

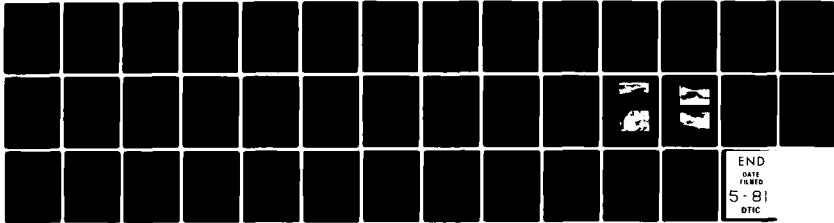
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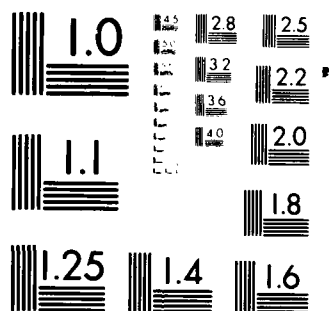
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**LEVEL**

ATLANTIC COAST BASIN  
WILLOW BROOK, MONMOUTH COUNTY  
NEW JERSEY

AD A 098 559

**N.J. NO NAME  
DAM NO. 52  
NJ 00806**

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



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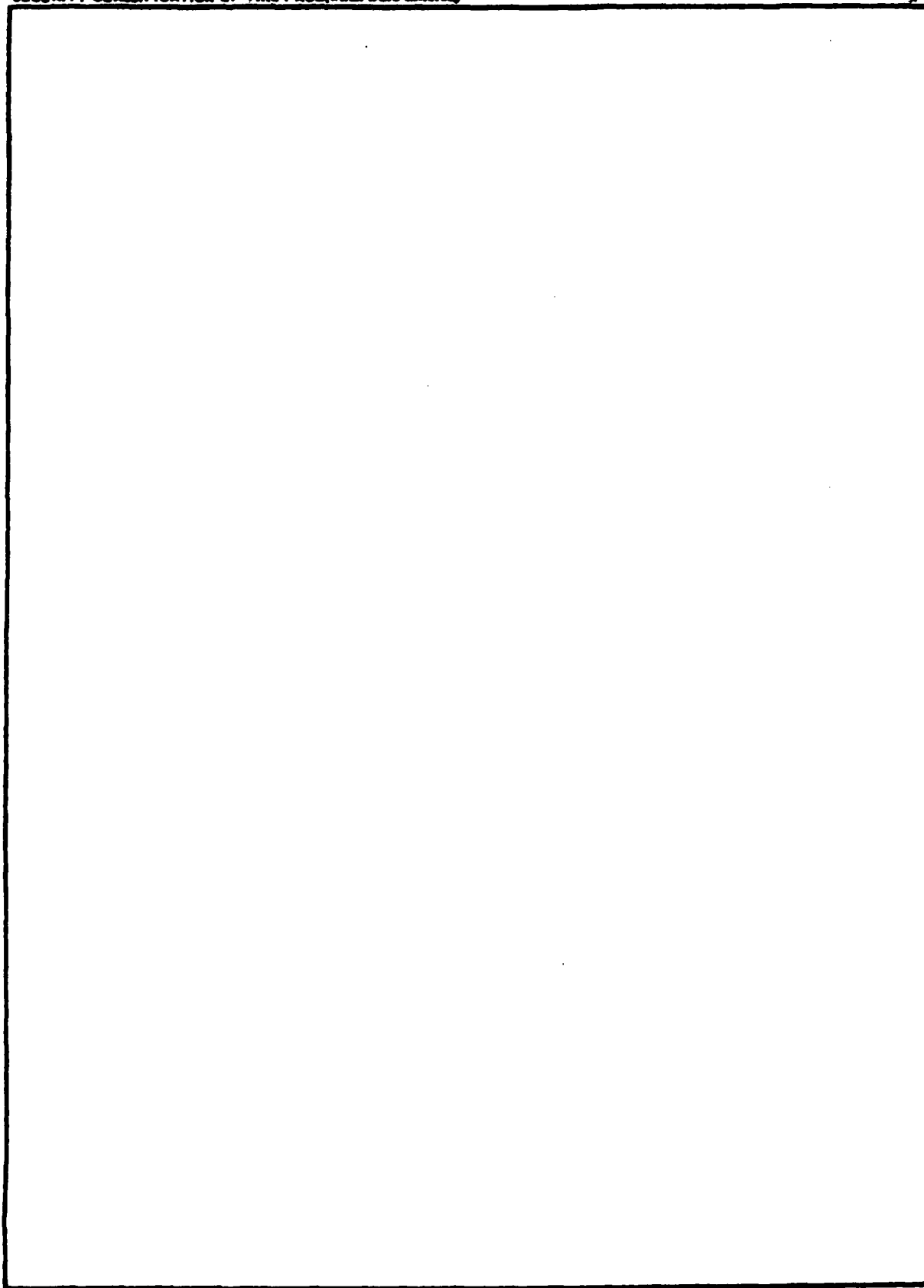
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| 1. REPORT NUMBER<br>18 DAEN/NAP-53842/NJ00806-81/03                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 2. GOVT ACCESSION NO.<br>AD-A098559                                                      | 3. RECIPIENT'S CATALOG NUMBER               |
| 4. TITLE (and Subtitle)<br>Phase I Inspection Report<br>National Dam Safety Program, New Jersey<br>N.J. No Name Dam No. 52 (NJ00806)<br>Monmouth County, N.J. Atlantic Coast                                                                                                                                                                                                                                                                                                                                                                                     | 5. TYPE OF REPORT & PERIOD COVERED<br>9 FINAL rept.                                      |                                             |
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| 19. KEY WORDS (Continue on reverse side if necessary and identify by block number)<br>Dams National Dam Safety Program<br>Embankments N.J. No Name Dam No. 52, N.J.<br>Visual Inspection Riprap<br>Structural Analysis Erosion                                                                                                                                                                                                                                                                                                                                   |                                                                                          |                                             |
| 20. ABSTRACT (Continue on reverse side if necessary and identify by block number)<br>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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DEPARTMENT OF THE ARMY  
PHILADELPHIA DISTRICT, CORPS OF ENGINEERS  
CUSTOM HOUSE-2 D & CHESTNUT STREETS  
PHILADELPHIA, PENNSYLVANIA 19106

IN REPLY REFER TO  
NAPEN-N

24 APR 1981

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

Dear Governor Byrne:

Inclosed is the Phase I Inspection Report for New Jersey No Name No. 52 Dam in Monmouth 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.

New Jersey No Name No. 52 Dam, initially listed as a high hazard potential structure but reduced to a low hazard potential structure as a result of this inspection, is judged to be in good overall condition. However, the spillway is considered inadequate, as 21 percent of the 100 year design flood would cause the dam to be overtopped. The low hazard potential classification means that in the event of failure of the dam, no loss of life and only minimal economic loss is expected. For the same reasons no further studies or increase of spillway capacity are recommended. However, to assure the continued functioning of the dam and its impoundment, the following remedial actions could be undertaken by the owner:

- a. Remove trees and brush on the downstream slope of the dam embankment.
- b. Clean the overflow inlet and the outlet pipe.
- c. Riprap the outlet end of the pipe to avoid erosion of the downstream channel at that point.
- d. Develop written operating procedures and a periodic maintenance plan to ensure the safety of the dam.

NAPEN-N

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 Howard of the Third 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 Inspection 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,



JAMES G. TON  
Colonel, Corps of Engineers  
District Engineer

1 Incl  
As stated

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

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

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A

NEW JERSEY NO NAME DAM NO. 52 (NJ00806)

CORPS OF ENGINEERS ASSESSMENT OF GENERAL CONDITIONS

This dam was inspected on 4 September 1980 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.

New Jersey No Name No. 52 Dam, initially listed as a high hazard potential structure but reduced to a low hazard potential structure as a result of this inspection, is judged to be in good overall condition. However, the spillway is considered inadequate, as 21 percent of the 100 year design flood would cause the dam to be overtopped. The low hazard potential classification means that in the event of failure of the dam, no loss of life and only minimal economic loss is expected. For the same reasons no further studies or increase of spillway capacity are recommended. However, to assure the continued functioning of the dam and its impoundment, the following remedial actions could be undertaken by the owner:

- a. Remove trees and brush on the downstream slope of the dam embankment.
- b. Clean the overflow inlet and the outlet pipe.
- c. Riprap the outlet end of the pipe to avoid erosion of the downstream channel at that point.
- d. Develop written operating procedures and a periodic maintenance plan to ensure the safety of the dam.

APPROVED:

*James G. Ton*  
JAMES G. TON

Colonel, Corps of Engineers  
District Engineer

DATE: 22 April 1981

PHASE I REPORT  
NATIONAL DAM INSPECTION PROGRAM

Name of Dam: N.J. No Name Dam No. 52 Fed ID # NJ 00806

|                    |                                   |
|--------------------|-----------------------------------|
| County Located     | <u>Monmouth County</u>            |
| Coordinates        | <u>Lat. 4021.3 - Long. 7411.4</u> |
| Stream             | <u>Willow Brook</u>               |
| Date of Inspection | <u>4 September 1980</u>           |

ASSESSMENT OF  
GENERAL CONDITIONS

No Name Dam No. 52 is assessed to be in good overall condition, and it is recommended that the dam be downgraded to a low hazard classification. Although the dam has an overflow inlet capable of passing only 20 percent of the 100-year design flood and no engineering data are available relative to the design and construction of the dam, it poses no danger of loss of life or property damage. In that the dam has not overtopped in the 20 years of its existence and there has been no damage of any kind downstream, no special recommendations are made other than that trees and brush on the downstream slope of the dam embankment should be selectively removed and the overflow inlet and outlet pipe should be thoroughly cleaned in order to insure the continued safety and good functioning of the dam and its impoundment.

  
Abraham Perera P.E.  
Project Manager



OVERVIEW OF N.J. NO NAME DAM No. 52  
AUGUST, 1980

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Rept. NO. DAEN/NAP - 53842/ NJ 00806 - 81/03

## 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 Investigations is to identify expeditiously those dams that may pose hazards to human life or property. The assessment of the general condition of the dam is based on 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 the review of 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 and on 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 will 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 aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition, and the potential for downstream damage.

PHASE I INSPECTION REPORT  
NATIONAL DAM INSPECTION PROGRAM  
NAME OF DAM: No Name Dam No. 52 FED I.D. #NJ 00806

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 Corps of Engineers, 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 N.J. No Name Dam No. 52 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

No Name Dam No. 52 is a 30-year-old earth dam without a spillway. No Name Dam No. 52 is an earth embankment across a tributary to Willow Brook. The dam is 166 feet long, 12 feet wide at top, and approximately 16 feet high. There is no spillway, and the only appurtenant structure consists of an overflow-type inlet and a 16-inch-diameter outflow pipe. The dam impounds a small reservoir serving to provide irrigation water for the adjacent croplands.

b. Location

N.J. No Name Dam No. 52 is located approximately 250 feet east of New Jersey Route 34 and 0.8 miles north of the intersection of Route 34 and Willow Brook in Holmdel Township, Monmouth County, New Jersey. It impounds a tributary stream to Willow Brook.

c. Size Classification

The maximum height of the dam is approximately 16 feet and the the maximum storage is estimated to be 61.4 acre-feet. Therefore, the dam is placed in the small size category as defined by the Recommended Guidelines for Safety Inspection of Dams (storage less than 1,000 acre-feet and height less than 40 feet).

d. Hazard Classification

The dam impounds a reservoir whose total drainage watershed is only 0.13 square miles. The overtopping or collapse of the dam would have little effect on the downstream property and no danger to human life. A 48-inch diameter concrete pipe culvert, located under Route 34 approximately 250 feet downstream from the dam, would serve to block the flow temporarily in case of the collapse of the dam. The road at that point is some 14 feet above the flow line. It is recommended, therefore that the hazard classification for the No Name Dam No. 52 be downgraded to low.

e. Ownership

The dam and surrounding property is owned by H.M.F. Associates, 136 Highway 22, North Plainfield, New Jersey, 07061 and is managed by Leonard Sachar, Attorney at Law (201-757-8800).

f. Purpose of Dam

The dam was originally constructed to supply water for irrigation of the adjacent lands. It continues to serve this purpose.

g. Design and Construction History

No documented information is available relative to the design and construction history of this dam. The information obtained from Bill Menzel, the present farmer tenant of the adjacent land, indicates that the dam had been built some 20 years ago and that the marl material for the dam was obtained by excavation of the area constituting the reservoir. No periodic maintenance appears to be performed on the dam. The overflow inlet is cleaned occasionally when obstructed by debris.

### 1.3 PERTINENT DATA

#### a. Drainage Area

The watershed of the No Name Dam No. 52 has an area of 0.13 square miles, which consists of cropland, meadowland, and woodland

#### b. Principal spillway capacity at maximum pool elevation (top of dam) - 17 cfs

#### c. Elevation (feet above MSL)

Top of dam - 122.7

Recreation pool - 118.8

Streambed at centerline of dam - 106.5<sup>±</sup>

#### d. Reservoir

Length of maximum pool - 1,120 feet

Length of recreation pool - 1,100 feet

#### e. Storage (acre-feet)

Recreation pool - 42.4

Top of dam - 61.4

#### f. Reservoir Surface (acres)

Top dam - 5.0

Recreation pool - 4.6

#### g. Dam

Type - earth embankment

Length - 166 feet

Height - 16 feet

Top width - 12 feet

Side slopes - 2.0H:1.0V

Zoning - unknown

Cutoff - unknown

Grout curtain - none

#### h. Diversion and Regulating Tunnel

None

#### i. Spillway

See regulating outlet

j. Regulating Outlets

2 feet x 2 feet inlet, 5 feet deep with a  
16-inch-diameter steel pipe

## SECTION 2 - ENGINEERING DATA

### 2.1 DESIGN

No plans or computations were located for the dam structure, and its original configuration can only be surmised from field measurements.

This dam is located in the northwest part of Monmouth County, where stratified deposits of marine origin predominate. They are represented on the Geologic Map of New Jersey as primarily Navesink marls that also include occasionally Red Bank and Tinton sands. These soils consist of stratified silts and clays overlying silty sands and clays. Because of this, low areas have poor surface as well as internal drainage. In general, the ground water table is relatively close to the ground surface.

### 2.2 CONSTRUCTION

Based on the information obtained at the site of the dam, the dam was constructed some 20 years ago by excavating the nearby marl and using it as material for the embankment. Maintenance appears very poor since both slopes of the dam embankment (particularly the downstream side) are covered with dense brush and tree growth. The outlet pipe and the inlet on the upstream side are cleaned at very infrequent intervals. In spite of the lack of frequent or regular maintenance, the dam appears in good condition.

### 2.3 OPERATION

Presently, the principal purpose of the dam is to provide impoundment for irrigation water for the adjacent croplands. The dam is uncontrolled, as there are no operational facilities except for the overflow inlet and a 16-inch-diameter outlet pipe.

### 2.4 EVALUATION

#### a. Availability

No engineering data are available to assess the structural stability and hydrologic characteristics of this dam. The foundation stability is not questioned, although no borings or founding levels of the embankment were located.

b. Adequacy

The field inspection and measurements reveal that the dam is structurally acceptable in its present condition. It is felt that these data were adequate to render the assessment contained in Sections 6 and 7 without recourse to gathering additional information.

c. Validity

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

## SECTION 3 - VISUAL INSPECTION

### 3.1 FINDINGS

#### a. General

The on-site inspections, conducted on September 4, 1980, revealed the dam to be in an overall stable condition. The slopes of the dam embankment as well as the downstream channel between the dam and the concrete pipe culvert under Route 34, approximately 250 feet below the dam, are overgrown with brush and trees. At the time of inspection the water level of the reservoir was 5 feet below the top of the dam. The flow over the flashboards of the overflow inlet was estimated at 2 to 3 gallons per minute.

#### b. Dam

The embankment of the dam was found in satisfactory condition. Although its slopes were overgrown with brush and trees, making a visual inspection difficult, no signs of cracking or seepage were detected. The top of the dam, 12 feet wide, serves as an access road from one side of the reservoir to the other. Although unpaved, the top of the dam appeared in good condition in spite of frequent use by agricultural vehicles. The dam is 12 feet wide at the top and has upstream and downstream slopes of 2.OH:1.OV. The overall length of the dam is 166 feet.

#### c. Appurtenant Structures

The only appurtenant structure is the overflow inlet on the upstream slope of the dam located 54 feet from the south abutment and 13 feet from the downstream edge of the top of the dam. The inlet has 2 feet x 2 feet inside dimensions. It is constructed of concrete, with the upstream side being formed by flashboards. The inlet is approximately 5 feet deep. It is drained by a 16-inch-diameter steel pipe. The inlet is in fair condition, but its bottom is filled with debris and stone. The outlet pipe also appears to be in fair condition.

d. Reservoir Area

The reservoir of the No Name Dam No. 52 is relatively small in area (4.6 acres), and its contributing drainage area is only 0.13 square miles. The reservoir, however, is between 10 to 16 feet deep, its area having been formed by excavation of the existing marl. The reservoir banks are fairly steep, stable, and overgrown with brush and weeds.

e. Downstream Channel

The downstream channel passes through a concrete pipe culvert under Route 34 approximately 250 feet downstream of the dam. The highway is approximately 9 feet above the culvert. The culvert has concrete endwalls on both sides of the highway that are 8.5 feet high above the flow line. The channel bottom width is irregular and its banks are rising at approximately 2H:1V. The channel slope was estimated to be approximately 1.3 feet in 100 feet.

## SECTION 4 - OPERATIONAL PROCEDURES

### 4.1 PROCEDURES

No operational procedures exist at this dam.

### 4.2 MAINTENANCE OF DAM

Maintenance is not performed by the owners. The overflow inlet is cleaned by the tenants of the adjacent croplands only as needed.

### 4.3 MAINTENANCE OF OPERATING FACILITIES

Because there are no operating facilities within the dam insofar as discharge capacity is concerned, there are no maintenance aspects to report on.

### 4.4 DESCRIPTION OF WARNING SYSTEM

No warning system exists at this site.

### 4.5 EVALUATION

Although there are no operational procedures or periodic maintenance at the No Name Dam No. 52, this does not constitute a serious deficiency or danger for life or property downstream because of the following:

- The extremely small drainage area of the dam
- The relatively long time of concentration because the drainage area is wooded and cultivated with crops
- The concrete pipe culvert downstream, which constitutes a barrier to unusually high flows
- The absence of historical overtopping of the dam and its apparent stable and good condition

## SECTION 5 - HYDRAULIC/HYDROLOGIC

### 5.1 EVALUATION OF FEATURES

#### a. Design Data

In accordance with the criteria in the Recommended Guidelines for Safety Inspection of Dams, it has been determined that the N.J. No Name Dam No. 52 is small in size and of low hazard. Accordingly, a 100-frequency event was selected at the design storm and an inflow hydrograph was calculated using precipitation data from Technical Paper 40 and NOAA Technical Memorandum NWS Hydro-35. Utilizing the HEC-1 computer program, inflow to the reservoir was calculated discharging a peak into the reservoir of 299 cfs. Routing this amount through the reservoir reduced the peak to 84 cfs. The spillway capacity before overtopping of the dam occurs is approximately 17 cfs, and it is, therefore, able to accommodate only 20% of the design flood.

#### b. Experience Data

The tenant indicated that to his recollection no overtopping had occurred. Streamflow records were not available.

#### c. Visual Observations

There is no evidence of recent problems. The lake level was at slightly below normal pool at the time of inspection.

#### d. Overtopping Potential

Because the spillway cannot accommodate the design flood, there is a potential for future overtopping. The design flood would overtop the embankment by approximately 0.4 feet.

#### e. Drawdown Potential

If the spillway were utilized by removal of all flashboards, it would take approximately 1.2 days to lower the lake level from elevation 118.8 to elevation 114.0.

## SECTION 6 - STRUCTURAL STABILITY

### 6.1 EVALUATION OF STRUCTURAL STABILITY

#### a. Visual Observation

Based upon the field inspection, the structural stability of the dam appears adequate. The top of the dam has a good alignment, both vertically and horizontally. The dam abutments blend well into the adjacent natural ground. Although detailed inspection of the downstream slope was difficult due to heavy brush and trees, no evidence was found of any embankment movement, seepage, or cracking. The overall cross section of the embankment, as per field measurements made, has dimensions and slopes that provide good embankment stability under anticipated conditions.

#### b. Design and Construction Data

Summarizing Section 2, very little is actually known regarding the initial construction or any design assumptions. The dam appears to have performed its intended function well since its installation. In the context of this report, additional design data would not basically alter any condition insofar as the downstream flooding conditions are concerned.

#### c. Operating Records

Written operating records are non-existent.

#### d. Post Construction Changes

There have been no apparent modifications or repairs of the dam since its original construction.

#### e. Seismic Stability

This dam is stable under static loading conditions. It is located in Seismic Zone 1 and experience reveals that such low dams have adequate stability under dynamic loading conditions if stable under static gravity conditions.

SECTION 7 - ASSESSMENTS/RECOMMENDATIONS/  
REMEDIAL ACTIONS

7.1 DAM ASSESSMENT

a. Safety

Subject to the inherent limitations of the Phase I visual inspection, the No Name Dam No. 52 is judged to be in good overall condition. Because the drainage area of the dam is small (0.13 square miles), the surface is covered with vegetation, and the storage capacity of the reservoir was relatively large before overtopping could occur (approximately 19 acre-feet), there is little likelihood that the safety of the dam itself could be affected. Furthermore, the presence of the Route 34 embankment with the 48-inch diameter pipe culvert would constitute a barrier to any sudden surge of flow in case of dam failure. The worst condition would be that produced, for a very short time, by the pipe culvert flowing full and causing erosion in its downstream channel. This, however, would still not endanger human life or cause high damage to property downstream.

b. Adequacy of Information

For reasons stated in Paragraph a. above, the data obtained as a result of this inspection of the dam are deemed adequate for the enclosed analysis regarding safe operation and stability.

c. Urgency

No urgency is attached to implementing any further studies in view of the dam hazard assessment.

d. Necessity for Further Study

Additional studies of this dam are deemed to be unnecessary because the dam does not constitute a hazard to human life or a significant danger to the downstream property.

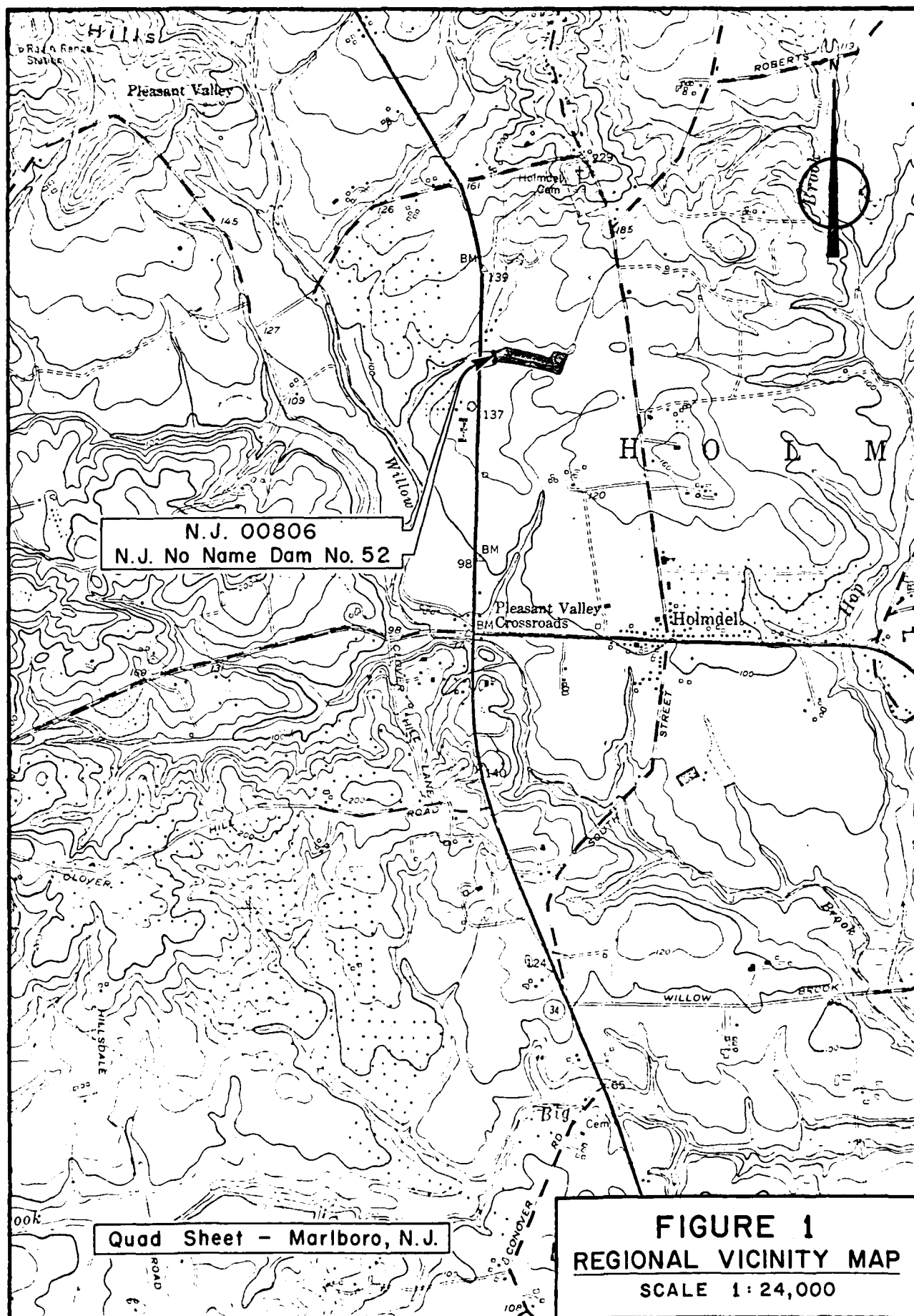
## 7.2 RECOMMENDATIONS/REMEDIAL MEASUREMENTS

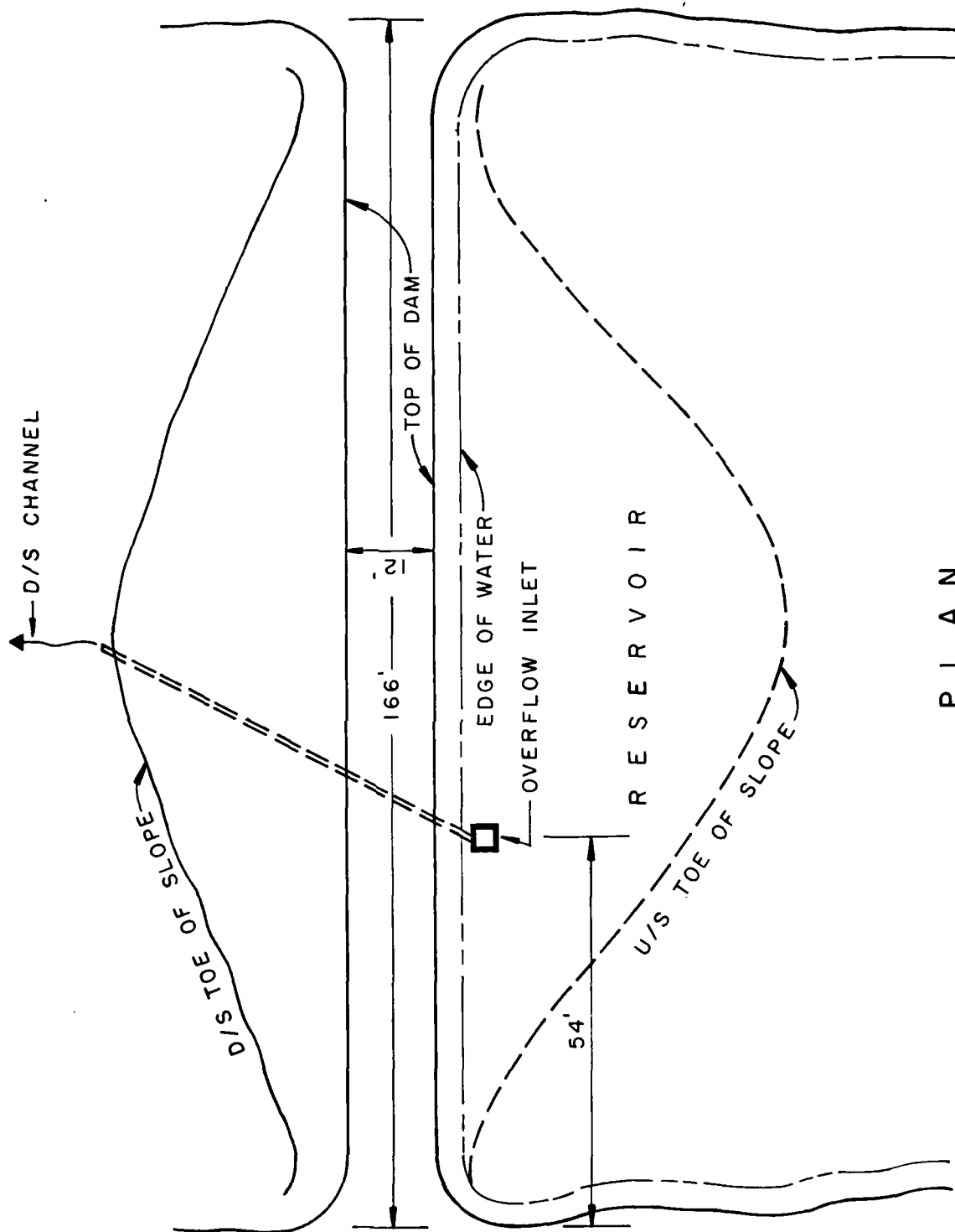
### a. Recommendations

It is recommended that the growth of brush and trees on the downstream slope of the dam embankment be cleared and that the overflow inlet and outlet pipe be cleaned. It is also recommended that the outlet end of the pipe be protected with riprap to avoid erosion of the downstream channel at that point.

### b. O&M Maintenance and Procedures

In the near future the owner should arrange for monitoring the dam during severe storms and develop written operating procedures and a periodic maintenance plan to ensure the continued safety of the dam.

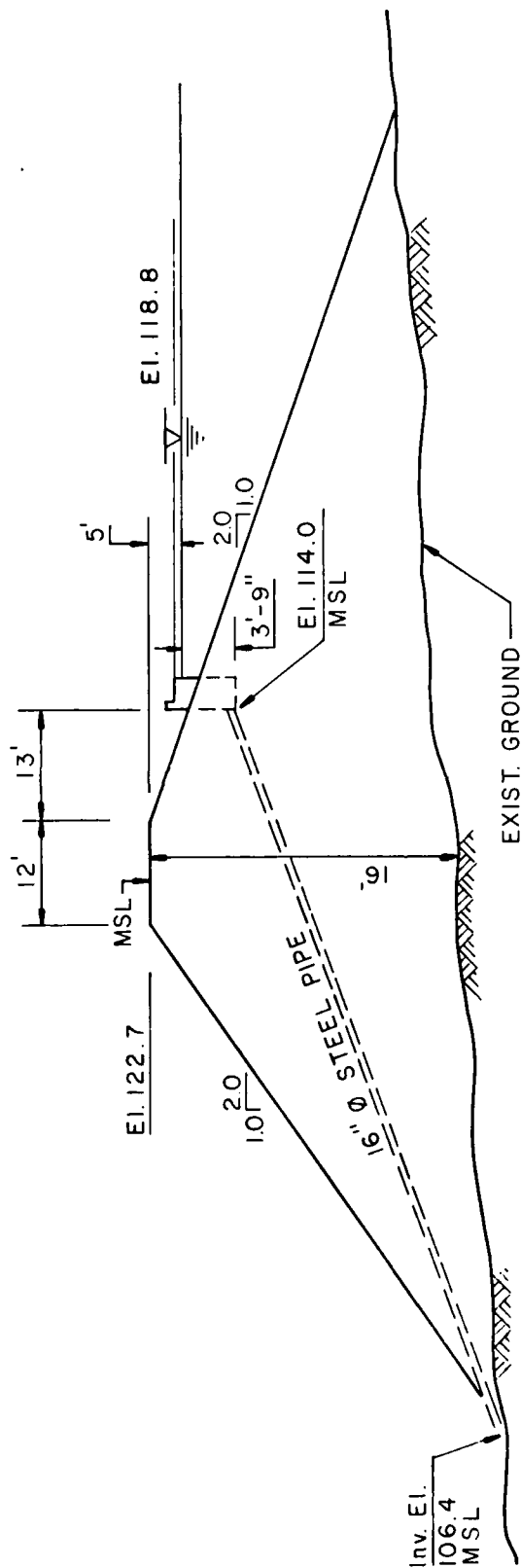




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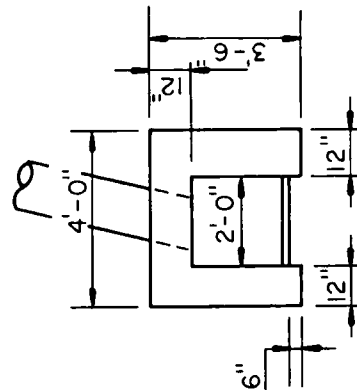
N.J. No Name Dam No. 52

FIGURE 2



TYPICAL CROSS-SECTION OF DAM

NOT TO SCALE



PLAN OF  
OVERFLOW INLET

NOT TO SCALE

N. J. No Name Dam No. 52

FIGURE 3

Check List  
Visual Inspection  
Phase 1

Name Dam N.J. No Name No. 52 County Monmouth State New Jersey Coordinators NJDEP

Date(s) Inspection 9/3/80 Weather Sunny Temperature 90°

Pool Elevation at Time of Inspection 117.7 M.S.L. Tailwater at Time of Inspection N/A M.S.L.

Inspection Personnel:

A. Perera \_\_\_\_\_  
D. Lang \_\_\_\_\_  
T. Chapter \_\_\_\_\_  
J. Greenstein \_\_\_\_\_

A. Perera \_\_\_\_\_ Recorder

# EMBANKMENT

| VISUAL EXAMINATION OF                                  | OBSERVATIONS | REMARKS OR RECOMMENDATIONS                                                                                                                                                            |
|--------------------------------------------------------|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SURFACE CRACKS                                         | None Noted   |                                                                                                                                                                                       |
| UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE      | None Noted   |                                                                                                                                                                                       |
| SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES | None Noted   | Downstream embankment slope heavily overgrown with brush and trees. Should be cleared in order to facilitate access and visual check, as well as to prevent damage due to tree roots. |
| VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST         | Good         | The crest serves as a road for access from one side of the reservoir to the other.                                                                                                    |
| RIPRAP FAILURES                                        | None         | There is no riprap on the upstream slope of the dam. None is recommended due to small size of the reservoir.                                                                          |

# EMBANKMENT

| VISUAL EXAMINATION OF                                 | OBSERVATIONS                                                          | REMARKS OR RECOMMENDATIONS                                                                                                                                          |
|-------------------------------------------------------|-----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TOP OF DAM                                            | 12 ft. wide, 166 ft. long in good condition.<br>There is no spillway. | No history of overtopping probably due to small watershed area and significant storage available because the top of the dam is 5 feet above normal reservoir level. |
| JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM | Embankment grades smoothly into adjacent natural terrain.             |                                                                                                                                                                     |
| ANY NOTICEABLE SEEPAGE                                | None Observed                                                         |                                                                                                                                                                     |
| STAFF GAGE AND RECORDER                               | None                                                                  |                                                                                                                                                                     |
| DRAINS                                                | None                                                                  | iii                                                                                                                                                                 |

# OUTLET WORKS

| VISUAL EXAMINATION OF                                              | OBSERVATIONS                          | REMARKS OR RECOMMENDATIONS                          |
|--------------------------------------------------------------------|---------------------------------------|-----------------------------------------------------|
| CRACKING AND SPALLING OF<br>CONCRETE SURFACES IN<br>OUTLET CONDUIT | N/A                                   |                                                     |
| INTAKE STRUCTURE                                                   | 2 ft. x 2 ft. drop (overflow) inlet.  | Partially filled with debris.<br>Should be cleaned. |
| OUTLET STRUCTURE                                                   | 16 inch diameter stell pipe in inlet. | In good condition as observed within<br>the inlet.  |
| OUTLET CHANNEL                                                     | Natural channel                       |                                                     |
| EMERGENCY GATE                                                     | None<br><br>iv                        |                                                     |

# RESERVOIR

| VISUAL EXAMINATION OF | OBSERVATIONS                                            | REMARKS OR RECOMMENDATIONS   |
|-----------------------|---------------------------------------------------------|------------------------------|
| SLOPES                | Fairly steep, approximately 1.5H:1.0 v.                 | Slopes overgrown with brush. |
| SEDIMENTATION         | None observed because the water depth is 10 to 16 feet. |                              |
|                       |                                                         |                              |
|                       |                                                         |                              |
|                       | v                                                       |                              |

# DOWNSTREAM CHANNEL

| VISUAL EXAMINATION OF                         | OBSERVATIONS                                                                                                                                       | REMARKS OR RECOMMENDATIONS                                                                                          |
|-----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| CONDITION<br>(OBSTRUCTIONS,<br>DEBRIS, ETC.)  | 250 feet downstream from the dam there is a 48 inch dia. concrete pipe culvert under Route 34. The road is approx. 9 ft. above the top of culvert. | Appears ample for anticipated flows and does not constitute an obstruction (except in case of collapse of the dam). |
| SLOPES                                        | Approximately 2.0 H to 1.0 V.                                                                                                                      | Overgrown with brush and trees.                                                                                     |
| APPROXIMATE NO.<br>OF HOMES AND<br>POPULATION | A few houses 2000 or more feet downstream from the culvert under Route 34. Well above the stream channel.                                          | No danger of damage or loss of life in case of collapse of the dam.                                                 |
|                                               |                                                                                                                                                    |                                                                                                                     |
|                                               | vi                                                                                                                                                 |                                                                                                                     |

CHECK LIST  
ENGINEERING DATA  
DESIGN, CONSTRUCTION, OPERATION

| ITEM                                                                                                            | REMARKS                                                                   |
|-----------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|
| PLAN OF DAM                                                                                                     | None Available                                                            |
| REGIONAL VICINITY MAP                                                                                           | Available from USGS Quad. Marlboro, N.J.                                  |
| CONSTRUCTION HISTORY                                                                                            | None Available in documented form. Based on information obtained on site. |
| TYPICAL SECTIONS OF DAM                                                                                         | None Available. Based on field measurements.                              |
| HYDROLOGIC/HYDRAULIC DATA                                                                                       | None Available                                                            |
| OUTLETS - PLAN                                                                                                  | None Available. Based on field measurements.                              |
| <ul style="list-style-type: none"> <li>- DETAILS</li> <li>- CONSTRAINTS</li> <li>- DISCHARGE RATINGS</li> </ul> | None Available                                                            |
| RAINFALL/RESERVOIR RECORDS                                                                                      |                                                                           |

## ITEM

## REMARKS

SPILLWAY PLAN

There is no spillway.

SECTIONS

DETAILS

OPERATING EQUIPMENT  
PLANS & DETAILS

N/A

| ITEM | REMARKS |
|------|---------|
|------|---------|

## DESIGN REPORTS

None Available

## GEOLOGY REPORTS

None Available

 DESIGN COMPUTATIONS  
 HYDROLOGY & HYDRAULICS  
 DAM STABILITY  
 SEEPAGE STUDIES

 None Available  
 None Available  
 None Available  
 None Available

 MATERIALS INVESTIGATIONS  
 BORING RECORDS  
 LABORATORY  
 FIELD

 None Available  
 None Available  
 None Available  
 None Available

## POST-CONSTRUCTION SURVEYS OF DAM

None Available

## BORROW SOURCES.

 None Available, but based on information obtained in field borrow  
 derived from excavation of marl within the reservoir.  
 ix

| ITEM | REMARKS |
|------|---------|
|------|---------|

## MONITORING SYSTEMS

None Available

## MODIFICATIONS

None Available

## HIGH POOL RECORDS

None Available

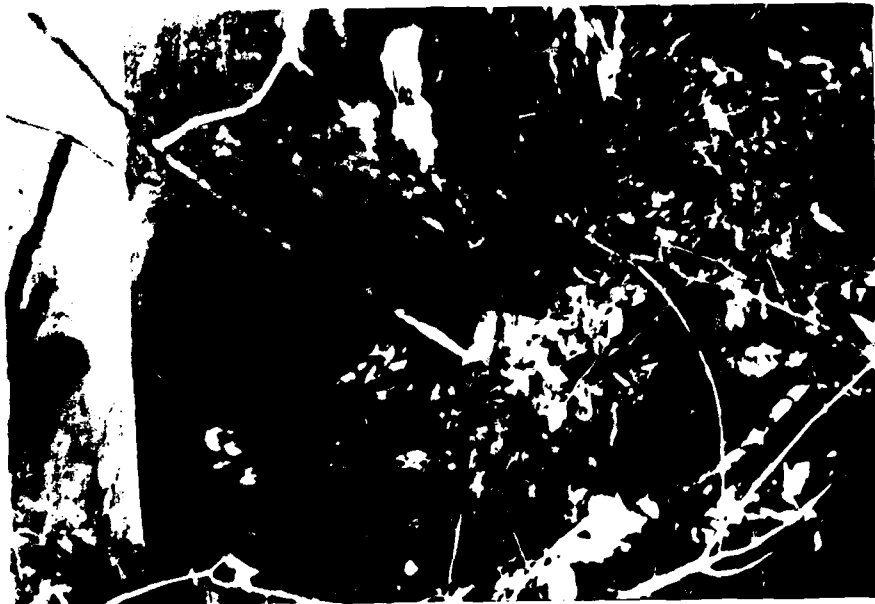
POST CONSTRUCTION ENGINEERING  
STUDIES AND REPORTS

None Available

PRIOR ACCIDENTS OR FAILURE OF DAM  
DESCRIPTION  
REPORTSNone Available  
None Available  
None AvailableMAINTENANCE  
OPERATION  
RECORDSNone Available  
None Available  
None Available



August, 1980  
View of Dam and Intake Structure



August, 1980  
View of Downstream Road Culvert



View of Lake from Dam Crest August, 1980



Dam Crest Looking North August, 1980

CHECK LIST  
HYDROLOGIC AND HYDRAULIC DATA  
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: 0.13 square miles

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): 118.8 (42.4 acre-feet)

ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): N/A

ELEVATION MAXIMUM DESIGN POOL: N/A

ELEVATION TOP DAM: 122.7 (61.4 acre-feet)

CREST: N/A (There is no spillway)

- a. Elevation \_\_\_\_\_
- b. Type \_\_\_\_\_
- c. Width \_\_\_\_\_
- d. Length \_\_\_\_\_
- e. Location Spillover \_\_\_\_\_
- f. Number and Type of Gates \_\_\_\_\_

OUTLET WORKS: Located on upstream slope of dam embankment

- a. Type Overflow Inlet
- b. Location 54 ft. from south abutment, 19 ft. from dam ctr.
- c. Entrance inverts 114
- d. Exit inverts 106.4
- e. Emergency draindown facilities None

HYDROMETEOROLOGICAL GAGES: None

- a. Type \_\_\_\_\_
- b. Location \_\_\_\_\_
- c. Records \_\_\_\_\_

MAXIMUM NON-DAMAGING DISCHARGE: 17 cfs

BY Engineer DATE Sept 10  
 CHKD. BY DATE  
 SUBJECT

# LOUIS BERGER & ASSOCIATES INC.

SHEET NO. 41 OF 43  
 PROJECT 3-332

## TIME OF CONCENTRATION:

LENGTH ALONG CONDUIT HYDROGRAPH - 4250'  $\approx$  0.85 mi.

$$LH = 190' - 115' = 75'$$

$$SLOPE = \frac{75 \times 1.5}{4250} = 1.3\%$$

ASSUME VELOCITY OF 2.57 FEET

$$T_c = \frac{4250'}{2 \times 2600} = 0.89 \text{ HOURS}$$

## CALIFORNIA CULVERT METHOD:

$$T_c = \left( \frac{11.3 \times 0.85}{75} \right)^{0.335} = 0.35 \text{ HOURS}$$

## COO METHOD:

(FROM 'URBAN HYDROLOGY FOR SMALL WATERSHEDS COO PRESS')

ADD UP CN FOR AREA = 84

$$SLOPE = 1.5\%$$

$$L = 4250'$$

$$LAG (LRS) = L = \frac{L^{0.8} (S+1)^{0.5}}{1900 \times 1.5}$$

$$= \frac{4250^{0.8} (1.3+1)^{0.5}}{1900 \times 1.5} = 0.74$$

$$\text{WHERE } C = \frac{1000}{CN} - 10$$

$$C = 1.30$$

$$T_c = \frac{L}{V} = \frac{4250}{2600} = 1.64 \text{ HOURS}$$

$$T_c = 0.70 \text{ HOURS}$$

$$T_c = \frac{L}{V} = \frac{4250}{2600} = 1.64 \text{ HOURS}$$

BY                      DATE                       
 CHKD. BY                      DATE                       
 SUBJECT                     

# LOUIS BERGER & ASSOCIATES INC.

SHEET NO. 48 OF 48  
 PROJECT                     

$$T_F = \frac{454.4 \text{ ft}^3}{T_F} = \frac{454.4 \times 0.2 \text{ ft}^3}{0.47} \approx 134 \text{ cfs}$$

| UNIT GRAPH<br>TIME<br>HOURS | T/F  | DISCHARGE<br>CFS (CFS) | Q (cfs)<br>Q <sub>P</sub> × D.O. |
|-----------------------------|------|------------------------|----------------------------------|
| 0.1                         | 0.21 | 0.684                  | 11                               |
| 0.2                         | 0.42 | 0.325                  | 44                               |
| 0.3                         | 0.63 | 0.668                  | 59                               |
| 0.4                         | 0.84 | 0.930                  | 125                              |
| 0.5                         | 1.05 | 0.740                  | 132                              |
| 0.6                         | 1.26 | 0.586                  | 115                              |
| 0.7                         | 1.47 | 0.369                  | 90                               |
| 0.8                         | 1.70 | 0.449                  | 60                               |
| 0.9                         | 1.91 | 0.365                  | 49                               |
| 1.0                         | 2.13 | 0.268                  | 33                               |
| 1.1                         | 2.34 | 0.193                  | 27                               |
| 1.2                         | 2.55 | 0.143                  | 19                               |
| 1.3                         | 2.77 | 0.103                  | 14                               |
| 1.4                         | 2.98 | 0.076                  | 10                               |
| 1.5                         | 3.19 | 0.050                  | 3                                |
| 1.6                         | 3.40 | 0.044                  | 6                                |
|                             |      |                        | Σ 541                            |

Check:  $\frac{24.1 \times 12 \times 360}{10 \times 0.13 \times 52.35} = 1.001 \approx 1.0 \text{ inch}$

BY                      DATE 5-1-61 LOUIS BERGER & ASSOCIATES INC. SHEET NO. 43 OF 112  
 CHKD. BY                      DATE                      N.J. No Name Dam No. 52 PROJECT 2-132  
 SUBJECT                      Test Storm: 100 Year Freq.

Precipitation data from TP-40 & NOAA Technical  
 Memorandum NWS Hydro - 35

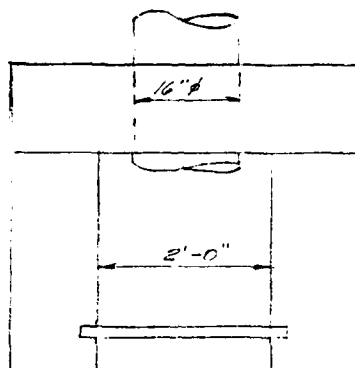
| Time | Precip. | $\Delta$ | RA  | Time | Precip. | $\Delta$ | RA  |
|------|---------|----------|-----|------|---------|----------|-----|
| 0.1  | .91     | .91      | .03 | 3.1  | 4.30    | .05      | .91 |
| 0.2  | 1.46    | .55      | .03 | 3.2  | 4.34    | .04      | .35 |
| 0.3  | 1.81    | .35      | .03 | 3.3  | 4.38    | .04      | .23 |
| 0.4  | 2.07    | .26      | .03 | 3.4  | 4.41    | .03      | .17 |
| 0.5  | 2.30    | .23      | .02 | 3.5  | 4.45    | .04      | .12 |
| 0.6  | 2.46    | .16      | .03 | 3.6  | 4.48    | .03      | .10 |
| 0.7  | 2.63    | .17      | .02 | 3.7  | 4.52    | .04      | .09 |
| 0.8  | 2.77    | .14      | .04 | 3.8  | 4.56    | .04      | .08 |
| 0.9  | 2.89    | .12      | .03 | 3.9  | 4.60    | .04      | .07 |
| 1.0  | 3.00    | .11      | .03 | 4.0  | 4.63    | .03      | .06 |
| 1.1  | 3.10    | .10      | .03 | 4.1  | 4.66    | .03      | .06 |
| 1.2  | 3.20    | .10      | .04 | 4.2  | 4.69    | .03      | .05 |
| 1.3  | 3.29    | .09      | .03 | 4.3  | 4.72    | .03      | .05 |
| 1.4  | 3.36    | .07      | .03 | 4.4  | 4.75    | .03      | .05 |
| 1.5  | 3.44    | .08      | .04 | 4.5  | 4.78    | .03      | .04 |
| 1.6  | 3.51    | .07      | .04 | 4.6  | 4.82    | .04      | .05 |
| 1.7  | 3.58    | .07      | .05 | 4.7  | 4.85    | .03      | .04 |
| 1.8  | 3.65    | .07      | .05 | 4.8  | 4.87    | .02      | .04 |
| 1.9  | 3.71    | .06      | .05 | 4.9  | 4.90    | .03      | .04 |
| 2.0  | 3.76    | .05      | .05 | 5.0  | 4.93    | .03      | .04 |
| 2.1  | 3.82    | .06      | .05 | 5.1  | 4.96    | .03      | .03 |
| 2.2  | 3.87    | .05      | .07 | 5.2  | 4.98    | .02      | .03 |
| 2.3  | 3.92    | .05      | .07 | 5.3  | 5.01    | .03      | .03 |
| 2.4  | 3.97    | .05      | .07 | 5.4  | 5.04    | .03      | .03 |
| 2.5  | 4.02    | .05      | .10 | 5.5  | 5.06    | .02      | .03 |
| 2.6  | 4.07    | .05      | .11 | 5.6  | 5.09    | .03      | .03 |
| 2.7  | 4.12    | .05      | .14 | 5.7  | 5.12    | .03      | .03 |
| 2.8  | 4.17    | .05      | .16 | 5.8  | 5.15    | .03      | .02 |
| 2.9  | 4.21    | .04      | .26 | 5.9  | 5.17    | .02      | .03 |
| 3.0  | 4.25    | .04      | .55 | 6.0  | 5.20    | .03      | .02 |

BY E. L. ... DATE 9/2/59  
 CHKD. BY ... DATE ...  
 SUBJECT ...

# LOUIS BERGER & ASSOCIATES INC.

SHEET NO. A4 OF A13  
 PROJECT 2262

CONCRETE OVERFLOW BOX w/ THREE FLASHBOARDS  
 16" PIPE 12' LONG  
 L x 50"



ENTRANCE INVERT ELEV = 114.0

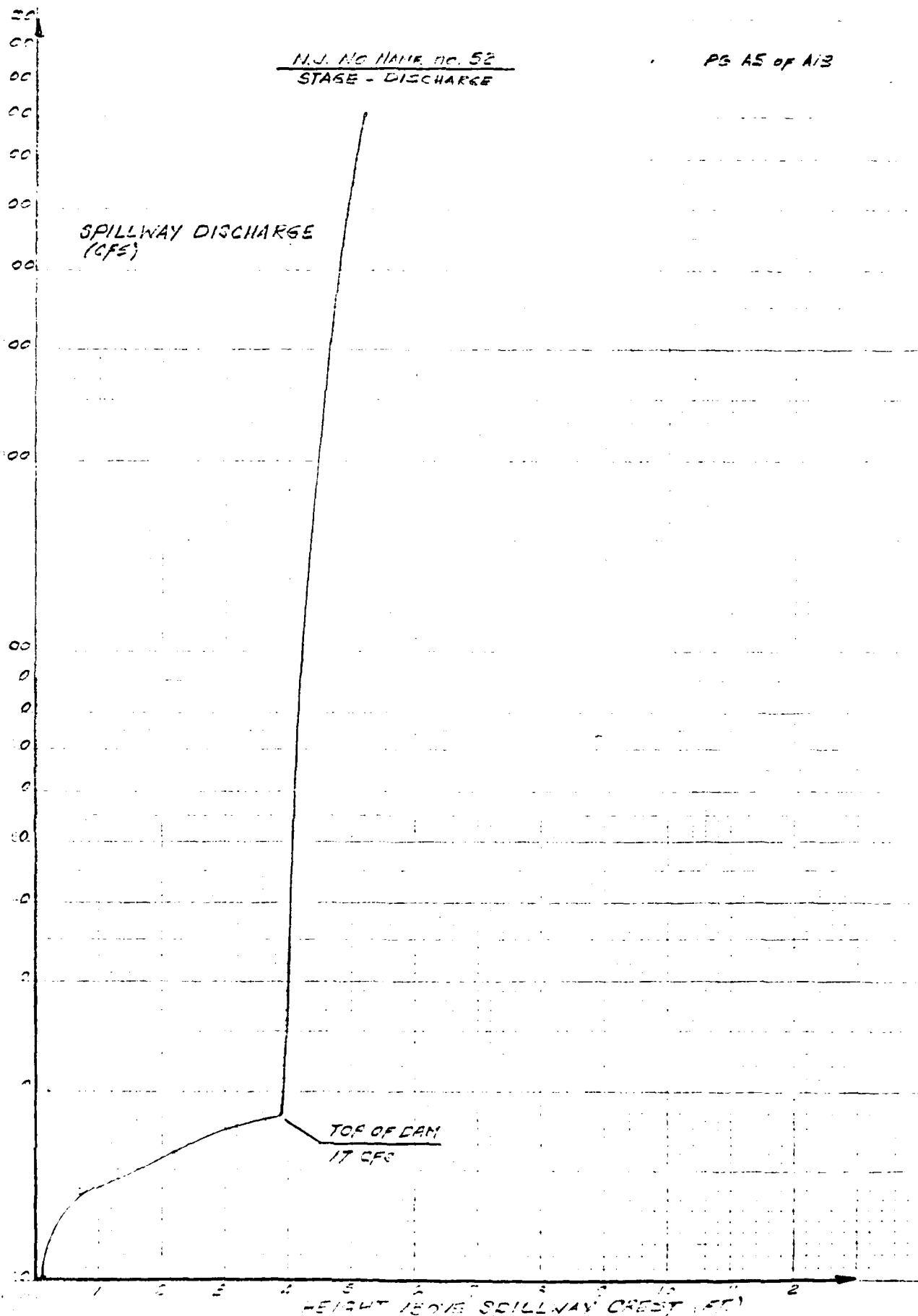
TOP OF DAM = 122.7

ASSUMING FLASHBOARDS CAN BE REMOVED  
 FOR PIPE  $Q = CA \cdot 2gH$   $C = 0.52$   $A = 1.40 \text{ ft}^2$   
 $\therefore Q = 0.52 \cdot 1.40 \cdot 2gH$

| ELEV. | WEIR |   |   |   | PIPE |    | OVER DAM |    |    |      | EQ   |
|-------|------|---|---|---|------|----|----------|----|----|------|------|
|       | H    | L | S | L | H    | S  | H        | L  | S  | L    |      |
| 115.0 | 0    | 0 | 0 | 0 | 4.8  |    |          |    |    |      | 0    |
| 119.0 | 0.2  |   |   | 8 | 5    | 13 |          |    |    |      | 2    |
| 120.0 | 0.7  |   |   | 6 | 5.5  | 14 |          |    |    |      | 12   |
| 120.0 | 1.2  |   |   | 5 | 6    | 14 |          |    |    |      | 12   |
| 121.0 | 1.7  |   |   |   | 7    | 16 |          |    |    |      | 15   |
| 122.0 | 2.7  |   |   |   | 8    | 17 |          |    |    |      | 17   |
| 122.7 | 3.7  |   |   |   | 8.7  | 17 | 0        |    |    |      | 17   |
| 123.0 | 4    |   |   |   | 9    | 18 | 0.5      | 28 | 16 | 76   | 20   |
| 124.0 | 5    |   |   |   | 10   | 19 | 1.3      |    |    | 237  | 21   |
| 125.0 | 6    |   |   |   | 11   | 20 | 2.5      |    |    | 152  | 240  |
| 126.0 | 7    |   |   |   | 12   | 20 | 3.3      |    |    | 2736 | 2706 |

N.J. NO NAME NO. 52  
STAGE - DISCHARGE

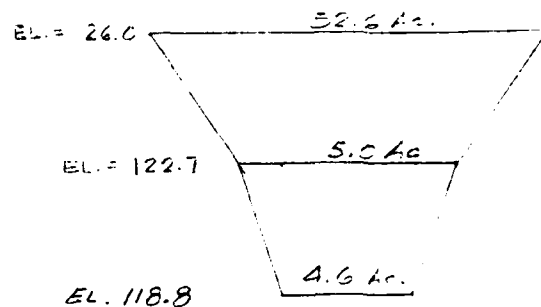
PG 45 of 113



BY        DATE         
 CHKD. BY        DATE         
 SUBJECT       

# LOUIS BERGER & ASSOCIATES INC.

SHEET NO. 46 OF 45  
 PROJECT       

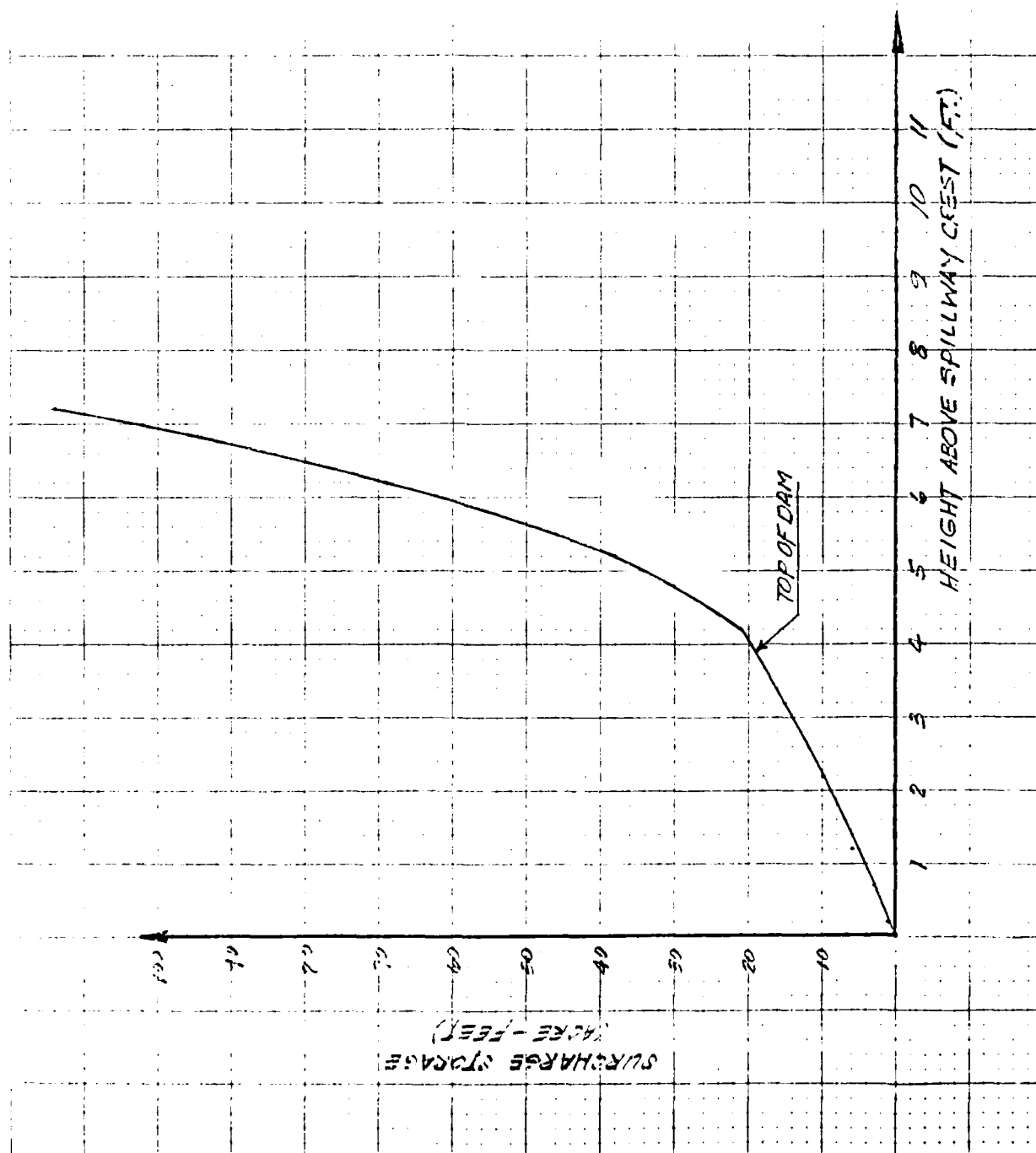


$$\Delta V = \Delta y (x + \Delta x)$$

| ELEV. | $\Delta y$ | ( $x + \Delta x$ )<br>AREA (ACRES) | SURCHARGE<br>STORAGE (ACRE-FT.) |     |
|-------|------------|------------------------------------|---------------------------------|-----|
| 118.8 | 0          | 4.60                               | 0                               | 2   |
| 119.0 | .2         | 4.61                               | 1                               | 1   |
| 119.5 | .5         | 4.64                               | 3                               | 3   |
| 120.0 | 1.2        | 4.66                               | 6                               | 6   |
| 121.0 | 2.2        | 4.71                               | 10                              | 10  |
| 122.0 | 3.2        | 4.76                               | 15                              | 15  |
| 122.7 | 3.9        | 4.80                               | 19                              | 19  |
| 123.7 | .3         | 7.12                               | 2                               | 21  |
| 124.0 | 1.3        | 19.32                              | 13                              | 38  |
| 125.0 | 2.3        | 21.59                              | 30                              | 69  |
| 126.0 | 3.3        | 28.87                              | 95                              | 114 |

A76F A13

N.J. NO NAME NO. 52  
SURCHARGE - STORAGE  
CURVE



**SUBJECT**\_\_\_\_\_

11.9. 110 1201E no. 52

## NEC-1 INPUT SUMMARY

PROJECT 0262

\_\_\_\_\_

| HEIGHT ABOVE<br>SEAWAY (FEET (FT.)) | SURCHARGE<br>STORAGE (LC-FEET) | DISCHARGE<br>(CFS.) |
|-------------------------------------|--------------------------------|---------------------|
| 0                                   | 0                              | 0                   |
| 0.5                                 | 1                              | 2                   |
| 1.2                                 | 6                              | 14                  |
| 2.2                                 | 10                             | 16                  |
| 3.2                                 | 15                             | 17                  |
| 3.9                                 | 19                             | 17                  |
| 4.7                                 | 21                             | 94                  |
| 5.2                                 | 35                             | 705                 |
| 6.2                                 | 69                             | 1640                |
| 7.2                                 | 114                            | 2806                |

BY J. LONG DATE SEPT. 10  
CHKD. BY \_\_\_\_\_ DATE \_\_\_\_\_  
SUBJECT \_\_\_\_\_

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. 47 OF 412  
PROJECT C-232

BY REMOVAL OF ALL FLAREHEADS, THE LAKE LEVEL  
CAN BE LOWERED TO ELEV. 114.0

VOLUME OF WATER BETWEEN ELEV 114.0 & 118.8 :

$$\begin{aligned} @ 118.8 ; \text{ STORAGE} &= 49.4 \text{ AC-FT} \\ @ 114.0 ; \text{ STORAGE} &= \frac{25.8 \text{ AC-FT}}{18.6 \text{ AC-FT VOL}} \end{aligned}$$

$$\text{AVE HEAD} = \frac{4.8}{2} = 2.4 \text{ FT}$$

$$\therefore Q = 0.73, 64.4 \text{ cfs} \\ = 9 \text{ cfs}$$

ASSUME INFLOW = 1 cfs

$$\therefore \text{NET Q}_{\text{OUT}} = 8 \text{ cfs}$$

$$\therefore \text{TIME} = \frac{18.6 \text{ AC-FT} \times 43560 \text{ FT}^2/\text{AC}}{8 \text{ cfs} \times 3600 \text{ SEC/HR.}} = 28.2 \text{ HOURS}$$

SAY 1.2 DAYS

TIME TO DRAWDOWN  
LAKE FROM ELEV. 118.8  
TO ELEV. 114.0

SHEET NO 4 OF 1  
PROJECT C-62  
1966 FEM 11 C-62

```

      JOB SPECIFICATION
      NO    NHR   NMN   IDAY   IHR   IMIN METRC   IPLT   IPRT NSTAN
      100    0     6     0     0     0     0       0     0     0
           JOPER      NWT
            3         0

```

| ISTAG | ICOMP | IECON | ITAPE | JPLT | JPRT | INAME |
|-------|-------|-------|-------|------|------|-------|
| 1     | 0     | 0     | 0     | 0    | 0    | 1     |

| INHYDG | IUHG | TAREA | SNAP | TRSDA | TRSPC | RATIO | ISNOW | ISAME | LOCAL |
|--------|------|-------|------|-------|-------|-------|-------|-------|-------|
| 0      | -1   | 0.13  | 0.00 | 0.13  | 0.00  | 0.000 | 0     | 0     | 0     |

|    |       |      |      |
|----|-------|------|------|
| NP | STORM | DAJ  | DAK  |
| 60 | 0.00  | 0.00 | 0.00 |

[illegible]

| STRKR | DLTKR | RTIOL | ERAIN | STRKS | RTIOK | STRTL | CNSTL | ALSMX | RTIMP |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0.00  | 0.00  | 1.00  | 0.00  | 0.00  | 1.00  | 0.50  | 0.10  | 0.00  | 0.00  |

|     |     |     |      |      |      |     |     |     |     |
|-----|-----|-----|------|------|------|-----|-----|-----|-----|
| 11. | 44. | 89. | 125. | 132. | 115. | 90. | 66. | 49. | 36. |
| 27. | 19. | 14. | 10.  | 8.   | 6.   |     |     |     |     |

UNIT GRAPH TOTALS 841 CFS OR 1.00 INCHES OVER THE AREA

```

STRTO=  --0.00  --GRCSN= ---0.00  ---RTIOR= -1.00

```

| TIME | RAIN | EXCS | COMP | Q |
|------|------|------|------|---|
| 1    | 0.03 | 0.00 | 0.   |   |
| 2    | 0.03 | 0.00 | 0.   |   |
| 3    | 0.03 | 0.00 | 0.   |   |
| 4    | 0.03 | 0.00 | 0.   |   |
| 5    | 0.02 | 0.00 | 0.   |   |
| 6    | 0.03 | 0.00 | 0.   |   |
| 7    | 0.02 | 0.00 | 0.   |   |
| 8    | 0.04 | 0.00 | 0.   |   |
| 9    | 0.03 | 0.00 | 0.   |   |
| 10   | 0.03 | 0.00 | 0.   |   |
| 11   | 0.03 | 0.00 | 0.   |   |
| 12   | 0.04 | 0.00 | 0.   |   |
| 13   | 0.03 | 0.00 | 0.   |   |
| 14   | 0.03 | 0.00 | 0.   |   |
| 15   | 0.04 | 0.00 | 0.   |   |
| 16   | 0.04 | 0.00 | 0.   |   |
| 17   | 0.05 | 0.04 | 0.   |   |
| 18   | 0.05 | 0.04 | 2.   |   |
| 19   | 0.05 | 0.04 | 6.   |   |
| 20   | 0.05 | 0.04 | 11.  |   |
| 21   | 0.05 | 0.04 | 16.  |   |
| 22   | 0.07 | 0.06 | 21.  |   |
| 23   | 0.07 | 0.06 | 25.  |   |
| 24   | 0.07 | 0.06 | 30.  |   |
| 25   | 0.10 | 0.09 | 35.  |   |
| 26   | 0.11 | 0.10 | 40.  |   |

BY L. H. H. DATE 10/1/57  
CHKD. BY DATE  
SUBJECT 1001 10757

# LOUIS BERGER & ASSOCIATES INC.

SHEET NO. 11 OF 112

PROJECT C235

REVIEW FOR A1 CEFALCLO

|     |      |      |      |
|-----|------|------|------|
| 27  | 0.14 | 0.13 | 47.  |
| 28  | 0.16 | 0.15 | 56.  |
| 29  | 0.26 | 0.25 | 67.  |
| 30  | 0.55 | 0.54 | 87.  |
| 31  | 0.91 | 0.90 | 124. |
| 32  | 0.35 | 0.34 | 181. |
| 33  | 0.23 | 0.22 | 244. |
| 34  | 0.17 | 0.16 | 289. |
| 35  | 0.12 | 0.11 | 299. |
| 36  | 0.10 | 0.09 | 280. |
| 37  | 0.09 | 0.08 | 245. |
| 38  | 0.08 | 0.07 | 208. |
| 39  | 0.07 | 0.06 | 174. |
| 40  | 0.06 | 0.05 | 146. |
| 41  | 0.06 | 0.05 | 122. |
| 42  | 0.05 | 0.04 | 102. |
| 43  | 0.05 | 0.04 | 86.  |
| 44  | 0.05 | 0.04 | 74.  |
| 45  | 0.04 | 0.03 | 63.  |
| 46  | 0.05 | 0.04 | 53.  |
| 47  | 0.04 | 0.03 | 44.  |
| 48  | 0.04 | 0.03 | 39.  |
| 49  | 0.04 | 0.03 | 35.  |
| 50  | 0.04 | 0.03 | 32.  |
| 51  | 0.03 | 0.02 | 30.  |
| 52  | 0.03 | 0.02 | 28.  |
| 53  | 0.03 | 0.02 | 26.  |
| 54  | 0.03 | 0.02 | 24.  |
| 55  | 0.03 | 0.02 | 22.  |
| 56  | 0.03 | 0.02 | 21.  |
| 57  | 0.03 | 0.02 | 20.  |
| 58  | 0.02 | 0.01 | 19.  |
| 59  | 0.03 | 0.02 | 18.  |
| 60  | 0.02 | 0.01 | 17.  |
| 61  | 0.00 | 0.00 | 16.  |
| 62  | 0.00 | 0.00 | 14.  |
| 63  | 0.00 | 0.00 | 12.  |
| 64  | 0.00 | 0.00 | 9.   |
| 65  | 0.00 | 0.00 | 7.   |
| 66  | 0.00 | 0.00 | 5.   |
| 67  | 0.00 | 0.00 | 4.   |
| 68  | 0.00 | 0.00 | 3.   |
| 69  | 0.00 | 0.00 | 2.   |
| 70  | 0.00 | 0.00 | 1.   |
| 71  | 0.00 | 0.00 | 1.   |
| 72  | 0.00 | 0.00 | 1.   |
| 73  | 0.00 | 0.00 | 0.   |
| 74  | 0.00 | 0.00 | 0.   |
| 75  | 0.00 | 0.00 | 0.   |
| 76  | 0.00 | 0.00 | 0.   |
| 77  | 0.00 | 0.00 | 0.   |
| 78  | 0.00 | 0.00 | 0.   |
| 79  | 0.00 | 0.00 | 0.   |
| 80  | 0.00 | 0.00 | 0.   |
| 81  | 0.00 | 0.00 | 0.   |
| 82  | 0.00 | 0.00 | 0.   |
| 83  | 0.00 | 0.00 | 0.   |
| 84  | 0.00 | 0.00 | 0.   |
| 85  | 0.00 | 0.00 | 0.   |
| 86  | 0.00 | 0.00 | 0.   |
| 87  | 0.00 | 0.00 | 0.   |
| 88  | 0.00 | 0.00 | 0.   |
| 89  | 0.00 | 0.00 | 0.   |
| 90  | 0.00 | 0.00 | 0.   |
| 91  | 0.00 | 0.00 | 0.   |
| 92  | 0.00 | 0.00 | 0.   |
| 93  | 0.00 | 0.00 | 0.   |
| 94  | 0.00 | 0.00 | 0.   |
| 95  | 0.00 | 0.00 | 0.   |
| 96  | 0.00 | 0.00 | 0.   |
| 97  | 0.00 | 0.00 | 0.   |
| 98  | 0.00 | 0.00 | 0.   |
| 99  | 0.00 | 0.00 | 0.   |
| 100 | 0.00 | 0.00 | 0.   |

SUM - 5.20 - 4.26 - 3583.

|        |      |        |         |         |              |
|--------|------|--------|---------|---------|--------------|
| CFS    | PEAK | 6-HOUR | 24-HOUR | 72-HOUR | TOTAL VOLUME |
| INCHES | 299. | 60.    | 36.     | 36.     | 3583.        |
| AC-FT  |      | 4.27   | 4.27    | 4.27    | 4.27         |
|        |      | 30.    | 30      | 30      | 30           |

BY D. LING DATE FEB 1971  
 CHKD. BY DATE  
 SUBJECT HEC 1 OUT PUT

# LOUIS BERGER & ASSOCIATES INC.

SHEET NO A12 OF 17  
 PROJECT C262  
151000 FEB 71 CERRAVILLO

## HYDROGRAPH ROUTING

### NG THROUGH RESERVOIR

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

ROUTING DATA  
 GLOSS 0.0 CLOSS 0.000 AVG 0.00 IRES 1 ISAME 0

NSTPS 1 NSTDL 0 LAG 0 AMSKK 0.000 X 0.000 TSK 0.000 STORA 0.

1. 6. 10. 19. 21. 27. 69 114 0.  
 2. 14 16 17 94 708 1640 2806 0.

| TIME | EOP | STOR | AVG IN | EOP | OUT |
|------|-----|------|--------|-----|-----|
| 1    | 0.  | 0.   | 0.     | 0.  | 0.  |
| 2    | 0.  | 0.   | 0.     | 0.  | 0.  |
| 3    | 0.  | 0.   | 0.     | 0.  | 0.  |
| 4    | 0.  | 0.   | 0.     | 0.  | 0.  |
| 5    | 0.  | 0.   | 0.     | 0.  | 0.  |
| 6    | 0.  | 0.   | 0.     | 0.  | 0.  |
| 7    | 0.  | 0.   | 0.     | 0.  | 0.  |
| 8    | 0.  | 0.   | 0.     | 0.  | 0.  |
| 9    | 0.  | 0.   | 0.     | 0.  | 0.  |
| 10   | 0.  | 0.   | 0.     | 0.  | 0.  |
| 11   | 0.  | 0.   | 0.     | 0.  | 0.  |
| 12   | 0.  | 0.   | 0.     | 0.  | 0.  |
| 13   | 0.  | 0.   | 0.     | 0.  | 0.  |
| 14   | 0.  | 0.   | 0.     | 0.  | 0.  |
| 15   | 0.  | 0.   | 0.     | 0.  | 0.  |
| 16   | 0.  | 0.   | 0.     | 0.  | 0.  |
| 17   | 0.  | 0.   | 0.     | 0.  | 0.  |
| 18   | 0.  | 1.   | 0.     | 0.  | 0.  |
| 19   | 0.  | 4.   | 0.     | 0.  | 0.  |
| 20   | 0.  | 8.   | 0.     | 0.  | 0.  |
| 21   | 0.  | 13.  | 0.     | 0.  | 0.  |
| 22   | 0.  | 18.  | 1.     | 1.  | 0.  |
| 23   | 1.  | 23.  | 1.     | 1.  | 0.  |
| 24   | 1.  | 28.  | 2.     | 2.  | 0.  |
| 25   | 1.  | 32.  | 2.     | 2.  | 0.  |
| 26   | 1.  | 37.  | 3.     | 3.  | 0.  |
| 27   | 2.  | 43.  | 4.     | 4.  | 0.  |
| 28   | 2.  | 51.  | 4.     | 4.  | 0.  |
| 29   | 2.  | 61.  | 6.     | 6.  | 0.  |
| 30   | 3.  | 77.  | 7.     | 7.  | 0.  |
| 31   | 4.  | 105. | 9.     | 9.  | 0.  |
| 32   | 5.  | 152. | 12.    | 12. | 0.  |
| 33   | 7.  | 213. | 14.    | 14. | 0.  |
| 34   | 9.  | 267. | 15.    | 15. | 0.  |
| 35   | 11. | 294. | 16.    | 16. | 0.  |
| 36   | 13. | 289. | 16.    | 16. | 0.  |
| 37   | 15. | 262. | 17.    | 17. | 0.  |
| 38   | 17. | 226. | 17.    | 17. | 0.  |
| 39   | 19. | 191. | 17.    | 17. | 0.  |
| 40   | 20. | 160. | 41.    | 41. | 0.  |
| 41   | 20. | 134. | 67.    | 67. | 0.  |
| 42   | 21. | 112. | 79.    | 79. | 0.  |
| 43   | 21. | 94.  | 84.    | 84. | 0.  |
| 44   | 21. | 80.  | 83.    | 83. | 0.  |
| 45   | 21. | 68.  | 79.    | 79. | 0.  |
| 46   | 20. | 58.  | 73.    | 73. | 0.  |
| 47   | 20. | 48.  | 66.    | 66. | 0.  |
| 48   | 20. | 41.  | 59.    | 59. | 0.  |
| 49   | 20. | 37.  | 53.    | 53. | 0.  |
| 50   | 20. | 34.  | 48.    | 48. | 0.  |
| 51   | 20. | 31.  | 43.    | 43. | 0.  |
| 52   | 20. | 29.  | 40.    | 40. | 0.  |
| 53   | 19. | 27.  | 36.    | 36. | 0.  |
| 54   | 19. | 25.  | 33.    | 33. | 0.  |
| 55   | 19. | 23.  | 30.    | 30. | 0.  |
| 56   | 19. | 22.  | 28.    | 28. | 0.  |
| 57   | 19. | 20.  | 26.    | 26. | 0.  |
| 58   | 19. | 19.  | 24.    | 24. | 0.  |
| 59   | 19. | 18.  | 22.    | 22. | 0.  |
| 60   | 19. | 17.  | 21.    | 21. | 0.  |
| 61   | 19. | 16.  | 20.    | 20. | 0.  |
| 62   | 19. | 15.  | 18.    | 18. | 0.  |
| 63   | 19. | 13.  | 17.    | 17. | 0.  |

BY L. LONG DATE SEPT 20  
 CHKD. BY \_\_\_\_\_ DATE \_\_\_\_\_  
 SUBJECT \_\_\_\_\_

# LOUIS BERGER & ASSOCIATES INC.

SHEET NO. A12 OF 13  
 PROJECT C262  
 REVISED FEB '81 CERRILLO

|     |     |     |     |
|-----|-----|-----|-----|
| 64  | 19. | 11. | 17. |
| 65  | 19. | 8.  | 17. |
| 66  | 19. | 6.  | 17. |
| 67  | 19. | 4.  | 17. |
| 68  | 19. | 3.  | 17. |
| 69  | 18. | 2.  | 17. |
| 70  | 18. | 2.  | 17. |
| 71  | 18. | 1.  | 17. |
| 72  | 18. | 1.  | 17. |
| 73  | 18. | 0.  | 17. |
| 74  | 18. | 0.  | 17. |
| 75  | 18. | 0.  | 17. |
| 76  | 17. | 0.  | 17. |
| 77  | 17. | 0.  | 17. |
| 78  | 17. | 0.  | 17. |
| 79  | 17. | 0.  | 17. |
| 80  | 17. | 0.  | 17. |
| 81  | 17. | 0.  | 17. |
| 82  | 17. | 0.  | 17. |
| 83  | 17. | 0.  | 17. |
| 84  | 16. | 0.  | 17. |
| 85  | 16. | 0.  | 17. |
| 86  | 16. | 0.  | 17. |
| 87  | 16. | 0.  | 17. |
| 88  | 16. | 0.  | 17. |
| 89  | 16. | 0.  | 17. |
| 90  | 16. | 0.  | 17. |
| 91  | 15. | 0.  | 17. |
| 92  | 15. | 0.  | 17. |
| 93  | 15. | 0.  | 17. |
| 94  | 15. | 0.  | 17. |
| 95  | 15. | 0.  | 17. |
| 96  | 15. | 0.  | 17. |
| 97  | 15. | 0.  | 17. |
| 98  | 14. | 0.  | 16. |
| 99  | 14. | 0.  | 16. |
| 100 | 14. | 0.  | 16. |

SUM 1873.

|        | PEAK | 6-HOUR | 24-HOUR | 72-HOUR | TOTAL VOLUME |
|--------|------|--------|---------|---------|--------------|
| CFS    | 84.  | 28.    | 19.     | 19.     | 1873.        |
| INCHES |      | 2.02   | 2.23    | 2.23    | 2.23         |
| AC-FT  |      | 14.    | 15.     | 15.     | 15.          |

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## RUNOFF SUMMARY, AVERAGE FLOW

|               | PEAK | 6-HOUR | 24-HOUR | 72-HOUR | AREA |
|---------------|------|--------|---------|---------|------|
| HYDROGRAPH AT | 1    | 299    | 60.     | 35.     | 0.13 |
| ROUTED TO     | 1    | 84.    | 28.     | 19.     | 0.13 |

DATE  
FILMED  
— 8