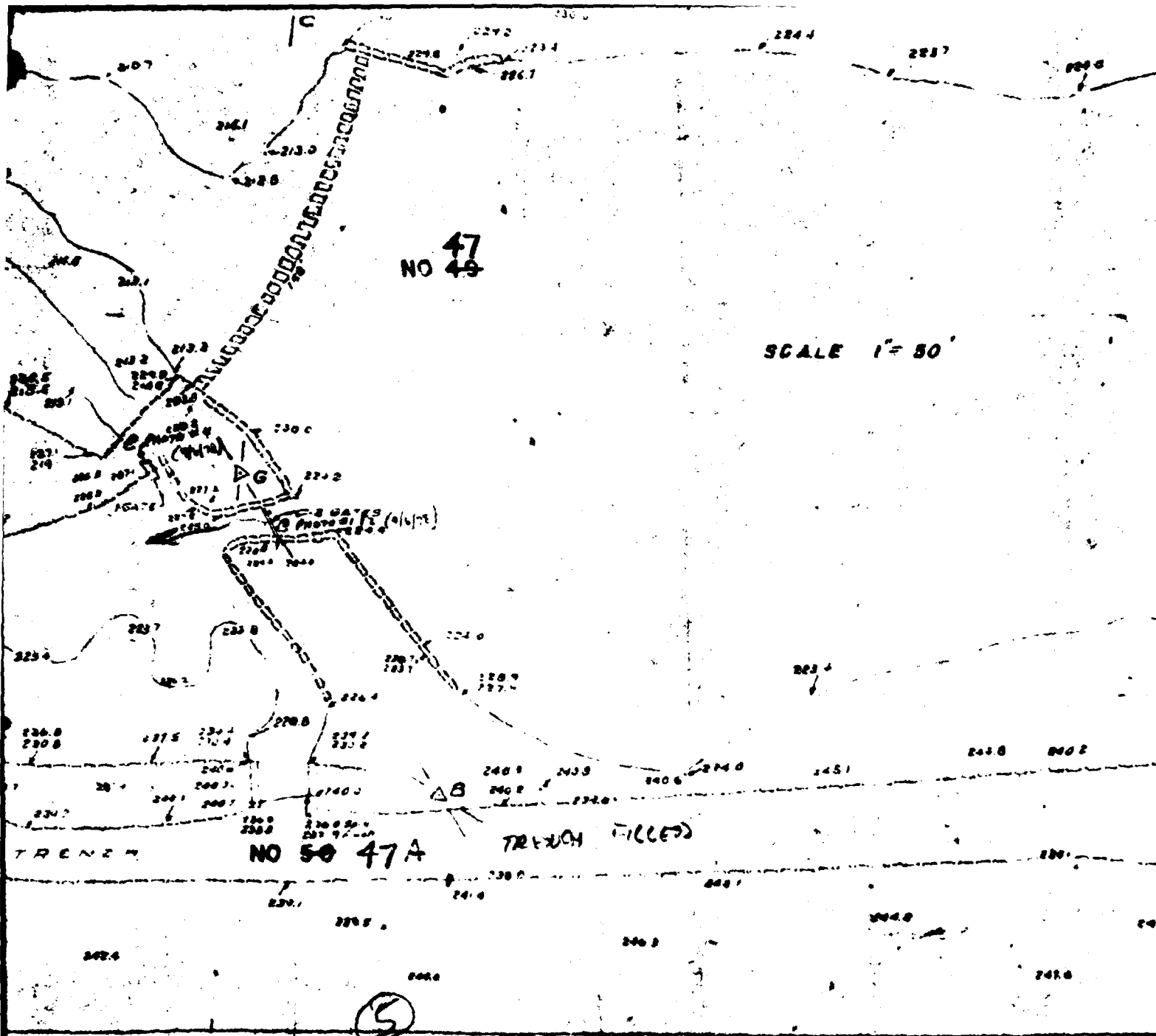
DISTANCE  
D TO C .8 MILE ±

SCALE 1" = 50'

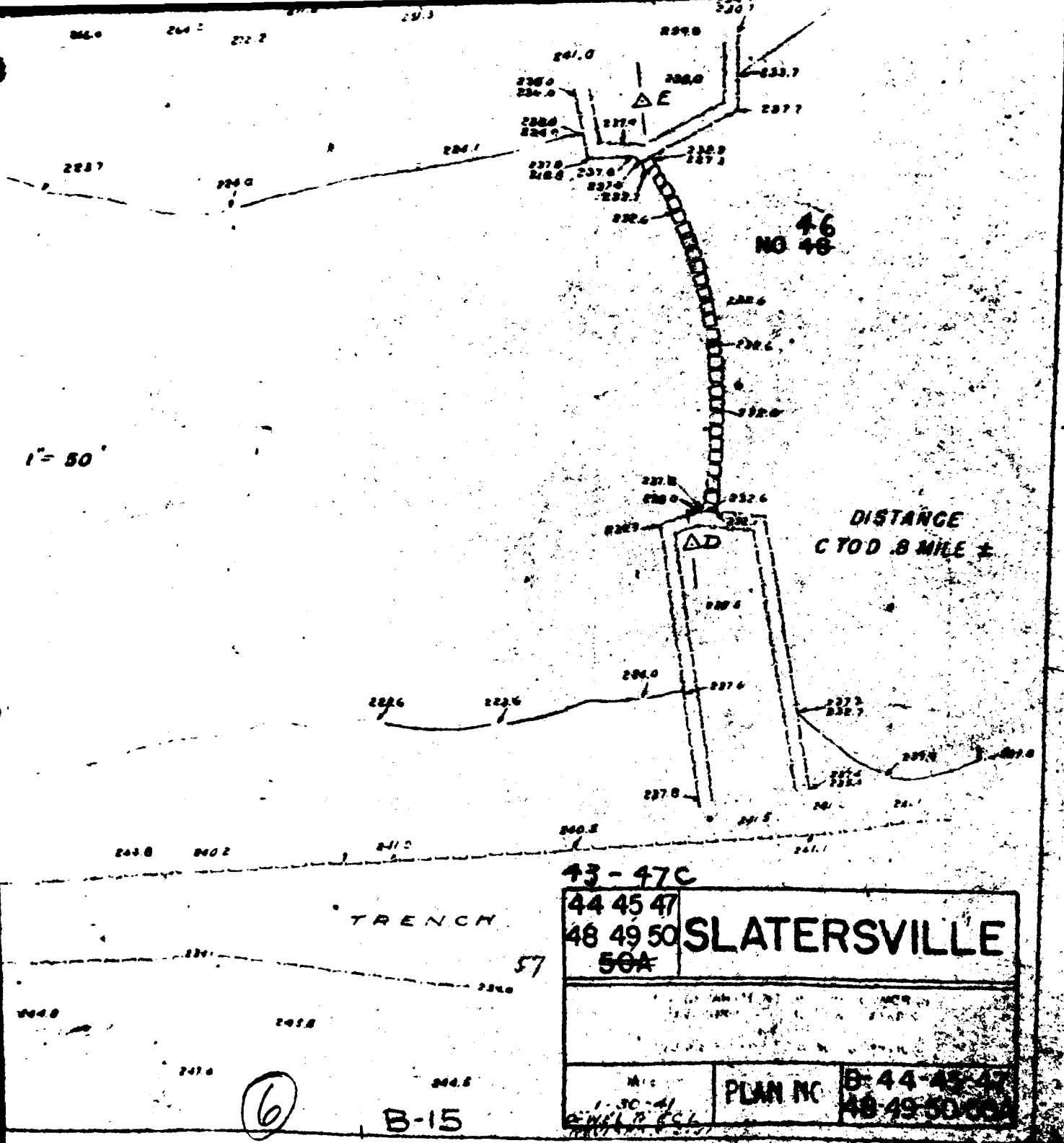






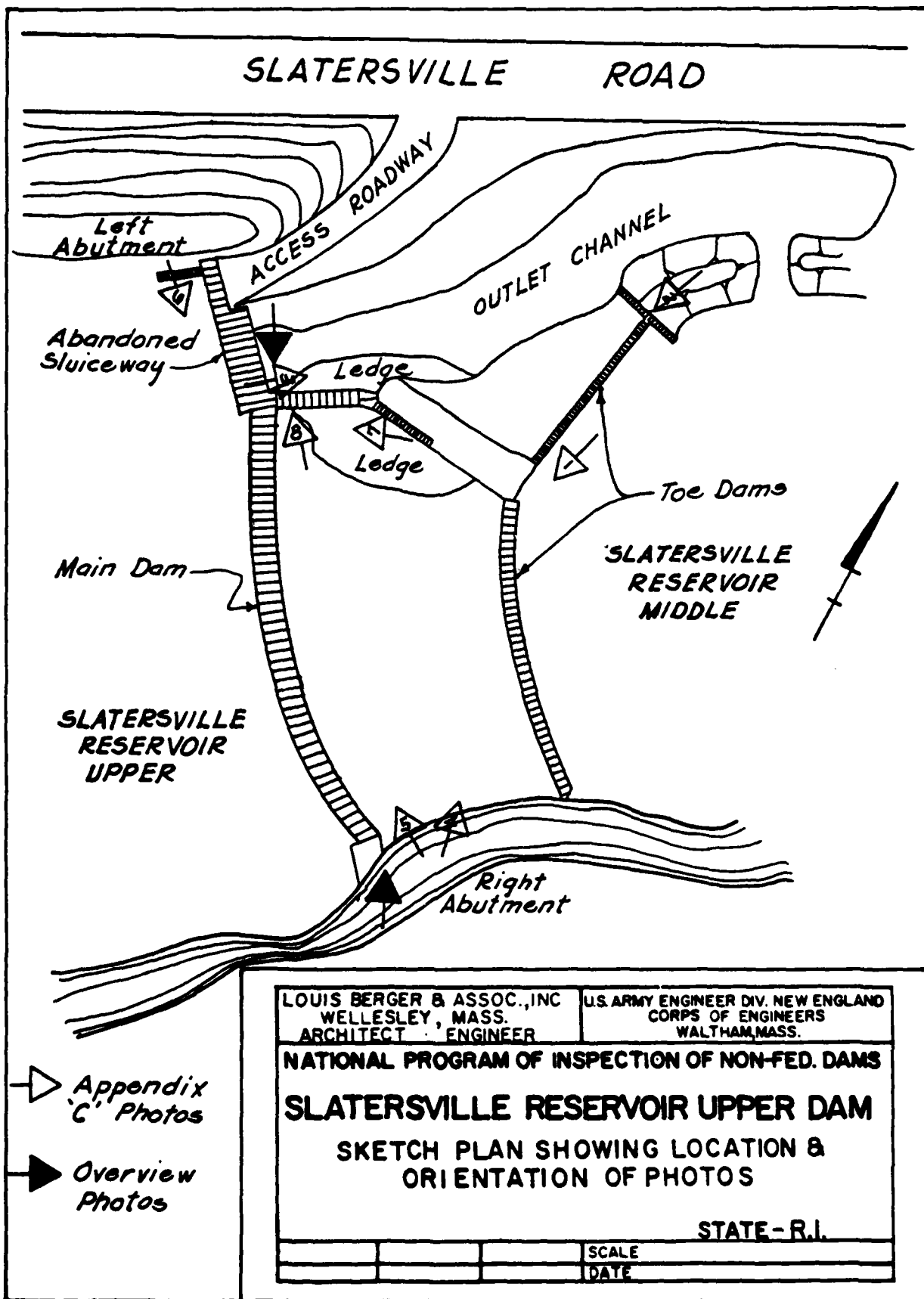


1" = 50'



APPENDIX C  
PHOTOGRAPHS





SLATERSVILLE RESERVOIR UPPER DAM



1. View of right toe dam foreground and main dam background.



2. Crest of canal overflow weir and rubble divider wall.

SLATERSVILLE RESERVOIR UPPER DAM



3. Upstream slope of left  
toe dam and outlet channel.



4. Downstream face of toe dams.

SLATERSVILLE RESERVOIR UPPER DAM



5. Downstream face of main dam.

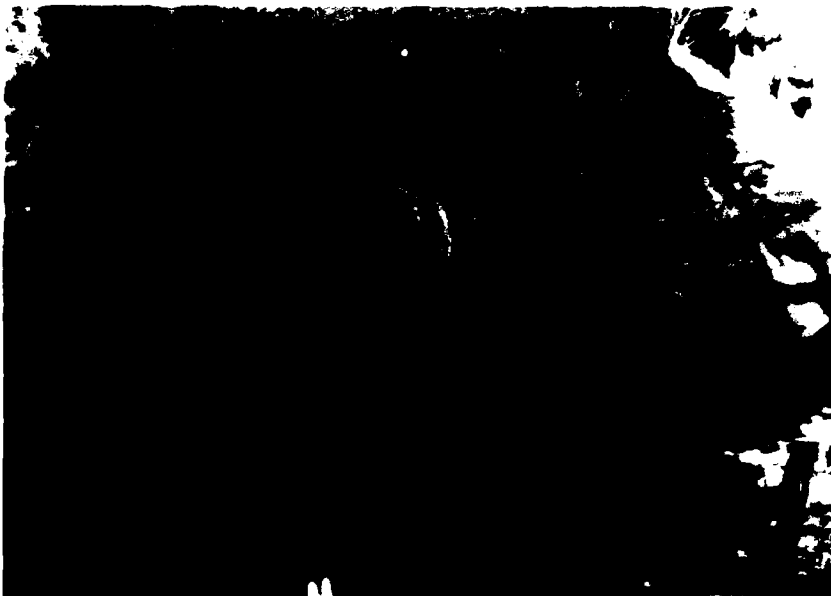


6. Abandoned sluiceway operating mechanisms

SLATERSVILLE RESERVOIR UPPER DAM



7. Detail, joint of dam, foundation and north abutment.



8. Growth, downstream side of gate structure.

APPENDIX D  
HYDROLOGIC AND HYDRAULIC COMPUTATIONS

BY RFB DATE 8-13-79

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. 3 OF 7

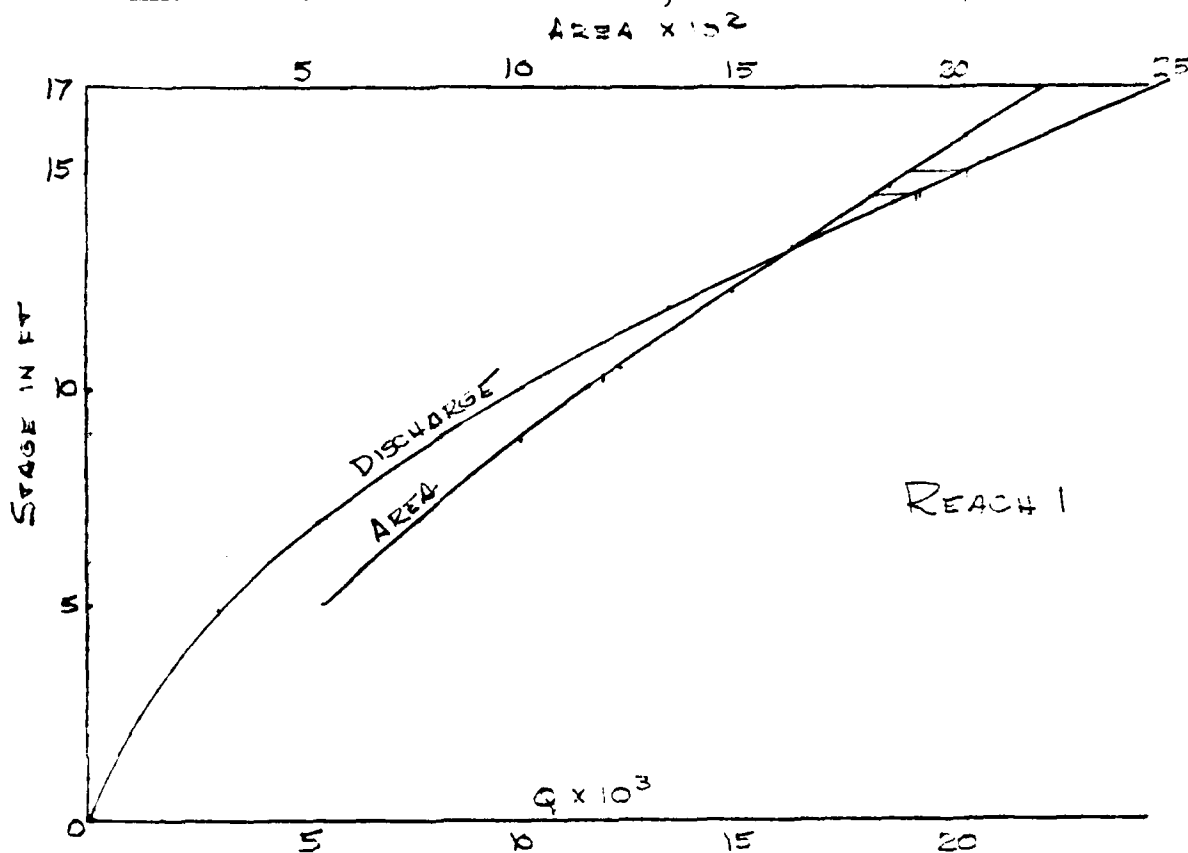
CHKD. BY DATE

INSPECTION OF DAMS

PROJECT

SUBJECT

SLATERVILLE UPPER DAM, FAILURE ANALYSIS



STA 46+00 TO STA 78+00

L = 2300

ESTIMATE REACH OUTFLOW FOR REACH 2

FROM MIDDLE DAM TO POND JUST ABOVE 449+19 STATION

$$Q_{P1} = 20230$$

$$\text{STAGE} = 15 \text{ FT} \quad \text{AREA} = 1000 \quad V = 100.3$$

ADD VOLUME BETWEEN DAM & PROVIDENCE PLE

$$\Delta V = \frac{1000 \times 15 \times 2300}{43,560} = 103.3$$

$$V_1 = 100.3 + 103.3 = 203.6 \text{ ACRE-FT}$$

$$Q_{P2}(\text{TRIAL}) = 20230 \left( 1 - \frac{203.6}{3640} \right) = 20230 ( - 0.56 )$$

$$Q_{P2}(\text{TRIAL}) = 19,097 \text{ CFS}$$

D-14

BY RFB DATE 8-10-79 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. 2 OF 7  
 CHKD. BY DATE INSPECTION OF DAM PROJECT SLATERVILLE UPPER DAM, FAILURE ANALYSIS  
 SUBJECT SLATERVILLE UPPER DAM, FAILURE ANALYSIS

$$Q_{P2}(\text{TRIAL}) = 23,200 \left(1 - \frac{530}{3640}\right) = 23,200 (1 - 0.146)$$

$$Q_{P2}(\text{TRIAL}) = 19813 \quad \text{SURCHARGE HEIGHT} = 242.7$$

$$V_2 = 1400 \quad \Delta V_2 = 1400 - 1000 = 400 \text{ ACROSS}$$

$$\Delta V_{AVE} = \frac{400 + 530}{2} = 465$$

$$Q_{P2} = 23,200 \left(1 - \frac{465}{3640}\right) = 23,200 (1 - .128)$$

$$Q_{P2} = 20230 \text{ CFS} \quad \text{SURCHARGE HEIGHT} = 242.55$$

$$\text{FOR SPILLWAY } Q = 240.6$$

$$\Delta H = 242.55 - 240.6 = 1.95' \text{ OR } 2 \text{ FT}$$

SECTION BELOW PROVIDENCE PIKE

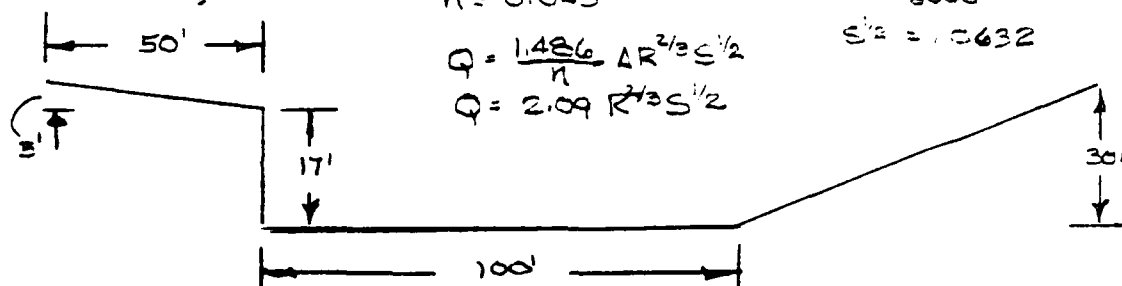
$$n = 0.045$$

$$S = \frac{512 - 180}{8000} = .001$$

$$Q = \frac{1.486}{n} AR^{2/3} S^{1/2}$$

$$S^{1/2} = .00632$$

$$Q = 2.09 R^{2/3} S^{1/2}$$



DEPTH	Δ AREA	Σ AREA	WP	R	R <sup>2/3</sup>	Q
5	542	542	122.4	4.43	2.70	3059
10	625	1167	144.8	2.06	4.02	9505
15	709	1876	167.2	11.22	5.02	19652
17	306	2182	176.2	12.38	5.36	24144
20	330	2712	216.7	12.51	5.29	30550



BY RFB DATE 8-10-79 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. 1 OF 7  
CHKD. BY DATE INSPECTION OF DAMS PROJECT SLATERSVILLE UPPER DAM, FAILURE ANALYSIS  
SUBJECT SLATERSVILLE UPPER DAM, FAILURE ANALYSIS

STEP 1: RESERVOIR STORAGE AT FAILURE = 3640  
ASSUME WATER AT TOP OF DAM  
 $S = 3640$  ACRE-FT

$$H = 359.5 - 332.4 = 27.1 \text{ SAY } 27 \text{ FT}$$
$$W = 40\% \text{ OF } 170 = 68 \text{ FT}$$

STEP 2: PEAK FAILURE OUTFLOW

$$Q_{PI} = 0.27 N \sqrt{g} Y_0^{3/2}$$

$$Q_{PI} = 1.68 (68) (27)^{3/2}$$

$$Q_{PI} = 16,027$$

ADD SPILLWAY FLOW:

$$Q_{SPILLWAY} = \frac{102}{170} (11,925) = 7,155$$

$$Q_{PI, \text{TOTAL}} = 16,027 + 7,155 = 23,182$$

$$\text{Say } Q_{PI} = 23,200 \text{ CFS}$$

SECTION BETWEEN UPPER DAM & MIDDLE DAM

FOR 23,200 CFS FROM MIDDLE DAM REPORT  
SURCHARGE HEIGHT = 243.4  
 $V_I = 1530$

FOR 11,925 CFS FROM MIDDLE DAM REPORT  
SURCHARGE HEIGHT = 240.6  
 $V_{II} = 1000$

$$\Delta V_I = 1530 - 1000 = 530 \text{ ACRE-FT}$$

BY RFB DATE 8-10-79 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. 3 OF 7  
 CHKD. BY DATE INSPECTION OF DAMS PROJECT SLATERSVILLE UPPER DAM, RESERVOIR ROUT.  
 SUBJECT SLATERSVILLE UPPER DAM, RESERVOIR ROUT.

TRY  $\frac{1}{2}$  PMF :  $\frac{1}{2}$  PMF = 18,500 CFS

STEP 1  $Q_{P1} = 18,500$  CFS

STEP 2 a. SURCHARGE HEIGHT = 261.9

b. VOLUME OF SURCHARGE = 2275

$$STOR_1 = \frac{2235 \text{ ACRE-FT}}{54385 \text{ ACRES}} \times 12 \text{ IN/FT} = 0.50$$

$$\begin{aligned} c \quad Q_{P2} &= Q_{P1} \times \left(1 - \frac{STOR_1}{9.5}\right) \\ &= 18,500 \left(1 - \frac{0.50}{9.5}\right) = 18,500 (1 - 0.053) \\ &= 17,520 \text{ CFS} \end{aligned}$$

STEP 3

a. SURCHARGE HT, ( $Q_{P2}$ ) = 261.5

b. VOLUME OF SURCHARGE = 2185

$$STOR_2 = \frac{2185 \text{ ACRE-FT}}{54385} \times 12 \text{ IN/FT} = 0.48 \text{ INCHS}$$

Ave STORAGE = 0.49 INCHS

$$\frac{0.49 \text{ IN} \times 54385}{12 \text{ IN/FT}} = 2220 \text{ ACRE-FT}$$

ELEV @ 2220 ACRE-FT = 261.6

@ 261.6  $Q_{P3} = 18,000$  CFS

SPILLWAY INADEQUATE TO PASS  $\frac{1}{2}$  PMF

OVERTOPPING BY  $261.6 - 259.5 = 2.1 \text{ FT}$

BY RFB DATE 8-10-79

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. 2 OF 7

CHKD. BY DATE

INSPECTION OF DAMS

PROJECT

SUBJECT SLATERSVILLE UPPER DAM, RESERVOIR ROUTING

TRY PMF FIRST: PMF = 37,000 CFS

STEP 1  $Q_{p1} = 37,000$  CFS

STEP 2 a. SURCHARGE HEIGHT = 266.60

b. VOLUME OF SURCHARGE = 3785

$$STOR_1 = \frac{3785 \text{ ACRE-FT}}{54385 \text{ ACRES}} \times 12 \text{ IN/FT} = 0.84 \text{ INCHES}$$

$$\begin{aligned} c. Q_{p2} &= Q_{p1} \times \left(1 - \frac{STOR_1}{19}\right) \\ &= 37,000 \left(1 - \frac{0.84}{19}\right) = 37,000 (1 - .044) \\ &= 35,372 \text{ CFS} \end{aligned}$$

STEP 3

a. SURCHARGE HT. ( $Q_{p2}$ ) = 266.25

b. VOLUME OF SURCHARGE = 3675

$$STOR_2 = \frac{3675 \text{ ACRE-FT}}{54385 \text{ ACRES}} \times 12 \text{ IN/FT} = 0.81 \text{ INCHES}$$

AVE. STORAGE = 0.825 INCHES

$$\frac{0.825 \text{ IN} \times 54385 \text{ ACRES}}{12 \text{ IN/FT}} = 3739 \text{ ACRE-FT}$$

ELEV @ 3739 ACRE-FT = 266.40

@ 266.40  $Q_{p3} = 35,200$  CFS

SPILLWAY INADEQUATE TO PASS PMF

OVERTOPPING BY  $266.40 - 259.5 = 6.9$  FT

D-10

BY RFB DATE 8-8-79 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. 1 OF 7  
CHKD. BY DATE INSPECTION OF DAMS PROJECT REER 210.2  
SUBJECT COMPUTATION OF PMF, SLATERSVILLE UPPER

FIND DRAINAGE AREA BETWEEN UPPER DAM & MIDDLE DAM

DRAINAGE AREA ABOVE MIDDLE DAM = 88.3 sq mi  
" " " " " = 615.44 sq mi USGS

PLANIMETER READING #2	53.23	#3	76.42	
"	"	#1	30.14	
			<u>23.09</u>	
		#2	<u>53.23</u>	AK=23.14
			23.19	

D.A. ABOVE UPPER DAM =  $615.44 - 23.19 = 592.25$

D.A. =  $\frac{592.25 \times 4,000,000}{43,560} = 54385 \text{ ACRES} = 84.98 \text{ sq mi}$

DRAINAGE AREA = 84.98 sq mi = 54385 ACRES

SIZE CLASSIFICATION = INTERMEDIATE

HAZARD CLASSIFICATION = SIGNIFICANT

INSPECTION FLOOD  $\frac{1}{2}$  PMF TO FULL PMF

CALCULATE PMF USING "PRELIMINARY GUIDANCE  
FOR ESTIMATING MAXIMUM PROBABLE DISCHARGE IN  
PHASE I DAM SAFETY INVESTIGATIONS, MARCH, 1978".

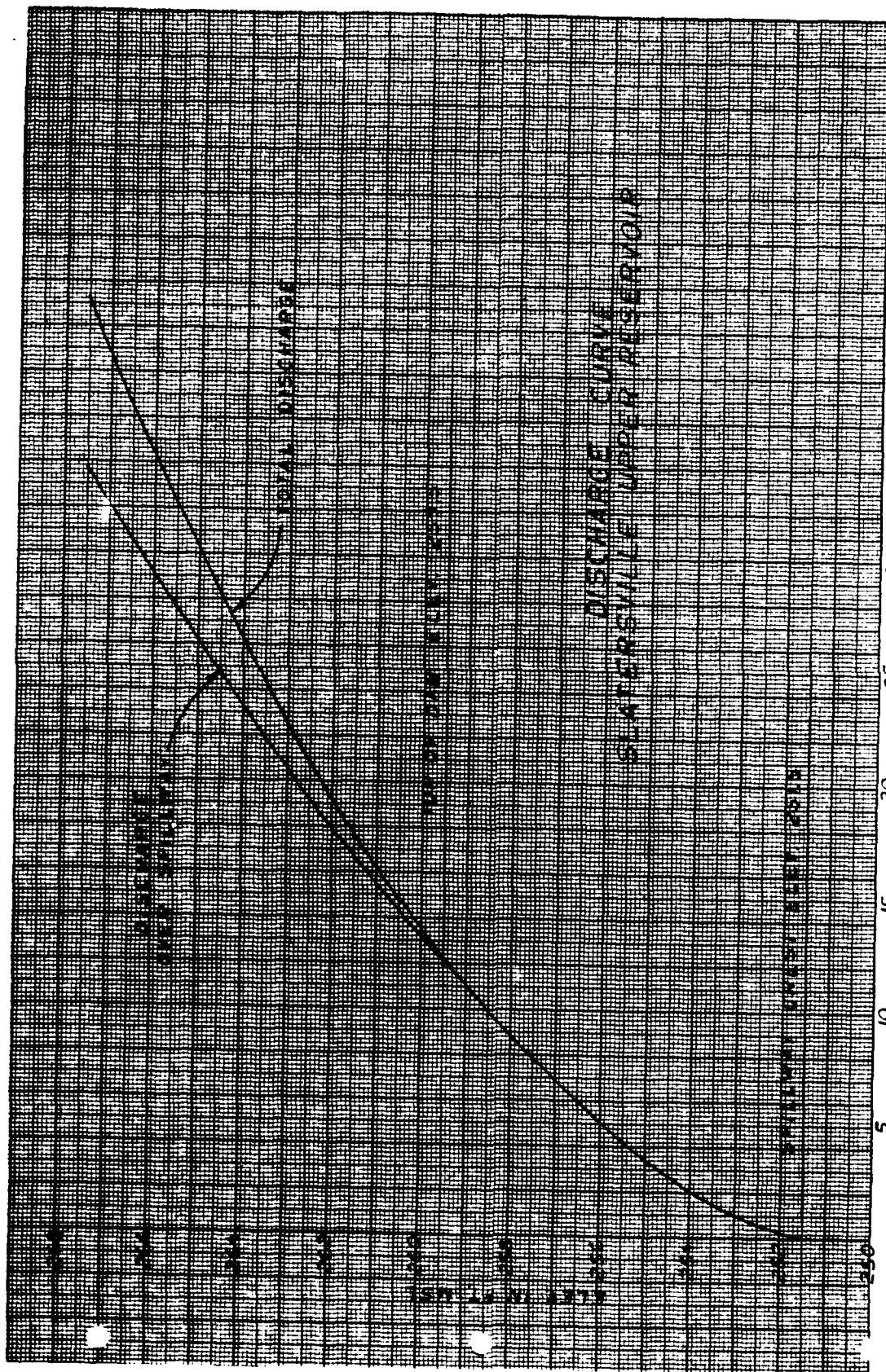
USE FLAT & COASTAL CURVE

@ 84.98 sq mi PMF IN CFS/MI<sup>2</sup> = 425

$84.98 \text{ sq mi} \times 425 \text{ CFS/sq mi} = 36,966$

Say PMF = 37,000 CFS

$\frac{1}{2}$  PMF = 18,500 CFS



K&E STANDARD • CONSTRUCTION  
IN 1910 TO THE HALF INCH

DISCHARGE IN CFS X 10<sup>3</sup>

40  
35  
30  
25  
20  
15  
10  
5

D-8

BY RFB DATE 8-10-79

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. 2 OF 7

CHKD. BY DATE

INSPECTION OF DAMS

PROJECT

SUBJECT SLATERSVILLE

UPPER DAM, SPILLWAY DISCHARGE

ELEV. FT	E, C=2.6			ΣQ
	L	H	Q	
252.5	0	0	0	527
253.5	0	0	0	1491
254.5	0	0	0	2738
255.5	0	0	0	4216
256.5	0	0	0	5892
257.5	0	0	0	7745
258.5	0	0	0	9760
259.5	0	0	0	11925
260.5	1.6	.4	1	14777
261.5	3.6	.9	8	17457
262.5	5.6	1.4	24	20775
263.5	7.6	1.9	52	24342
264.5	9.6	2.4	93	28196
265.5	11.6	2.9	149	32306
266.5	13.6	3.4	222	36666
267.5	15.6	3.9	313	41266

BY REB DATE 8-10-79

LOUIS BERGER & ASSOCIATES INC.

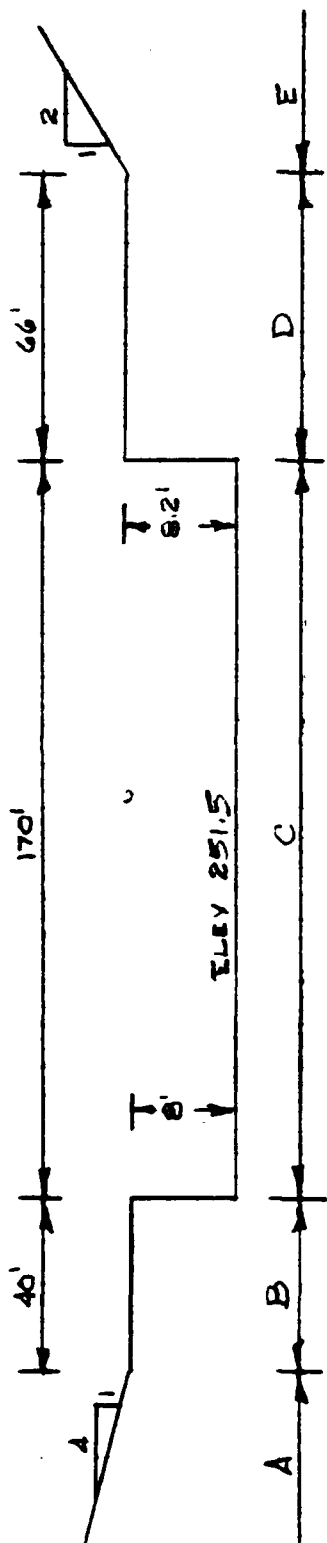
SHEET NO. 1 OF 1

CHKD. BY DATE

INSPECTION OF DAMS

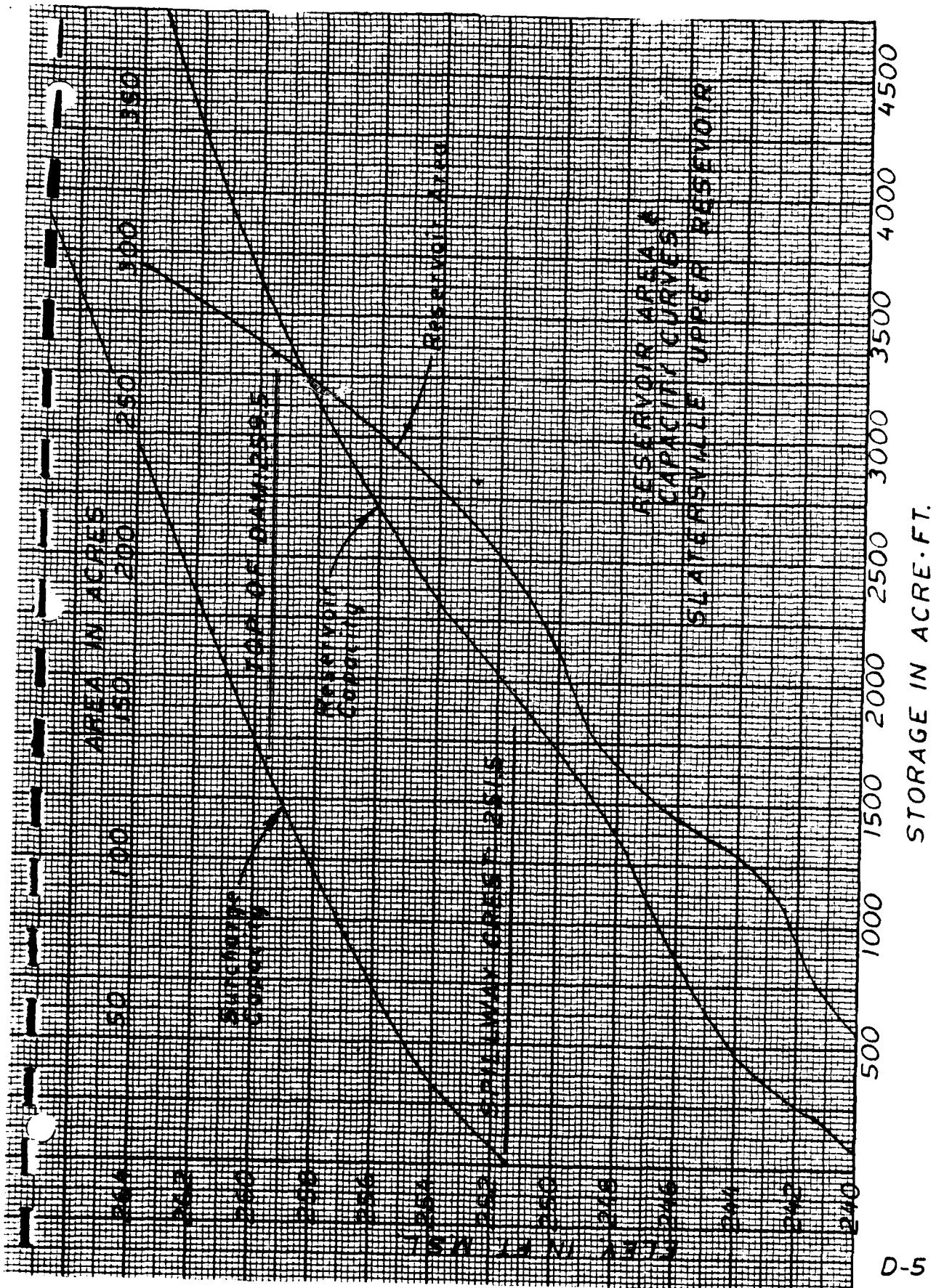
PROJECT

SUBJECT SLATERVILLE UPPER DAM, SPURWAY DISTRICT



ELEV FT	A, C=2.6			B, C=2.8			C, C=3.1			D, C=2.8		
	L	H	Q	L	H	Q	L	H	Q	L	H	Q
252.5	0	0	0	0	0	0	170	1	527	0	0	0
253.5	0	0	0	0	0	0	170	2	1491	0	0	0
254.5	0	0	0	0	0	0	170	3	2738	0	0	0
255.5	0	0	0	0	0	0	170	4	4216	0	0	0
256.5	0	0	0	0	0	0	170	5	5892	0	0	0
257.5	0	0	0	0	0	0	170	6	7745	0	0	0
258.5	0	0	0	0	0	0	170	7	9760	0	0	0
259.5	0	0	0	0	0	0	170	8	11925	0	0	0
260.5	4	0.5	4	40	1	112	170	9	14229	66	0.8	132
261.5	8	1	21	40	2	317	170	10	16665	66	1.8	446
262.5	12	1.5	57	40	3	582	170	11	19206	66	2.8	866
263.5	16	2	118	40	4	896	170	12	21907	66	3.8	1369
264.5	20	2.5	206	40	5	1252	170	13	24702	66	4.8	1943
265.5	24	3	324	40	6	1646	170	14	27606	66	5.8	2581
266.5	28	3.5	477	40	7	2075	170	15	30615	66	6.8	3277
267.5	32	4	666	40	8	2534	170	16	33728	66	7.8	4025

D-6





BY RFB DATE 8-9-79

LOUIS BERGER &amp; ASSOCIATES INC.

SHEET NO. 3 OF 7

CHKD. BY DATE

INSPECTION OF DAMS

PROJECT

SUBJECT VOLUME COMPUTATIONS, SLATESVILLE UPPER DAM

ELEV MSL	AREA AC	AVE AREA	HT FT	INC STOR AC FT	CUM STOR AC FT	SURCHARGE STOR AC-FT
226	0					
228	0.8	0.4	2	0.8	0.8	
231	4	2.4	3	7.2	8	
234	12	8	3	24	32	
237	21	16.5	3	49.5	82	
240	44	32.5	3	97.5	179	
242	74	59	2	118	297	
244	103	88.5	2	177	474	
246	115	109	2	418	892	
248	133	248	2	496	1388	
250	172	152.5	2	305	1693	
251.5	195	183.5	1.5	275	1968	
252	201	198	0.5	99	2067	99
254	223	212	2	214	2281	313
256	241	232	2	464	2745	777
258	257	249	2	498	3243	1275
259.5	268	262.5	1.5	394	3637	1669
260	271	269.5	0.5	135	3772	1804
262	284	277.5	2	555	4327	2359
264	296	290	2	580	4907	2939
266			2			

BY REB DATE 8-9-79

LOUIS BERGER &amp; ASSOCIATES INC.

SHEET NO. 2 OF 7

CHKD. BY \_\_\_\_\_ DATE \_\_\_\_\_

INSPECTION OF DAMS

PROJECT \_\_\_\_\_

SUBJECT RESERVOIR VOLUME COMPUTATIONS SUGARSVILLE UPPER

C ELEV 249	READ 3	89.84	READ 2	77.08	Ave	12.76
"	2	77.08	"	1	64.31	AREA = 145.21
		<u>12.76</u>			<u>12.77</u>	

---

FROM U.S.G.S. MAP, 1 sq in = 4,000,000 sq ft = 91.83 ACRES

C ELEV 249	READ 2	11.13	READ 3	12.69	Ave	1.56
"	1	9.58	"	2	11.13	AREA = 143.25
		<u>1.55</u>			<u>1.56</u>	

C ELEV 250	READ 2	14.56	READ 3	16.43	Ave	1.87
"	1	12.69	"	2	14.56	AREA = 171.72
		<u>1.87</u>			<u>1.87</u>	

C ELEV 260	READ 2	19.42	READ 3	22.34	Ave	2.95
"	1	16.45	"	2	19.42	AREA = 270.70
		<u>2.97</u>			<u>2.92</u>	

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BY REB DATE 8-8-79 LOUIS BERGER & ASSOCIATES INC. SHEET NO. 1 OF 1  
 CHECKED BY DATE INSPECTION OF DAMS PROJECT  
 SUBJECT RESERVOIR VOLUME COMPUTATIONS, SLATERSVILLE UPPER

# AREA COMPUTATIONS

SOURCE MAP, BELOW ELEVATION 249, FISH & GAME MAP  
 ABOVE " " U.S.G.S.

FROM FISH & GAME MAP: 1 SQ IN = 495,616 SQ FT = 11.38 ACRES

B ELEV 228	READ 2 63.17	READ 3 63.23	AVE .065
	" 1 <u>63.10</u>	" 2 <u>63.17</u>	AREA = 0.74 ACRES
	.07	.06	

C ELEV 231	READ 2 63.54	READ 3 63.82	AVE 0.31
	" 1 <u>63.20</u>	" 2 <u>63.54</u>	AREA = 3.53 A
	.34	.28	

C ELEV 234	READ 2 64.93	READ 3 65.96	AVE 1.06
	" 1 <u>63.85</u>	" 2 <u>64.93</u>	AREA = 12.06 A
	1.08	1.03	

C ELEV 237	READ 2 74.21	READ 3 76.07	AVE 1.83
	" 1 <u>72.41</u>	" 2 <u>74.21</u>	AREA 20.82
	1.80	1.86	

C ELEV 240	READ 2 06.49	READ 3 10.39	AVE 3.90
	" 1 <u>02.59</u>	" 2 <u>06.49</u>	AREA = 44.38
	3.90	3.90	

C ELEV 243	READ 2 23.34	READ 3 31.50	AVE 8.17
	" 1 <u>15.16</u>	" 2 <u>23.34</u>	AREA = 92.97
	8.18	8.16	

C ELEV 246	READ 2 41.56	READ 3 51.65	AVE 10.08
	" 1 <u>31.49</u>	" 2 <u>41.56</u>	AREA 114.7
	10.07	10.09	

# UPPER SLATERSVILLE RESERVOIR

DAM #43

147 ACRES

Town: North Smithfield

County: Providence

Physical Features: 147 acres

Maximum Depth: 23 feet

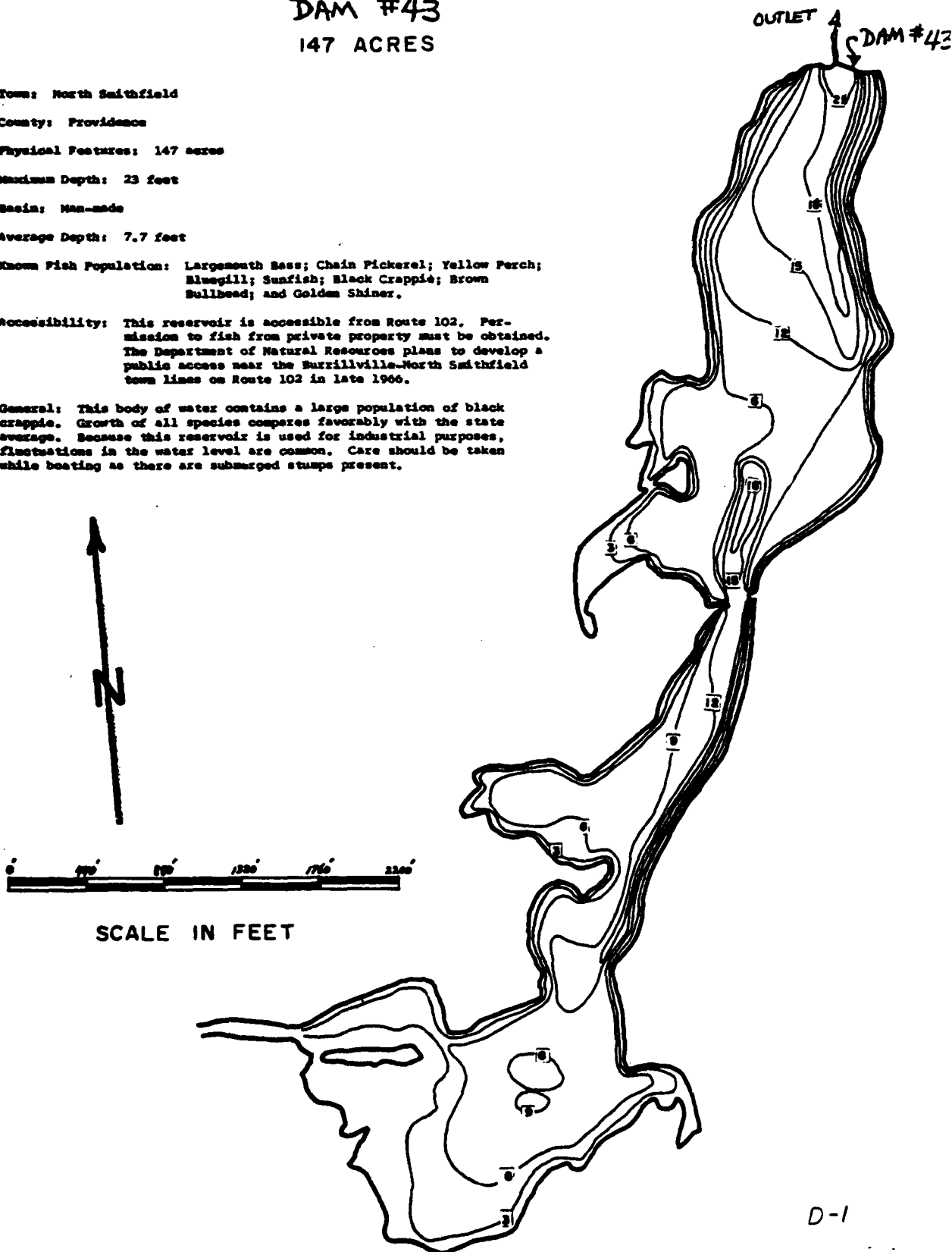
Basin: Man-made

Average Depth: 7.7 feet

Known Fish Population: Largemouth Bass; Chain Pickerel; Yellow Perch; Bluegill; Sunfish; Black Crappie; Brown Bullhead; and Golden Shiner.

Accessibility: This reservoir is accessible from Route 102. Permission to fish from private property must be obtained. The Department of Natural Resources plans to develop a public access near the Burrillville-North Smithfield town lines on Route 102 in late 1966.

General: This body of water contains a large population of black crappie. Growth of all species compares favorably with the state average. Because this reservoir is used for industrial purposes, fluctuations in the water level are common. Care should be taken while boating as there are submerged stumps present.



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BY RFB DATE 8-12-79 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. 4 OF     
 CHKD. BY    DATE    INSPECTION OF DAMS PROJECT     
 SUBJECT SLATESVILLE UPPER DAM, FAILURE ANALYSIS

STAGE = 14.5 AREA = 1810 VOL = 95.6

ADD VOLUME BETWEEN DAM & FIRST LOUPE PILE

$$\Delta V = \frac{1000 \times 14.5 \times 300}{43,560} = 99.9$$

$$V_2 = 95.6 + 99.9 = 195.5$$

$$Y_{AVE} = \frac{203.6 + 195.5}{2} = 199.6$$

$$Q_{P2} = 20230 \left(1 - \frac{199.6}{2640}\right) = 20230 (1 - .0755)$$

$$Q_{P2} = 19,177 \text{ CFS} \quad \text{STAGE} = 13.0$$

$$\Delta + \text{SPILLWAY } Q \text{ 11,925} \quad \text{STAGE} = 10.2$$

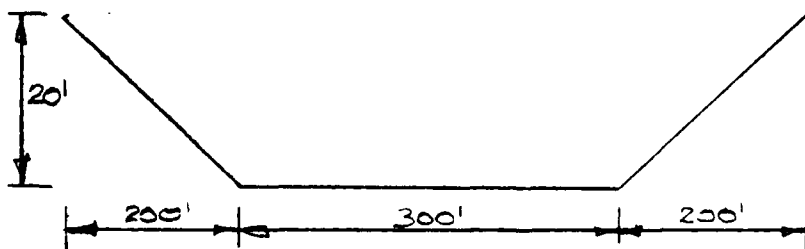
$$\Delta H = 5.3 \text{ FT}$$

REACH 2, STA 78+00 to 106+00, L = 2800 FT

$$S^{1/2} = .0632$$

$$n = 0.045$$

$$Q = 2.09 AR^{2/3}$$



DEPTH	Δ AREA	Σ AREA	P	R	R <sup>2/3</sup>	Q
2	620	620	240.2	1.82	1.49	1930
5	1130	1750	400.4	4.57	2.67	3765
8	1290	3040	460.8	6.60	3.52	22235
10	960	4000	501	11.98	5.24	43804

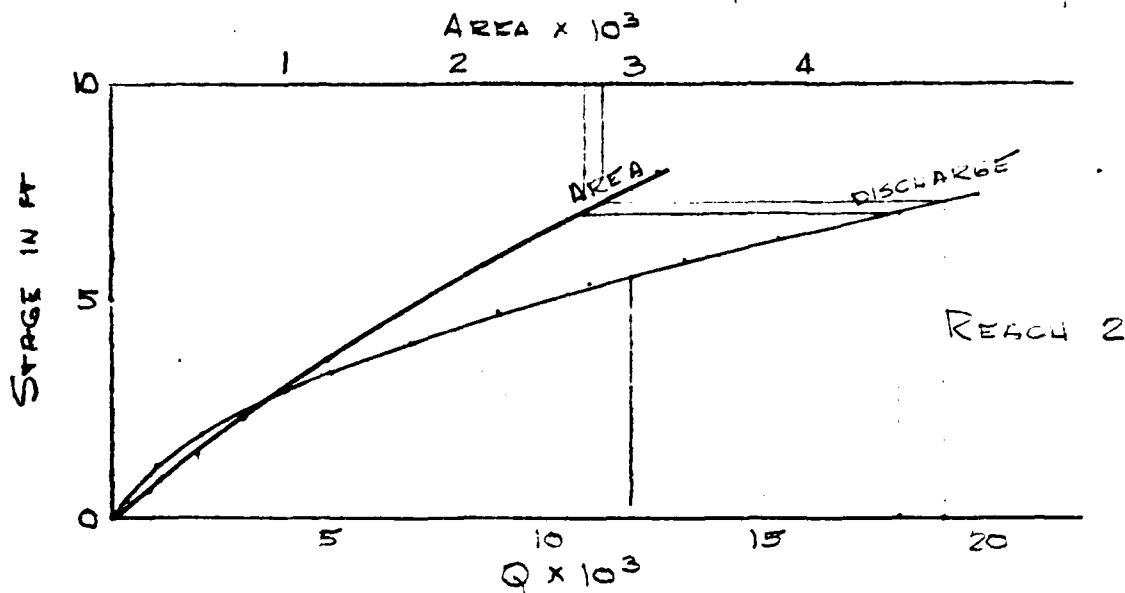
BY RFB DATE 8-13-79 **LOUIS BERGER & ASSOCIATES INC.**

SHEET NO. 5 OF 5

CHKD. BY DATE INSPECTION OF DAMS

PROJECT

SUBJECT SLATERSVILLE UPPER DAM, FAILURE ANALYSIS



$$Q_1 = 19,097$$

$$\text{STAGE} = 7.3 \quad \text{AREA} = 2830 \quad V_1 = 181.9$$

$$Q_{P2} (\text{TRIAL}) = 19097 \left(1 - \frac{181.9}{3640}\right) = 19097 (1 - .05)$$

$$Q_{P2}^{(T)} = 18,142$$

$$\text{STAGE} = 7.0 \quad \text{AREA} = 2710 \quad V_2 = 174.2$$

$$V_{\text{AVE}} = \frac{181.9 + 174.2}{2} = 178.05$$

$$Q_{P2} = 19097 \left(1 - \frac{178}{3640}\right) = 19097 (1 - .049)$$

$$Q_{P2} = 18,161$$

$$\text{STAGE} = 7.0 \text{ FT}$$

$$\text{AT SPILLWAY } Q = 11,925$$

$$\text{STAGE} = 5.6 \text{ FT}$$

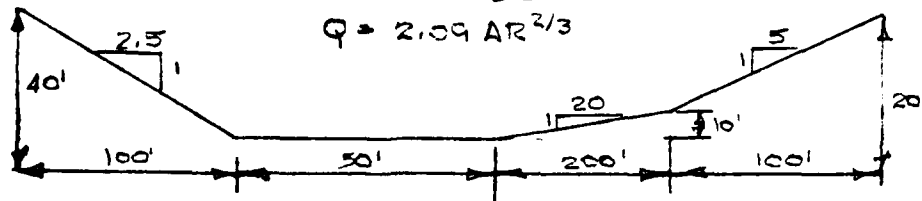
BY RFB DATE 8-13-79 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. 6 OF 6  
 CHKD. BY DATE INSPECTION OF DAM PROJECT SLATERSVILLE UPPER DAM FAILURE ANALYSIS  
 SUBJECT SLATERSVILLE UPPER DAM FAILURE ANALYSIS

STA STA 106+00 TO STA 122 REACH 3 L=1600'

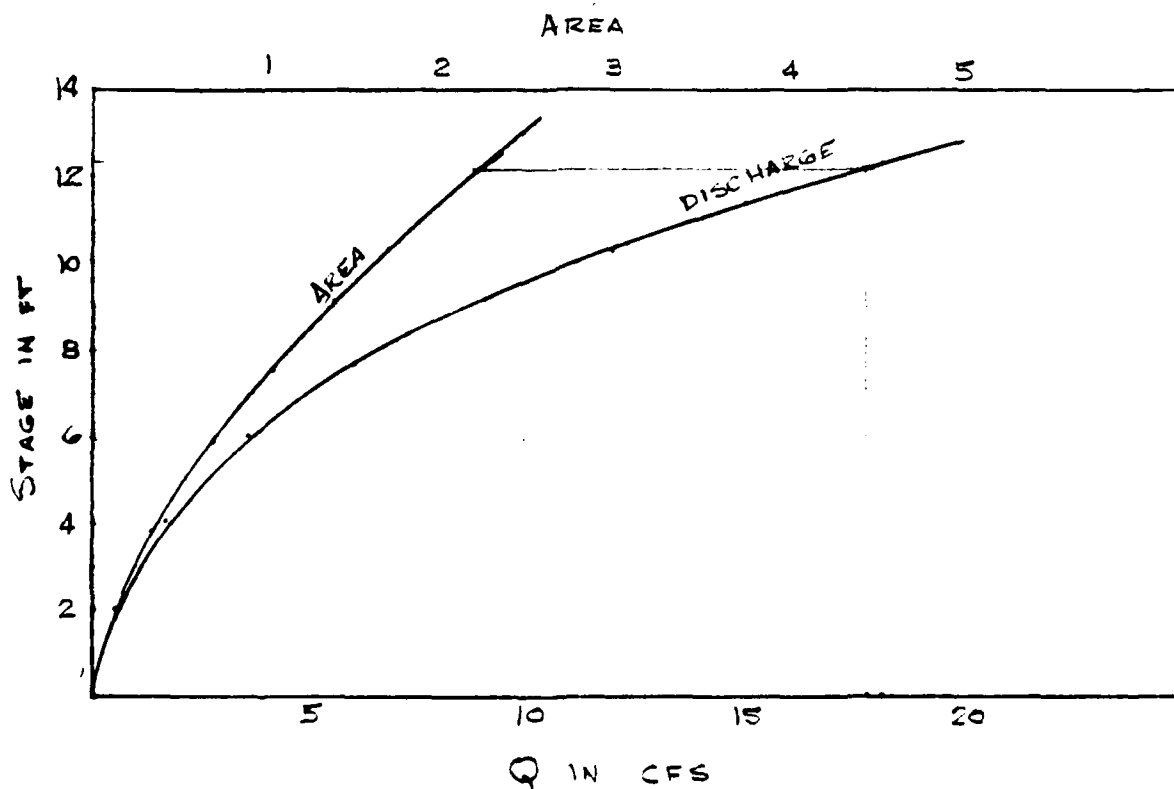
$$n = 0.045$$

$$S^{1/2} = 0.0632$$

$$Q = 2.09 AR^{2/3}$$



DEPTH	Δ AREA	Σ AREA	WP	R	$R^{2/3}$	Q
2	145	145	95.4	1.52	1.32	400
5	386	531	163.7	3.04	2.19	2430
8	589	1120	231.7	4.83	2.86	6694
10	505	1625	277.1	5.86	3.25	11038
12	565	2190	292.7	7.48	3.83	17530



D-17

BY RFB DATE 8-13-79 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. 7 OF       
 CHKD. BY      DATE      INSPECTION OF DAMS PROJECT       
 SUBJECT SLATERSVILLE UPPER DAM, FAILURE ANALYSIS

$$Q_1 = 18,161 \quad \text{STAGE} = 12.3 \quad \text{AREA} = 2100 \quad V_1 = 77.1$$

$$Q_{p2} (\text{TRIAL}) = 18161 \left(1 - \frac{77.1}{3640}\right) = 18161 (1 - .021)$$

$$Q_{p2} (\text{TRIAL}) = 17,780 \quad \text{STAGE} = 12.2$$

$$\text{AREA} = 2080 \quad V_2 = 76.4$$

$$\text{By INSPECTION } Q_{p2} = 18,161 \quad \text{STAGE} = 12.2$$

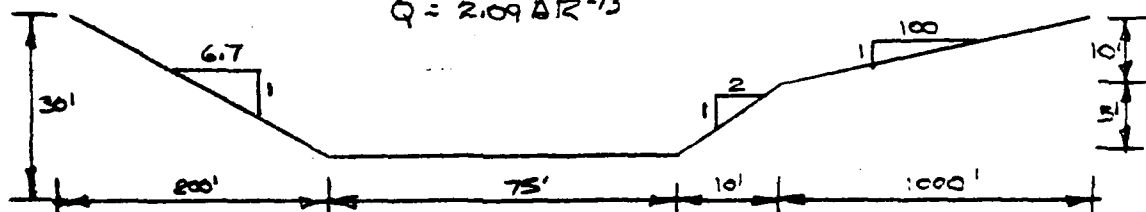
$$\text{At SPILLWAY } Q = 11,925 \quad \text{STAGE} = 10.3$$

Sta 122+00 to 132+00 REACH 4, L = 3000

$$n = 0.045$$

$$S' = 0.0632$$

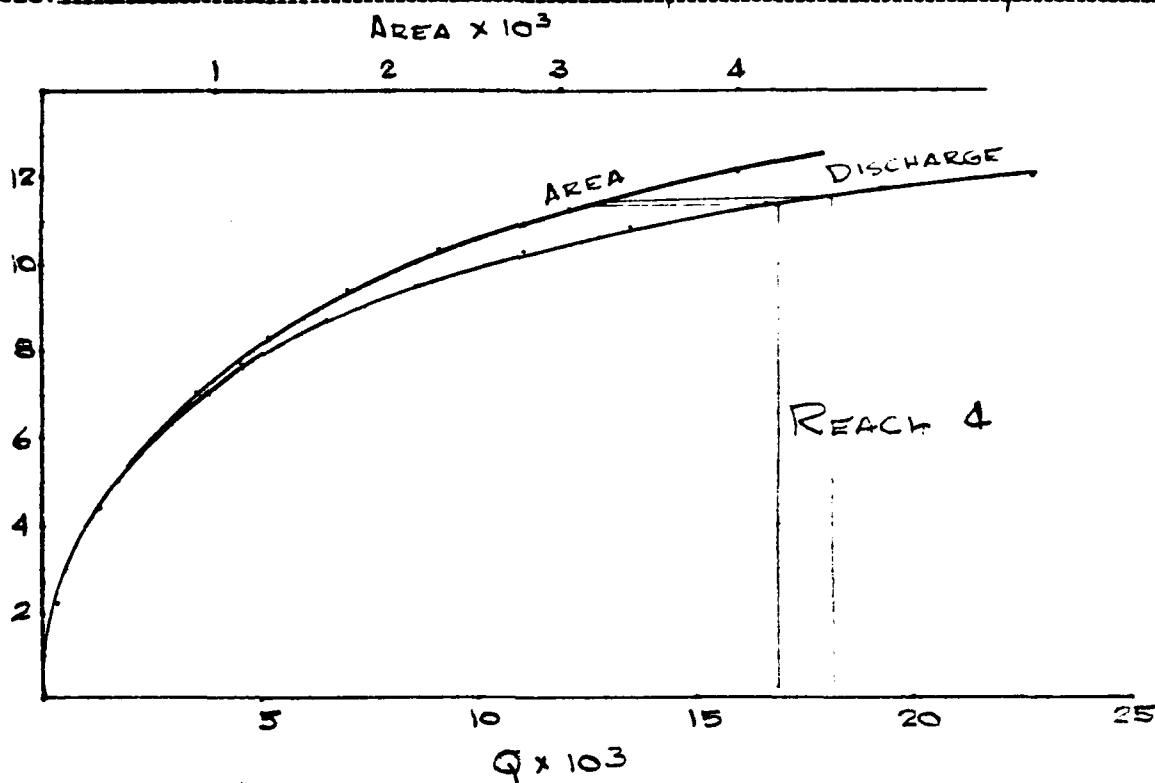
$$Q = 2.09 AR^{2/3}$$



DEPTH	Δ AREA	Σ AREA	WP	R	R <sup>2/3</sup>	Q
2	161	161	93	1.73	1.44	484
5	323	484	120	4.03	2.52	2560
7	425	909	324	2.72	1.95	3704
10	1233	2142	654	3.27	2.21	9893
12	1785	3927	867	4.53	2.74	22488



BY RFB DATE 8-13-79 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. 8 OF 7  
 CHKD. BY DATE INSPECTION OF DAM PROJECT SLATERSVILLE UPPER DAM, FAILURE ANALYSIS  
 SUBJECT SLATERSVILLE UPPER DAM, FAILURE ANALYSIS



$$Q_{P1} = 18,161, \text{ STAGE} = 11.6, \text{ AREA} = 3250, V_1 = 223.8$$

$$Q_{P2}(\text{TRIAL}) = 18,161 \left(1 - \frac{223.8}{3640}\right) = 18,161 (1 - 0.061)$$

$$Q_{P2}(\text{TRIAL}) = 17,053$$

$$\text{STAGE} = 11.4, \text{ AREA} = 3150, V_2 = 216.9$$

$$V_{\text{AVE}} = \frac{223.8 + 216.9}{2} = 220.4$$

$$Q_{P2} = 18,161 \left(1 - \frac{220.4}{3640}\right) = 18,161 (1 - 0.061)$$

$$Q_{P2} = 17,053$$

$$\text{STAGE} = 11.4$$

$$\text{AT SPILLWAY } Q = 11,925$$

$$\text{STAGE} = 10.4$$

BY RFB DATE 8-13-79

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. 9 OF 7

CHKD. BY DATE

INSPECTION OF DAMS

PROJECT

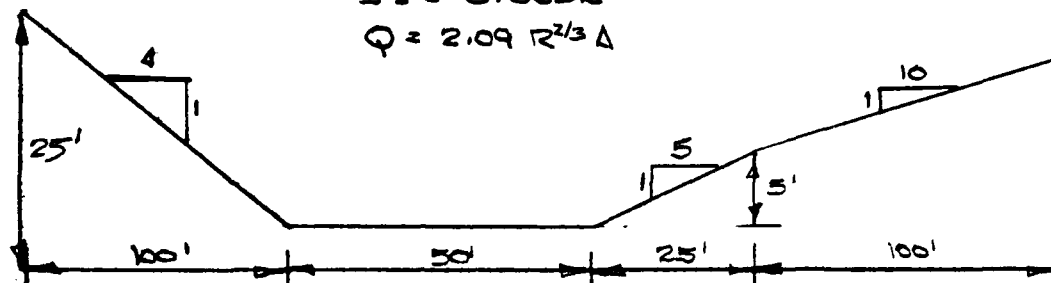
SUBJECT SLATERSVILLE UPPER RESERVOIR, FAILURE ANALYSIS

STA 152+00 TO STA 192+00 REACH 5  
L = 4000

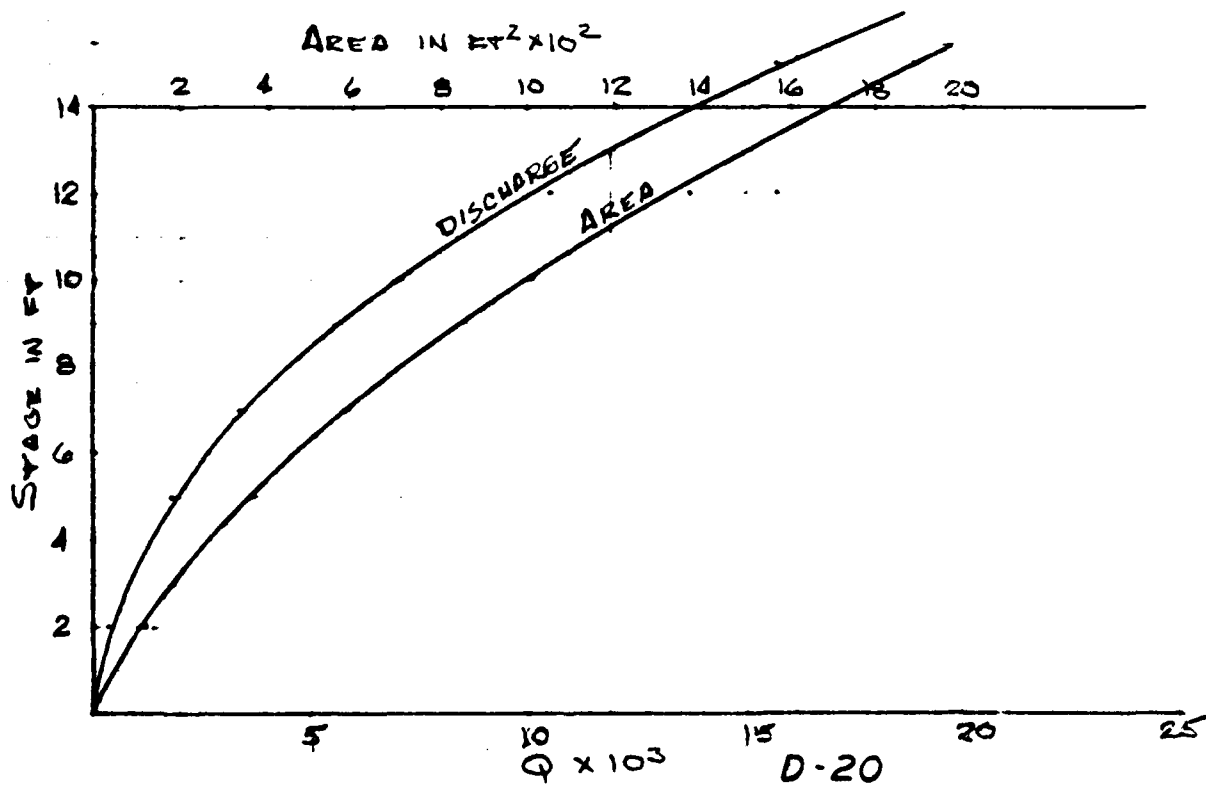
$$n = 0.045$$

$$S^{1/2} = 0.0632$$

$$Q = 2.09 R^{2/3} A$$



DEPTH	Δ AREA	AREA	W.P.	R	$R^{2/3}$	Q
2	118	118	68.4	1.73	1.44	355
5	244	362	96.1	3.77	2.42	1830
7	218	580	124.4	4.66	2.79	3252
10	432	1012	167.0	6.06	3.33	7043
12	358	1370	195.3	7.01	3.67	10508
15	518	1888	237.8	7.94	3.98	15715



BY RFB DATE 8-13-79

LOUIS BERGER &amp; ASSOCIATES INC.

SHEET NO. 10 OF 7CHKD. BY DATE

INSPECTION OF DAMS

PROJECT

SUBJECT SLATERSVILLE UPPER DAM, FAILURE ANALYSIS

$$Q_{P1} = 17053, \text{ STAGE} = 15.5, \text{ AREA} = 1970, V = 181$$

$$Q_{P2}(\text{TRIAL}) = 17053 \left(1 - \frac{181}{3640}\right) = 17053 (1 - .050)$$

$$Q_{P2}(\text{TRIAL}) = 16,200, \text{ STAGE} = 15.1 \text{ AREA} = 1910$$

$$V_2 = 175.4 \quad V_{\text{AVE}} = \frac{181 + 175}{2} = 178 \text{ ACRES-FT}$$

$$Q_{P2} = 17053 \left(1 - \frac{178}{3640}\right) = 17053 (1 - .049)$$

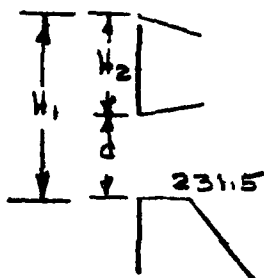
$$Q_{P2} = 16,217, \text{ STAGE} = 15.1 \text{ FT}$$

$$\text{AT SPILLWAY } Q = 11,925 \quad \text{STAGE} = 13.0$$

## SUMMARY

STA TO STA	FAILURE STAGE	SPILLWAY STAGE	$\Delta$ H
0 46+00	242.55	240.6	2
46+00 78+00	15.6	10.3	5.3
78+00 106+00	7.0	5.6	1.4
106+00 122+00	12.2	10.3	1.9
122+00 152+00	11.4	10.4	1.0
152+00 192+00	15.1	13.0	2.1

CHKD. BY \_\_\_\_\_ DATE \_\_\_\_\_ INSPECTION OF DAMS PROJECT \_\_\_\_\_  
 SUBJECT SLAYERSVILLE UPPER DAM - LOW LEVEL OUTLET FLOW



$$Q = \frac{2}{3} \sqrt{2g} CL (H_1^{3/2} - H_2^{3/2})$$

$$L = 3.5$$

$$\frac{2}{3} \sqrt{2g} L = 18.72$$

WHEN WATER LEVEL IS AT TEST FLOOD, ELEV 261.6

$$d = 6.0', H_1 = 261.6 - 231.5 = 30.1 \text{ FT}$$

$$H_2 = 30.1 - 6.0 = 24.1$$

$$\frac{d}{H_1} = \frac{6}{30.1} = 0.20 \text{ FROM D.S.D. pg 386 } C = .698$$

$$Q = 18.72 (.698) (30.1^{3/2} - 24.1^{3/2}) = 13.07 (165.1 - 118.3)$$

$$Q = 13.07 (46.8) = 612 \text{ CFS}$$

WHEN WATER IS AT TOP OF DAM, ELEV 259.5

$$d = 6.0 \text{ FT}, H_1 = 259.5 - 231.5 = 28 \text{ FT}$$

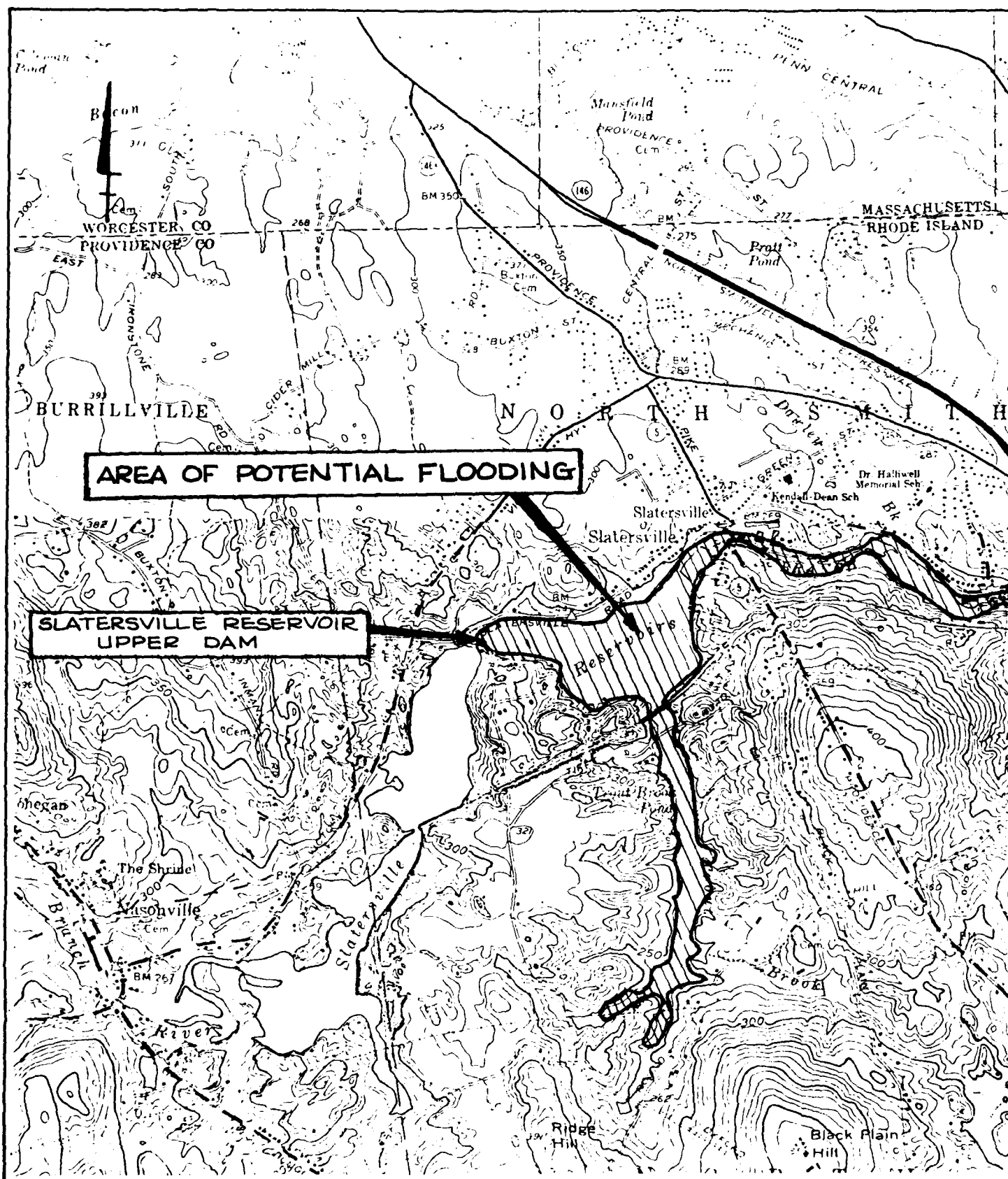
$$H_2 = 28 - 6 = 22'$$

$$\frac{d}{H_1} = \frac{6}{28} = 0.214 \text{ FROM D.S.D. pg 386 } C = .697$$

$$Q = 18.72 (.697) (28^{3/2} - 22^{3/2}) = 13.05 (148 - 103)$$

$$Q = 13.05 (45) = 587 \text{ CFS}$$

D-22







APPENDIX E

INFORMATION AS CONTAINED IN  
THE NATIONAL INVENTORY OF DAMS





## INVENTORY OF DAMS IN THE UNITED STATES

IDENTITY NUMBER	STATE	COUNTY	DIST.	CONTRACT	NAME	LATITUDE (NORTH)	LONGITUDE (WEST)	REPORT DATE
2503	MI	007	01		SLATERSVILLE RESERVOIR UPPER DAM	4159.6	7135.7	10MAY79

POPULAR NAME	NAME OF IMPOUNDMENT
	SLATERSVILLE RESERVOIR UPPER

FEED BASIN	RIVER OR STREAM	NEAREST DOWNSTREAM CITY - TOWN - VILLAGE	DIST. FROM DAM (MI.)	POPULATION
01 06	BRANCH RIVER	NORTH SMITHFIELD	0	9349

TYPE OF DAM	YEAR COMPLETED	PURPOSES	STAGE HYDRAULIC	IMPOUNDING CAPACITIES	1970
CHNEPG	1886	0	30 27	3640	1970

DIST OWN FED R  
PRV/VED SCB A VER/DATE  
NED . N' N N

REMARKS
22-ESTIMATED 23-INDUSTRIAL USE

D/S HAS	SPILLWAY	MAXIMUM DISCHARGE (FT.)	VOLUME OF DAM (CY)	POWER CAPACITY (KW)	PROPOSED NO.	NAVIGATION LOCKS
2	256 U	11925	9100			

OWNER	ENGINEERING BY	CONSTRUCTION BY
THE DUDLEY CORP.	J. M. ELLIS, C.E.	

DESIGN	CONSTRUCTION	OPERATION	MAINTENANCE
NONE	NONE	NONE	NONE

INSPECTION BY	INSPECTION DATE	AUTHORITY FOR INSPECTION
LOUIS BERGER & ASSOCIATES, INC.	10MAY79	PL92-367

REMARKS

END

DATE  
FILMED

9 - 85

DTIC