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NATIONAL DAM SAFETY PROGRAM. LIONSHEAD LAKE DAM (NJ00254). PASS--ETC(U)  
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PASSAIC RIVER BASIN

HAYCOCK BROOK, PASSAIC COUNTY

NEW JERSEY

**LIONSHEAD LAKE DAM**

**PHASE I INSPECTION REPORT**

**NATIONAL DAM SAFETY PROGRAM**

DDC FILE COPY

NJ 00254



**DEPARTMENT OF THE ARMY  
PHILADELPHIA DISTRICT, CORPS OF ENGINEERS  
CUSTOM HOUSE - 2D & CHESTNUT STREETS  
PHILADELPHIA, PENNSYLVANIA 19106**

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



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DEPARTMENT OF THE ARMY  
PHILADELPHIA DISTRICT, CORPS OF ENGINEERS  
CUSTOM HOUSE-2 D & CHESTNUT STREETS  
PHILADELPHIA, PENNSYLVANIA 19106

IN REPLY REFER TO

NAPEN-D

23 AUG 1978

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

Dear Governor Byrne:

Inclosed is the Phase I Inspection Report for Lionshead Lake Dam in Passaic 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 on the first two pages of the report.

Based on visual inspection, available records, calculations and past operational performance, Lionshead Lake Dam is judged to be in good overall condition. To insure adequacy of the structure, the following actions, as a minimum, are required:

a. The following minor remedial work should be undertaken by the owner within three months from the date of approval of this report.

(1) The dam's downstream channel should be cleaned of debris and obstructions. Further channel cleaning should be performed as frequently as required.

(2) The small erosion channels on the upstream side of the embankment at the left abutment, should be repaired and lined with riprap.

(3) The eroded areas on both embankment slopes along the dam's crest should be graded and seeded.

b. The eroded portions of the asphalt lining in the downstream portions of the weir outlet culvert pipe should be repaired within nine months from the date of approval of this report.

c. Emergency warning and evacuation plans should be developed and implemented for the area downstream of the dam within two months of the date of approval of this report.

NAPEN-D  
Honorable Brendan T. Byrne

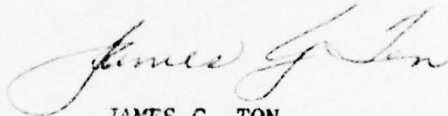
d. Procedures for rapid emergency drawdown, including operational procedures for mechanical equipment, should be developed within six months from the date of approval of this report. These procedures should be implemented in calendar year 1979.

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 Robert A. Roe of the Eighth District. Under the provisions of the Freedom of Information Act, the inspection report will be subject to release by this office, upon request, thirty days after the date of this letter.

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

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

Sincerely yours,



JAMES G. TON  
Colonel, Corps of Engineers  
District Engineer

1 Incl  
As stated

Cy furn:  
Mr. Dirk C. Hofman, P.E.  
Department of Environmental Protection

PHASE I REPORT  
NATIONAL DAM SAFETY PROGRAM

Name of Dam - Lionshead Lake Dam, Passaic County, New Jersey

Stream - Haycock Brook

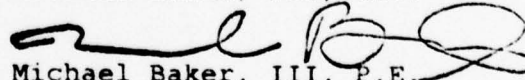
Date of Inspection - 13 June 1978

ASSESSMENT OF  
GENERAL CONDITIONS

Lionshead Lake Dam is a roadway embankment dam approximately 23 feet high and 200 feet long, owned and operated by Wayne Township.

The visual inspection and review of engineering data, made in June and July 1978, indicate no serious deficiencies requiring emergency attention. The dam was found to be in good overall condition at the time of inspection. It is recommended that the downstream channel be cleaned of any debris and obstructions. The small erosion channels on the upstream side of the embankment at the left abutment contact located approximately fifty feet southwest of the culvert inlet should be repaired and perhaps lined with riprap. Some minor erosion has occurred along the crests of the upstream and downstream slopes. Minor grading and seeding should correct these erosion problems. The culvert joints and the asphalt paving in the culvert should be repaired as a routine maintenance project of the culvert. Formal emergency procedures should be developed including emergency evacuation plans for areas which would be affected in the event of a dam failure. Procedures for rapid emergency drawdown should be developed, including operational procedures for mechanical equipment. In addition, the dam should have a formal program of future periodic inspections.

MICHAEL BAKER, JR., INC.



Michael Baker, III, P.E.  
Chairman of the Board and  
Chief Executive Officer  
Registration Number 13385



NAME OF DAM: LIONSHEAD LAKE DAM

(Continued)



Based on visual inspection, available records, calculations and past operational performance, Lionshead Lake Dam is judged to be in good overall condition. To insure adequacy of the structure, the following actions, as a minimum, are required:

a. The following minor remedial work should be undertaken by the owner within three months from the date of approval of this report.

(1) The dam's downstream channel should be cleaned of debris and obstructions. Further channel cleaning should be performed as frequently as required.

(2) The small erosion channels on the upstream side of the embankment at the left abutment, should be repaired and lined with rip-rap.

(3) The eroded areas on both embankment slopes along the dam's crest should be graded and seeded.

b. The eroded portions of the asphalt lining in the downstream portions of the weir outlet culvert pipe should be repaired within nine months from the date of approval of this report.

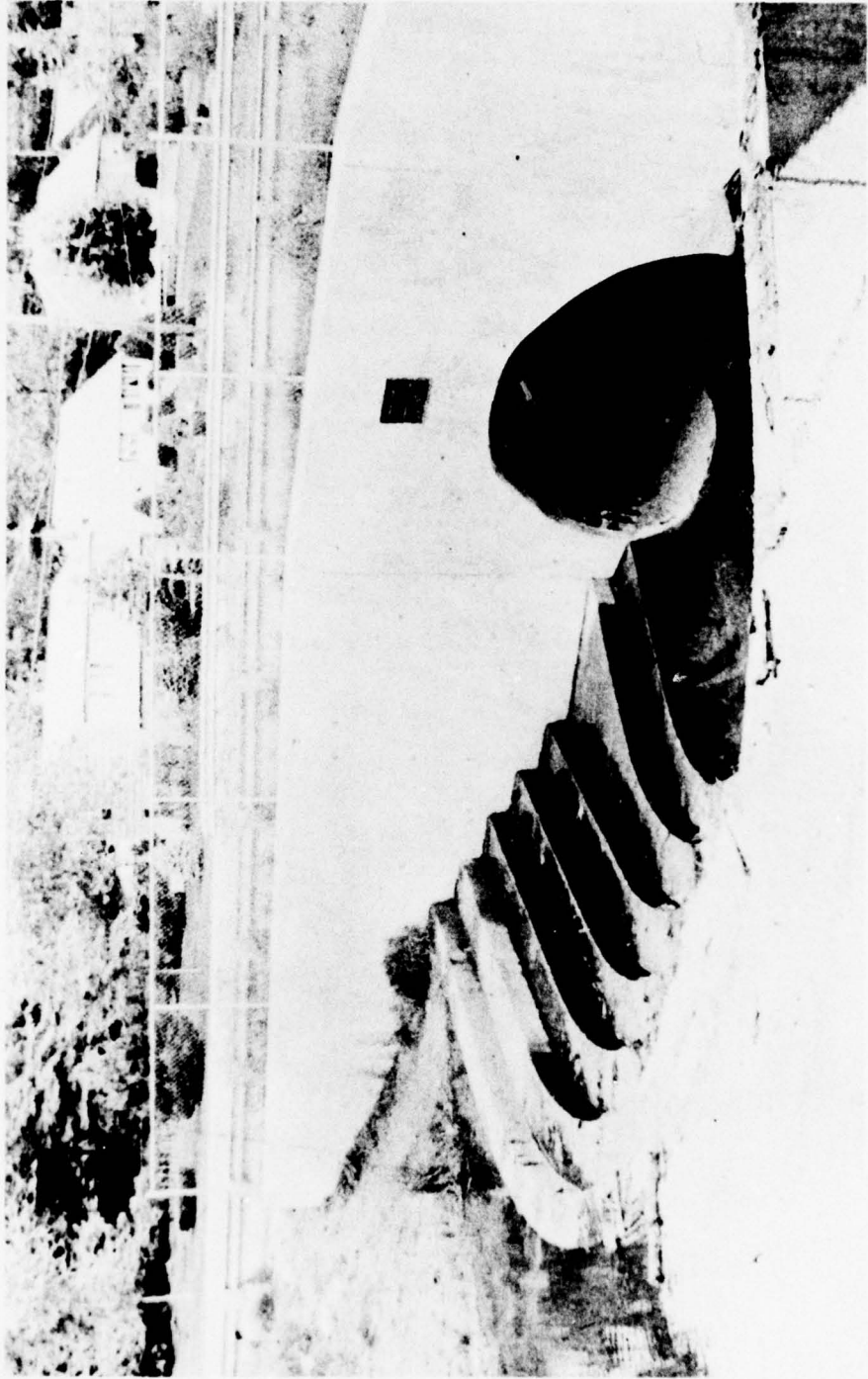
c. Emergency warning and evacuation plans should be developed and implemented for the area downstream of the dam within two months of the date of approval of this report.

d. Procedures for rapid emergency drawdown, including operational procedures for mechanical equipment, should be developed within six months from the date of approval of this report. These procedures should be implemented in calendar year 1979.

APPROVED: James G. Ton

JAMES G. TON  
Colonel, Corps of Engineers  
District Engineer

DATE: 23 August 1978



OVERALL VIEW OF DAM

PASSAIC RIVER BASIN .

Name of Dam: Lionshead Lake Dam  
County and State: Passaic County, State of New Jersey  
Inventory Number: NJ 00254

PHASE I INSPECTION REPORT  
NATIONAL DAM SAFETY PROGRAM

Prepared By: Michael Baker, Jr., Inc.  
Consulting Engineers  
4301 Dutch Ridge Road  
Box 280  
Beaver, Pennsylvania 15009

Prepared For: Department of the Army  
Philadelphia District, Corps of Engineers  
Custom House - 2D and Chestnut Streets  
Philadelphia, Pennsylvania 19106

Date: August 1978



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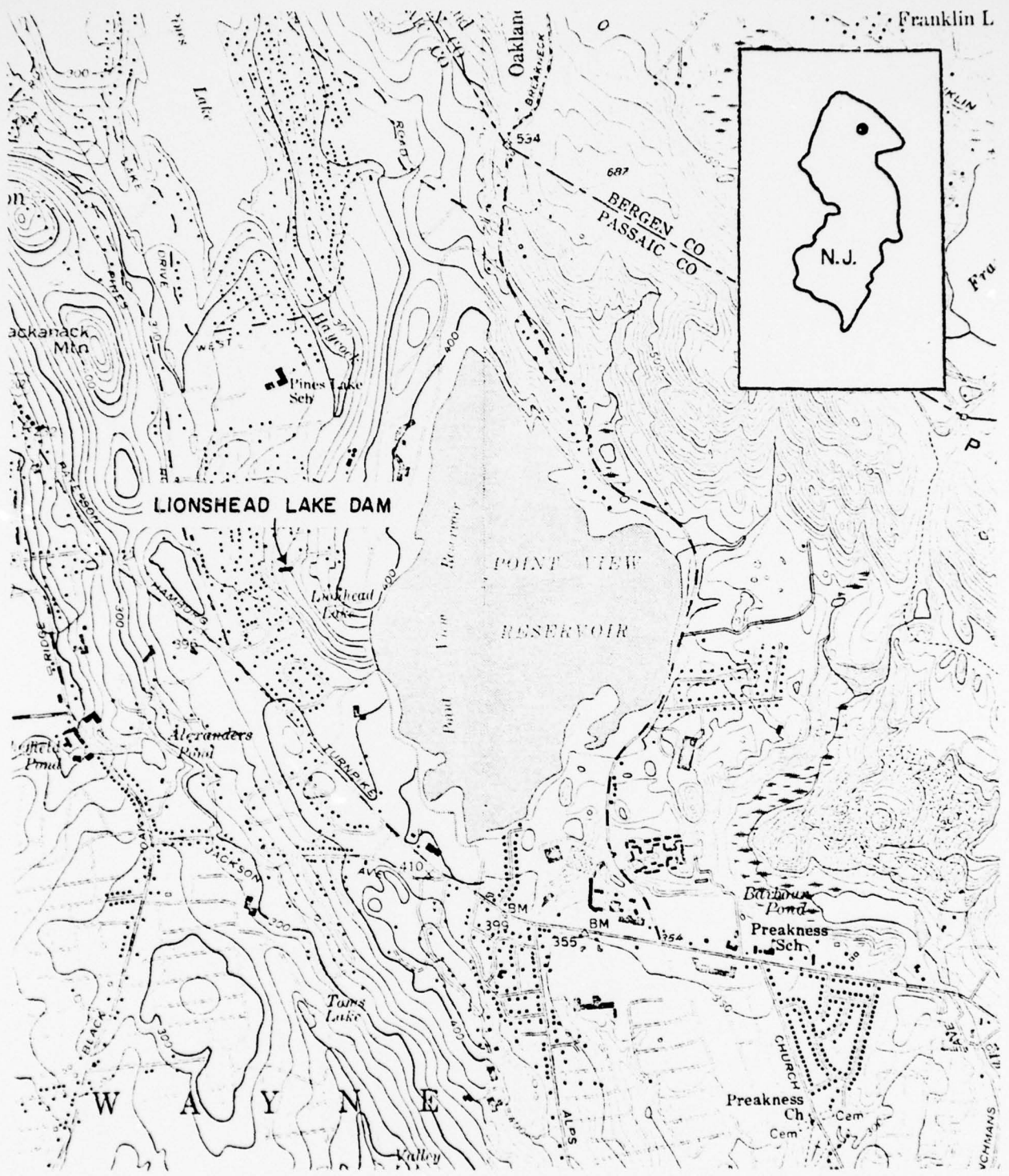
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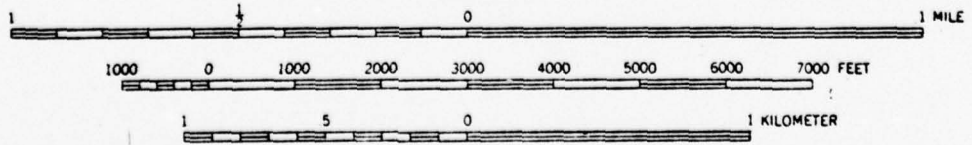
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NAME OF DAM: LIONSHEAD LAKE DAM



SCALE 1:24000



LOCATION PLAN  
LIONSHEAD LAKE DAM

PHASE I INSPECTION REPORT  
NATIONAL DAM SAFETY PROGRAM  
NAME OF DAM: LIONSHEAD LAKE DAM, ID# NJ 00254

SECTION 1 - PROJECT INFORMATION

1.1 GENERAL

- a. Authority - This report is authorized by the National Dam Inspection Act, Public Law 92-367, 92nd Congress, H.R. 15951 enacted 8 August 1972.
- b. Purpose of Inspection - The purpose of this inspection is to evaluate the general condition of Lionshead Lake Dam with respect to safety of the facility based upon available data and visual inspection.

1.2 DESCRIPTION OF PROJECT

- a. Description of Dam and Appurtenances - Lionshead Lake Dam consists of a roadway embankment dam and semicircular weir with a corrugated metal pipe (C.M.P.) arch culvert below the roadway. The roadway embankment is approximately 23 feet high and 200 feet long. The semicircular weir is approximately 16 feet high and 63 feet long. The weir is constructed in a step down fashion to a basin leading into the C.M.P. arch culvert. A low flow weir notch 4.0 feet wide by 1.5 feet long and 3.0 inches deep is located near the center of the semicircular weir. A C.M.P. arch culvert 13.25 feet wide by 9.0 feet high runs beneath the roadway embankment (Tamarack Road) from the weir basin to the downstream channel. The downstream channel, Haycock Brook, is lined with riprap for a distance of 85 feet downstream from the C.M.P. arch culvert outlet. Haycock Brook then flows approximately one mile northward before entering Pines Lake. Seepage control is provided by a homogeneous embankment consisting of compacted well graded silty sand and gravel material. Seepage control is also aided by a concrete core wall left in place from a previous dam.

Lionshead Lake is the tailwater for Point View Dam; consequently the lake level is primarily controlled by the amount of discharge from Point View Dam. No operating mechanisms are associated with Lionshead Lake Dam and the spillway (weir) is uncontrolled.

NAME OF DAM: LIONSHEAD LAKE DAM



Prior to its reconstruction in 1973 and 1974, the dam consisted of a earthfill dam with a concrete core wall and a bridge over a spillway channel. This original dam was constructed in 1939. Part of the outlet works for this dam consisted of an 18 inch cast-iron pipe which could have been used for drawdown of the lake. The upstream half of this pipe was left in place during reconstruction and an additional section was added extending from the original valve vault located in the center of the dam to an outlet in the downstream channel. This new section of pipe was only 12 inches in diameter (see Plate 3 for location).

During reconstruction in 1973 and 1974, the earth dam and roadway were relocated immediately downstream from the pre-existing dam and bridge. The new spillway (weir) was located immediately downstream from the previous bridge location. In order to construct the weir, the bridge had to be removed, and the concrete core wall and the previous embankment near the weir had to be excavated to El. 333.0 feet. The concrete core wall and earth embankment not located near the weir were excavated to El. 343.0 feet (see Plate 2). The original core wall and embankment below El. 343.0 feet which did not interfere with construction were left in place. At the location of the previous bridge, a 36 inch clay core wall was constructed and tied into the existing concrete core wall (see Plate 3).

The "as built" reconstruction drawings are included in this report as Plates 1 through 6.

- b. Location - Lionshead Lake Dam is located on Haycock Brook in the Township of Wayne. Lionshead Lake is located immediately downstream from Point View Dam and approximately one mile upstream from Pines Lake Reservoir. Tamarack Road is constructed on the crest of the Lionshead Lake Dam.
- c. Size Classification - The maximum height of the dam is 23 feet. The reservoir volume to the spillway crest is 60 acre-feet. Therefore, the dam is in the "Small" size category as defined by the "Recommended Guidelines for Safety Inspection of Dams."
- d. Hazard Classification - Due to the proximity of the town of Wayne, New Jersey with a population of about 50,000, many lives could be lost in the event of failure of the dam. Therefore, this dam is considered in the "High" hazard category as defined by the "Recommended Guidelines for Safety Inspection of Dams."

NAME OF DAM: LIONSHEAD LAKE DAM

- e. Ownership - The dam is owned by Wayne Township, 475 Valley Road, Wayne, New Jersey, 07470.
- f. Purpose of Dam - The dam and lake are used for recreational purposes.
- g. Design and Construction History - The existing facility was designed for the owner by A.G. Lichtenstein and Associates, Teaneck, New Jersey. The dam was built by Conti Construction Co., 78 Floral Lane, Murray Hill, New Jersey beginning in 1973. Construction was completed in 1974.
- h. Normal Operational Procedures - Not applicable

1.3 PERTINENT DATA

- a. Drainage Area - The drainage area of Lionshead Lake is 2.04 square miles. This includes 1.82 square miles controlled by Point View Dam which is located 1800 feet upstream. The drainage area other than the discharge from Point View Dam is only 0.22 square mile or 141 acres.
- b. Discharge at Damsite - The maximum known flow at the damsite through the overflow weir is unknown.
- c. Elevation [feet above Mean Sea Level (M.S.L.)] -
  - Top of Dam - 349.0
  - Maximum Pool (Design Discharge) - 349.0 (1530 c.f.s.)
  - Recreation Pool - 343.5
  - Streambed at Centerline of Dam - 325.7
  - Maximum Tailwater - Not available
- d. Reservoir (feet) -
  - Length of Maximum Pool - 1800
  - Length of Recreation Pool - 1800
- e. Storage (acre-feet) -
  - At Spillway Crest (El. 343.5 feet) - 60
- f. Reservoir Surface (acres) -
  - Top of Dam - Not available
  - Spillway Crest - 5.4

NAME OF DAM: LIONSHEAD LAKE DAM

g. Dam -

Type - Homogeneous embankment

Length - 200 feet

Height - 23 feet

Top Width - 60 feet (minimum)

Side Slopes - Upstream - Not applicable, upstream  
slope grades into remainder  
of previous existing dam.

Downstream - 2:1

Impervious Core - Concrete core wall from previous  
dam located immediately upstream  
from existing dam and clay core  
wall in former bridge area.

h. Diversion and Regulating Tunnel - Not applicable

i. Spillway -

Type - Semicircular weir

Length of Weir - 63 feet

Crest Elevation - 343.5 feet (M.S.L.)

Gates - Not applicable

Downstream Channel - 85 feet of stable riprap

j. Regulating Outlets - The upstream half of an 18  
inch cast-iron pipe was left in place during  
reconstruction of the dam, and an additional section  
of 12 inch diameter cast-iron pipe was added  
extending from the original valve vault located in  
the center of the dam to an outlet in the downstream  
channel.

NAME OF DAM: LIONSHEAD LAKE DAM



## SECTION 2 - ENGINEERING DATA

### 2.1 DESIGN

The design data reviewed included the "as built" drawings of the 1973 and 1974 reconstruction furnished by Wayne Township. Information concerning the original dam and bridge constructed in 1939 was available in the microfiche files of the New Jersey Department of Environmental Protection (N.J.D.E.P.). This file included the original permit application, various correspondence, monthly construction progress reports, construction specifications, various inspection reports, and the design drawings. No design reports or calculations of the 1973 and 1974 reconstruction were available for review. The N.J.D.E.P. file on the reconstruction phase was reported missing and unavailable for review.

### 2.2 CONSTRUCTION

The Lionshead Lake Dam was reconstructed by the Conti Construction Company in 1973 and 1974. Full time inspection was provided by Wayne Township personnel. Part time inspection was furnished by A.G. Litchenstein & Associates, the design engineer. "As built" drawings, reports, and photographs of the construction are available in the Wayne Township Engineering Department files. The "as built" survey of the dam and weir was performed by Osborne M. Campbell & Associates, Mendham, New Jersey.

### 2.3 OPERATION

The Township of Wayne, New Jersey is responsible for maintenance of the dam and its appurtenances. The spillway is uncontrolled and the lake level is primarily controlled by the discharge from Point View Dam. No operating mechanisms are associated with this dam; therefore, no operating or pool records have been recorded for the dam and reservoir.

### 2.4 EVALUATION

Although design information was not available, sufficient information for a Phase I Inspection is available on the "as built" drawings. Any deviations from design were incorporated into the "as built" drawings.

NAME OF DAM: LIONSHEAD LAKE DAM

## SECTION 3 - VISUAL INSPECTION

### 3.1 FINDINGS

- a. General - The dam and its appurtenant structures were found to be in good overall condition at the time of inspection. The problems noted during the visual inspection are considered minor and do not require immediate remedial treatment. Noteworthy deficiencies observed are described briefly in the following paragraphs. The complete visual inspection check list is given in Appendix A.
- b. Dam - There are several small erosion channels on the upstream side of the embankment at the left (west) abutment contact approximately fifty feet southwest of the culvert inlet. Riprap should be considered for the erosion area near the culvert inlet. Some minor erosion has also occurred along the crests of the upstream and downstream slopes. Minor grading and seeding should correct the erosion problems on the slopes.

No seepage was observed in the embankment. It had rained earlier 13 June 1978 and showered during the inspection. A small seepage area was observed at the contact of the downstream slope and the downstream toe of the right abutment, approximately 40 feet east of culvert outlet. Seepage was also observed at the toe of fill behind the house at #115 Tamarack Road (downstream right bank). Both seepage areas are inferred to be natural groundwater flow from the hill to the east of the dam. This inference is based upon: the low hydraulic head on the dam, the permeability of the material in the embankment and abutment regions, the distance the seepage would have to travel through the dam, and the relative elevation of the seepage areas compared to the pool elevation. Although no seepage was observed in the embankment, future inspections should check the embankment in dry weather. Also, the future inspections in dry weather should verify if the seepage areas observed were the result of the rain prior to the inspection of 13 June 1978 or natural groundwater flow.

- c. Appurtenant Structures - The overflow weir was found to be in good overall condition. Minor spalling has occurred on the third step from the top on the right (east) side. This spalled concrete should be chipped out and patched.

NAME OF DAM: LIONSHEAD LAKE DAM

Minor seepage with a flow less than one g.p.m. was occurring at a culvert joint one foot above the invert on the right (east) side approximately thirty-five feet upstream from the culvert outlet. This seepage is not considered to constitute a problem. The three inch thick asphalt paving on the culvert invert has eroded in an area approximately four feet wide and twelve feet back from the culvert outlet. The culvert joint and the asphalt paving should be repaired as a part of routine maintenance of the culvert. Both the inlet and the outlet culvert head walls were found to be in good overall condition.

An estimated flow of three to four g.p.m. was discharging from the 12 inch cast-iron pipe outlet at the time of inspection. This outlet is located at the base of the left (west) wing wall approximately three feet downstream from the arch culvert outlet. Dennis Hamilton, the Wayne Township Waterways Inspector, indicated this outlet pipe and valve have never been used for drawdown of the lake and the valve is non-operational at this time.

- d. Reservoir Area - No serious deficiencies were observed in the reservoir area. Some minor erosion and sedimentation has occurred at several locations along the lakeshore. However, the erosion and sedimentation do not require remedial measures.
- e. Downstream Channel - No major deficiencies were observed in the downstream channel. However, a moderate amount of debris was present in the channel at the time of inspection. Frequent routine maintenance should remove this debris and any other channel obstructions.

### 3.2 EVALUATION

None of the above items, with the exception of the debris in the outlet channel, is serious enough to warrant immediate repair since they do not intrinsically threaten the integrity of the dam. However, these repair items are considered good housekeeping practices and should be accomplished as part of a routine maintenance program.

NAME OF DAM: LIONSHEAD LAKE DAM



## SECTION 4 - OPERATIONAL PROCEDURES

### 4.1 PROCEDURES

There is no formal written procedure for emergency downstream evacuation in the event of impending catastrophe. However, the civil defense unit in Wayne Township does handle flood emergencies. The civil defense unit is aided by the police department and public works department.

It is recommended that a formal emergency procedure be prepared and prominently displayed and furnished to all personnel. This should include:

- 1) Who to notify, including public officials, in case evacuation from the downstream area is necessary.
- 2) Coordination procedures with Passaic Valley Water Commission, owners of Point View Dam, for evaluating inflow during periods of emergency operation.
- 3) Procedures for rapid emergency drawdown should be developed, including the operation of any mechanical equipment necessary for emergency drawdown.

### 4.2 MAINTENANCE OF DAM

The dam is maintained by Wayne Township. Dennis Hamilton, the Wayne Township Waterways Inspector, inspects the dam approximately once every two weeks and schedules maintenance of the dam and channels as necessary.

### 4.3 MAINTENANCE OF OPERATING FACILITIES

Currently, there is no maintenance of the 12 inch cast-iron pipe and valve. However, maintenance of this facility is not considered necessary because the pipe and valve will not contribute significantly to emergency drawdown of the reservoir during periods of peak flow. Drawdown of the reservoir can be accomplished more readily by alternate methods, as discussed in paragraph 5.1.e.

### 4.4 EVALUATION

Maintenance performed by Wayne Township is considered adequate for this dam. Emergency procedures should include coordination with the Passaic Valley Water Commission, owners of Point View Dam, because emergency operation of Point View Dam will have a significant influence on emergency conditions at Lionshead Lake Dam. In case of emergency drawdown or impending catastrophe for Point View Dam, close coordination will be necessary to evaluate overtopping and stability of Lionshead Lake Dam.

NAME OF DAM: LIONSHEAD LAKE DAM

## SECTION 5 - HYDRAULIC/HYDROLOGIC

### 5.1 EVALUATION OF FEATURES

- a. Design Data - Hydraulic design data and hydraulic capacity were not readily available for review.
- b. Experience Data - Records of the lake levels were not available. However, the lake level is primarily controlled by the discharge from Point View Dam and is fairly constant year round.
- c. Visual Observations - The low flow notch in the center of the weir was flowing 0.2 foot deep at the time of inspection. Various debris was present in the downstream channel at the time of inspection. No evidence of past flood damage to the dam or appurtenant structures was observed.
- d. Overtopping Potential - Lionshead Lake Dam is classified as a "High" hazard-"Small" dam requiring evaluation for a spillway design flood greater than one-half Probable Maximum Flood (P.M.F.). The spillway is a 63 foot wide circular shaped concrete broad crested weir 18 inches long that outlets into a 9.0 feet by 13.25 feet steel plate C.M.P. arch culvert. The crest elevation of the weir is 343.5 with a four feet wide by three inch deep notch in the center to carry normal flow. The invert elevation at the inlet of the C.M.P. arch culvert is 334.8. This C.M.P. arch culvert carries the flow beneath the Tamarack Road embankment, which serves as a dam for high flows. The lowest point on top of the dam was determined to be 349.0 by field measurements at the time of inspection. This is 0.5 foot less than "as built" due to erosion near the west end of the concrete wall.

Calculations were performed for both the weir and C.M.P. arch culvert to determine which one controlled the flow. These calculations indicate that the culvert began flowing full at approximate El. 347.0, discharging 1350 c.f.s. Therefore, the culvert controls all flow above EL. 347.0. At the top of dam elevation of 349.0, the outflow would be 1530 c.f.s.

Lionshead Lake Dam has a drainage area of 2.04 square miles. Lionshead Lake functions as the tailwater for Point View Dam, which is located 1800 feet upstream from Lionshead Lake Dam. Point View Dam has a drainage area of 1.82 square miles

NAME OF DAM: LIONSHEAD LAKE DAM

and a spillway design discharge of 2067 c.f.s. with the gates closed. This discharge was determined to be in excess of the P.M.F. for Point View Dam by the N.J.D.E.P. during the original permit application process in 1962. These calculations are attached as Appendix C and were obtained from the N.J.D.E.P. microfiche file for Point View Dam. Comparison of the drainage areas for Lionshead Lake Dam and Point View Dam indicates that only 0.22 square mile or 11 percent of the Lionshead Lake drainage area is located downstream from Point View Dam. This means that very little inflow enters Lionshead Lake other than the discharge from Point View Dam. Therefore, one-half of the P.M.F. for Lionshead Lake Dam would be less than one-half of the 2067 c.f.s. spillway design discharge from Point View Dam. (Recall that the 2067 c.f.s. discharge with the gates closed was determined to be in excess of the P.M.F. for Point View Dam.) Since the maximum discharge (lake level at the top of the dam) from Lionshead Lake Dam is 1530 c.f.s., which exceeds one-half of P.M.F. (one-half of P.M.F. approximately equals 1035 c.f.s.); it is evident that the spillway and C.M.P. arch culvert arrangement for Lionshead Lake Dam is adequate to pass, as a minimum, the one-half P.M.F. in accordance with Phase I criteria.

The conclusions presented in this Phase I Inspection Report pertain to present day conditions and the effect of future development on the hydrology has not been considered.

- e. Emergency Drawdown - The 12 inch cast-iron pipe and valve are non-operational; therefore, they cannot be used for drawdown of the lake. This pipe would not contribute significantly during periods of peak flow. During periods of low inflow, emergency drawdown can be accomplished by coordinating with the Passaic Valley Water Commission, owner of Point View Dam, concerning the discharge from Point View Dam and by pumping the water from Lionshead Lake over the weir at Lionshead Lake Dam. The rate of drawdown would depend upon the hydraulic capacity of the pump(s) and the inflow from Point View Dam.

NAME OF DAM: LIONSHEAD LAKE DAM



## SECTION 6 - STRUCTURAL STABILITY

### 6.1 EVALUATION OF STRUCTURAL STABILITY

- a. Visual Observations - No structural inadequacies were noted during the visual inspection of the dam.
- b. Design and Construction Data - Calculations of embankment slope and foundation stability were not available for review. General experience with slopes of heights, inclinations, materials, and hydraulic conditions similar to those of the dam slopes indicates that these slopes could be shown to satisfy the stability requirements of the "Recommended Guidelines for Safety Inspection of Dams." This inference is supported by empirical guidelines on stable slope inclinations given by the U.S. Bureau of Reclamation (1973) Design of Small Dams, 2nd Ed., pp. 265-267. In view of the modest heights and inclinations of the dam slopes, their history of satisfactory performance, and the fact that no indications of instability were observed during the field inspection of 13 June 1978; no further stability assessments are necessary for this Phase I Inspection Report.
- c. Operating Records - Operating records have not been recorded for Lionshead Lake Dam. No mechanical mechanisms are associated with this dam and the overflow spillway (weir) is uncontrolled. The lake level is primarily controlled by the discharge from Point View Dam. The discharge from Point View Dam is considered to be fairly steady the year round, because Point View Reservoir is a pumped storage reservoir with a small watershed.
- d. Post-Construction Changes - There have been no post-construction changes to the dam and its appurtenant structures since their completion in 1974.
- e. Seismic Stability - Lionshead Lake Dam is located in Zone 1 on the Seismic Zone Map of the Contiguous United States. This is a zone of very low seismic activity. Experience has shown that dams with adequate stability under static loading conditions will also have adequate stability under seismic loading conditions in such zones of low seismic activity. As indicated above in paragraph 6.1.b., Lionshead Lake Dam could be shown to meet the stability requirements of the "Recommended Guidelines

NAME OF DAM: LIONSHEAD LAKE DAM

for Safety Inspection of Dams." There is no need  
for further consideration of seismic stability  
under the circumstances.

NAME OF DAM: LIONSHEAD LAKE DAM

## SECTION 7 - ASSESSMENT, RECOMMENDATIONS/REMEDIAL MEASURES

### 7.1 DAM ASSESSMENT

- a. Safety - The outlet culvert is adequate to prevent overtopping the dam under conditions exceeding one-half P.M.F. No seepage or slope failures were noted that would indicate potential piping or embankment failure.
- b. Adequacy of Information - The information available was sufficient to evaluate the adequacy of design. "As built" drawings and visual inspection indicated no great departure from design conditions.
- c. Urgency - The dam will not require urgent remedial treatment.
- d. Necessity for Further Investigation - Further investigation is not considered necessary.

### 7.2 RECOMMENDATIONS/REMEDIAL MEASURES

- a. Remedial Action - The downstream channel should be cleaned of debris and continued to be cleaned frequently in the future. The small erosion channels on the upstream side of the embankment at the left (west) abutment contact approximately fifty feet southwest of the culvert inlet should be repaired. It is felt that riprap will be the best protection for this area. Some minor erosion has occurred along the crests of the upstream and downstream slopes. Minor grading and seeding should correct these erosion problems. The culvert joints and asphalt paving in the culvert should be repaired as a part of routine maintenance of the culvert.

It is recommended that a formal emergency procedure be prepared, prominently displayed and furnished to all personnel. This should include:

- 1) Who to notify, including the appropriate public officials, in case evacuation from the downstream area is necessary.
- 2) The appropriate public officials should develop emergency evacuation procedures for areas which will be affected in the event of a dam failure.

NAME OF DAM: LIONSHEAD LAKE DAM



- 3) Coordination procedures with Passaic Valley Water Commission, owners of Point View Dam, for evaluating inflow during periods of emergency operation.
- 4) Procedures for rapid emergency drawdown should be developed, including the operation of any mechanical equipment necessary for emergency drawdown.

In addition, the dam should have a formal program of future periodic inspections.

NAME OF DAM: LIONSHEAD LAKE DAM

PLATES

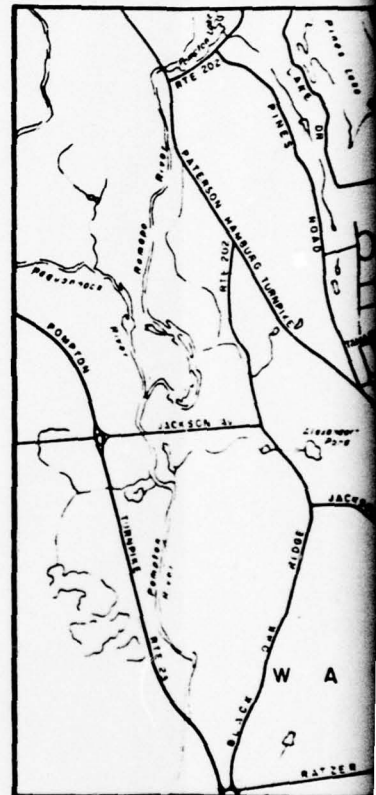
# TOWNSHIP RECONSTRUCTION OF AT LIONS

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(CONTR

PASSAIC COUNTY

PUBLIC UTILITIES
<u>ELECTRIC (OVERHEAD):</u> PUBLIC SERVICE ELECTRIC & GAS CO
<u>GAS:</u> PUBLIC SERVICE ELECTRIC & GAS CO
<u>TELEPHONE:</u> N. J. BELL TELEPHONE CO
<u>SANITARY SEWER:</u> TOWNSHIP OF WAYNE
<u>STORM SEWER:</u> TOWNSHIP OF WAYNE
<u>POINT VIEW RESERVOIR:</u> PASSAIC VALLEY WATER COMMISSION
<u>CABLE TV:</u> MICRO CABLE COMMUNICATIONS



AS BUILT PLANS (SHEETS 1 & 3 THRU 14 INCL.)

Prepared by:

OSBORNE M. CAMPBELL & ASSOCIATES  
CONSULTING ENGINEERS AND LAND SURVEYORS  
MENDHAM, NEW JERSEY

Lic. No. 8816

DATE: 6/25/75

**KEY**

SCALE

197

**TOWNSHIP**

**COUNCIL**

- NEWTON
- JAMES A.
- THOMAS
- WALTER
- CHARLES
- ESTELLE
- DR. LEON
- HARRY P.
- JOSEPH
- DAVID
- KENNETH
- ANTHONY
- JOHN E.

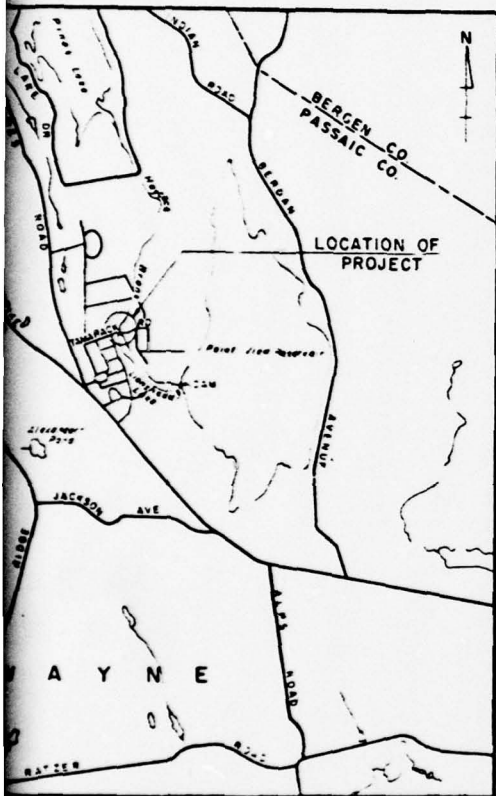


HIP OF WAYNE  
 TAMARACK ROAD BRIDGE  
 SONSHEAD LAKE

CONTRACT NO. 290)

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NEW JERSEY



KEY MAP

SCALE 1" = 2000'

1973

TOWNSHIP OF WAYNE

NEWTON E MILLER, MAYOR  
 JAMES A. MANCO, PRESIDENT  
 THOMAS ELM, JR.  
 WALTER J. JASINSKI  
 CHARLES KABASH  
 ESTELLE PERRY  
 DR. LEONARD PINE  
 HARRY F. RUDIGER  
 JOSEPH JADALA  
 DAVID WAKS  
 KENNETH R. MAHONY, BUSINESS ADMIN. STRATOR  
 ANTHONY T. BUZZON, DIRECTOR OF PUBL. WORKS  
 JOHN E. KUHNAST, TOWNSHIP ENGINEER

INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
1	KEY SHEET
2	ARCHITECTURAL RENDERING
3	ESTIMATE OF QUANTITIES
4	TYPICAL SECTIONS
5	GENERAL PLAN
6	ROAD PROFILE
7	STREAM PROFILE
8	GRADING PLAN
9-12	CROSS SECTIONS
13	INLET STRUCTURE
14	CULVERT STRUCTURE & ELEVATION
15-18	CONSTRUCTION DETAILS
19	EXISTING TOPOGRAPHY

REVISION	DATE	SHEET NO'S.
1	12/7/73	4, 5, 7, 14, 15

PREPARED BY A. M. Lieberstein 7/31/73  
 AG LICHTENSTEIN & ASSOC. CONSULTING ENGINEERS DATE

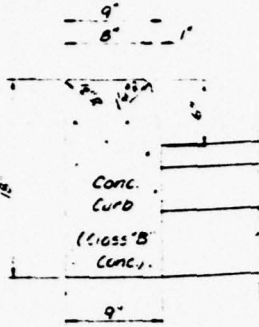
APPROVED BY John E. Kuhnast 7/31/73  
 JOHN E. KUHNAST TOWNSHIP ENGINEER DATE

PLATE 1



2

Transverse Joints 2" wide shall be installed in the curb 20" from corner and shall be filled with Preformed Bituminous Impregnated Fiber Joint Seal, complying with the requirements of AASHTO spec M-23, recessed 1/2" from front face and top of curb. Expansion Joints shall be adjacent to the curb shall be recessed 1/2" from front face and top of curb.

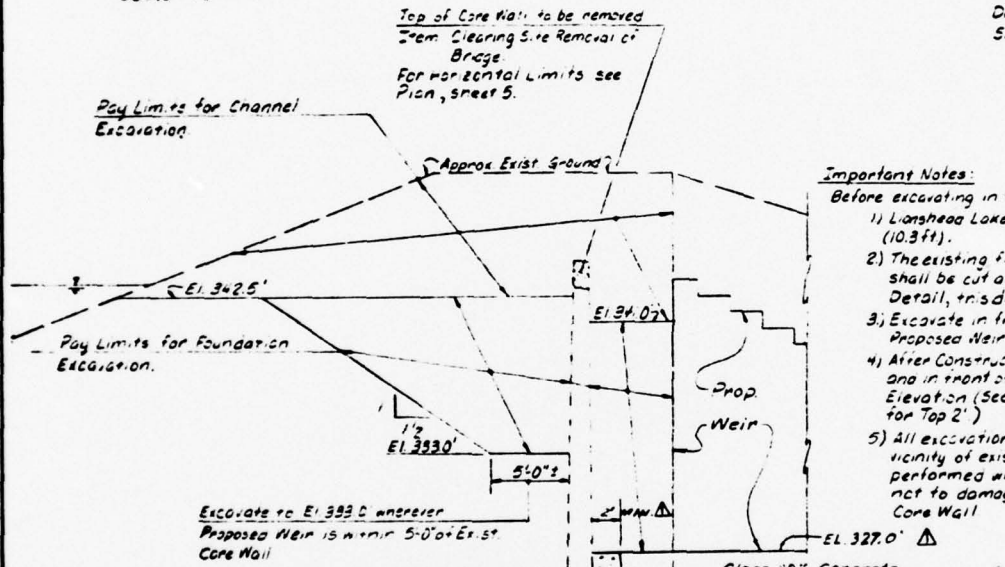
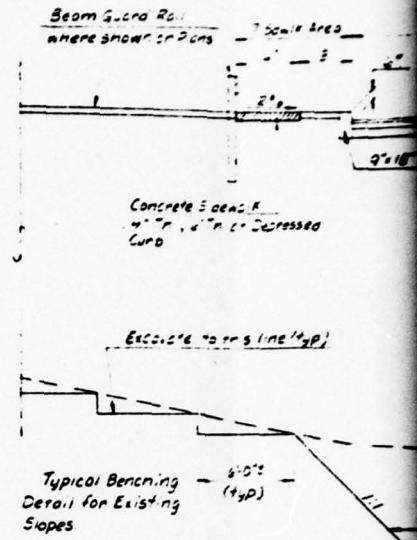


**9"x18" CONCRETE CURB**

Scale: 1/2" = 1'-0"

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See Appropriate Cross Section for required grouting



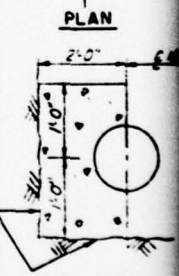
**PROPOSED EXCAVATION FOR WEIR CONSTRUCTION DETAIL**

N.T.S.

**Important Notes:**

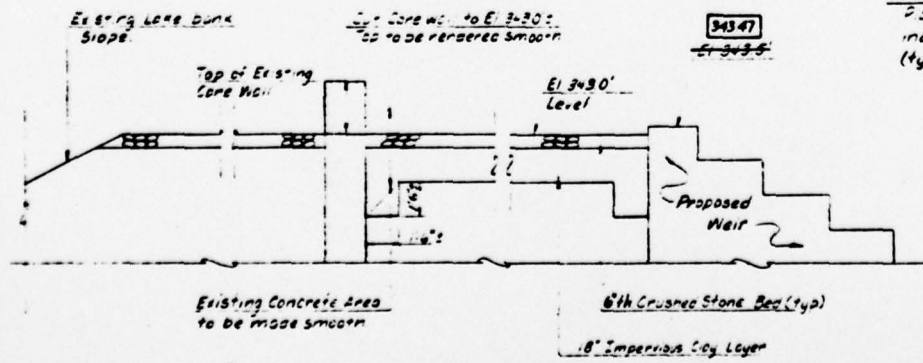
- Before excavating in front of existing Core Wall:
- 1) Lionhead Lake shall be lowered to EL. 333.0mm (10.3ft).
  - 2) The existing fill behind the Core Wall shall be cut as indicated in Excavation Detail, this drawing.
  - 3) Excavate in front of Core Wall for Proposed Weir and Wall Construction.
  - 4) After construction backfill shall be to and in front of Core Wall to Proposed Elevation (See Slope Treatment Detail for Top 2').
  - 5) All excavation and backfilling in vicinity of existing Core Wall shall be performed with utmost care so as not to damage the existing concrete Core Wall.

Pour Thrust Block directly against side of Excavation cut vertically



**ELEVATION THRUST BLOCK DETAIL**

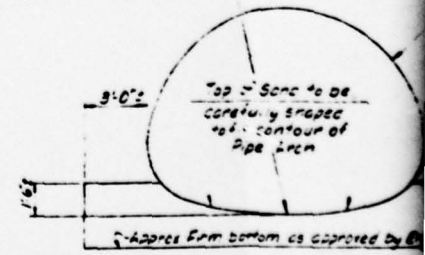
N.T.S.



**SLOPE TREATMENT DETAIL**

N.T.S.

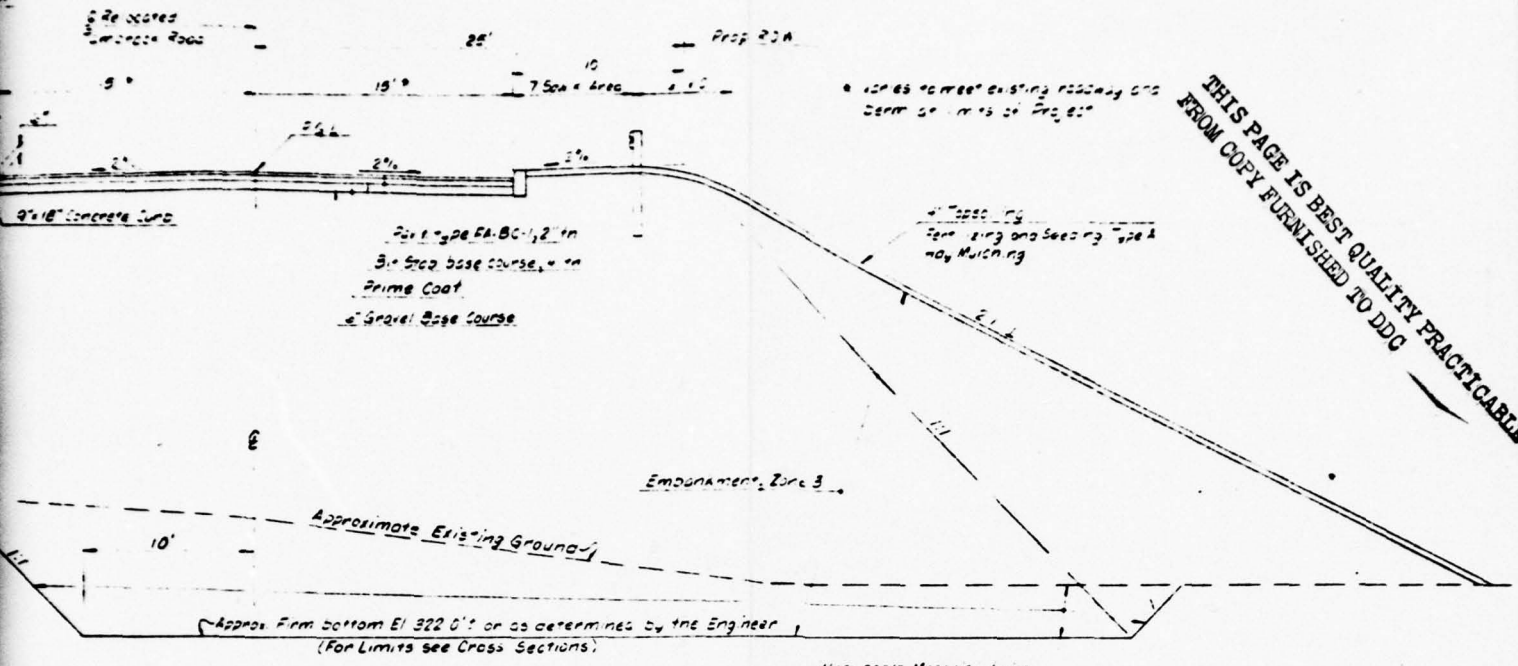
Note: For Areas where this Detail is to apply see Plan sheet No. 5.



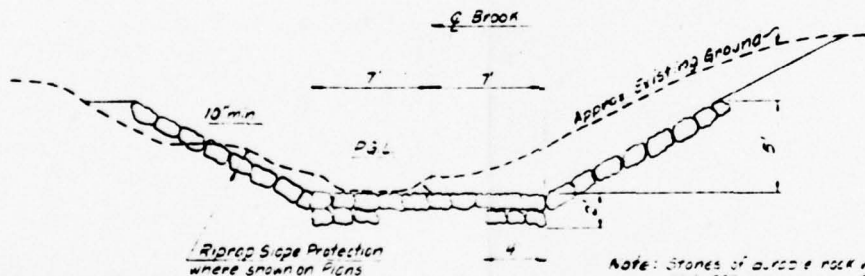
**TYPICAL BEDDING SECTION**

Scale: 1/2" = 1'-0"

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**TYPICAL SECTION**  
Scale: 1" = 5'



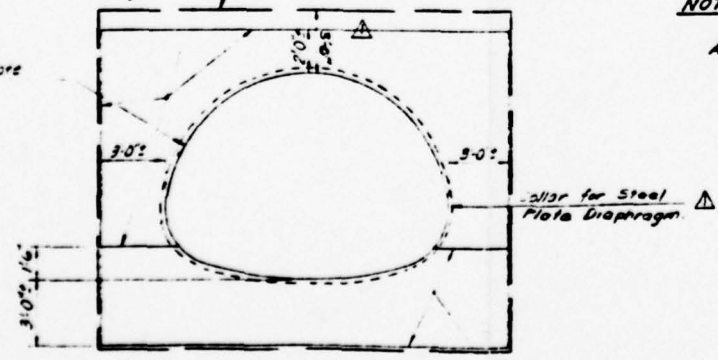
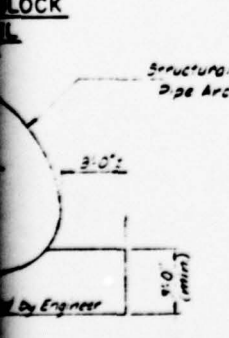
**PROPOSED BROOK SECTION**  
Scale: 1" = 5'

**A-36 Steel Diaphragm Mounted on Steel Angle Columns. Caulk to render Water Tight (for location see Sheet No. 14), 1 Req'd.**

Impervious Clay Diaphragm 18" Thick to be built as prior is backfilled - 4 Req'd.

Note: Stones of hard rock weighing from 25 to 300 pounds each. Stones to be placed in close contact with longest axis perpendicular to the slope. Open spaces to be filled with spalls rammed into place.

**NOTE:**  
AS BUILT ELEVATIONS SHOWN 34347

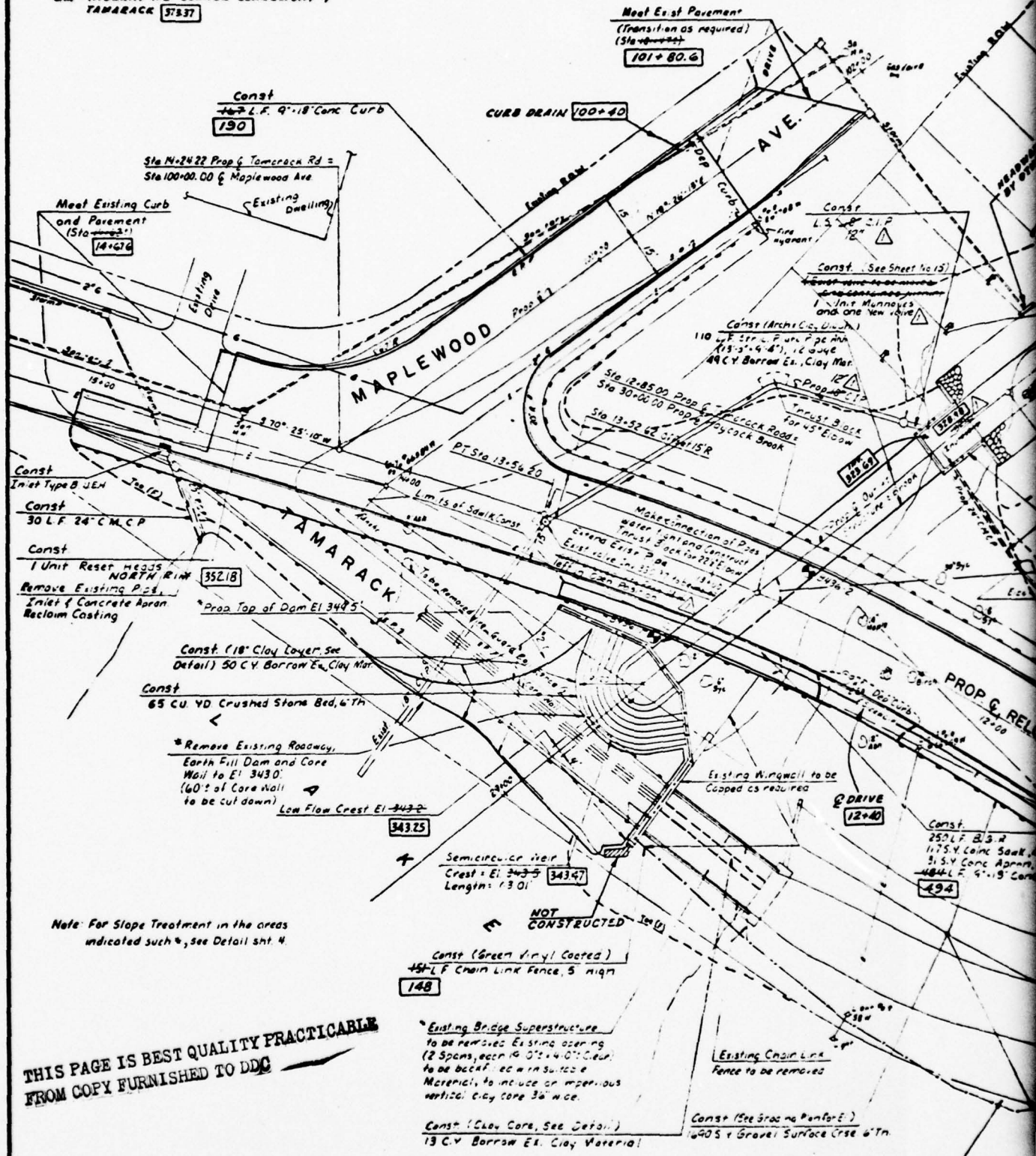


**TYPICAL DIAPHRAGM SECTION**  
Scale: 1/4" = 1'-0"

<b>PLATE 2</b>		
REV. $\Delta$	12/7/73	STEEL DIAPHRAGM & CONC. TOE @ CORE WALL
RECONSTRUCTION OF TAMARACK ROAD BRIDGE AT LIONSHEAD LAKE		
TOWNSHIP OF WAYNE		
PASSAIC COUNTY		NEW JERSEY
<b>TYPICAL SECTIONS</b>		
JOHN E. KUHNAST		TOWNSHIP ENGINEER
A G LICHTENSTEIN & ASSOC CONSULTING ENGINEERS TEANECK, N.J.	DATE July 1973	DWG NO. 4 OF 19
	SCALE As Shown	SHEET NO 4



BM - HYDRANT NE CORNER CLAREMONT & TAMARACK 37337

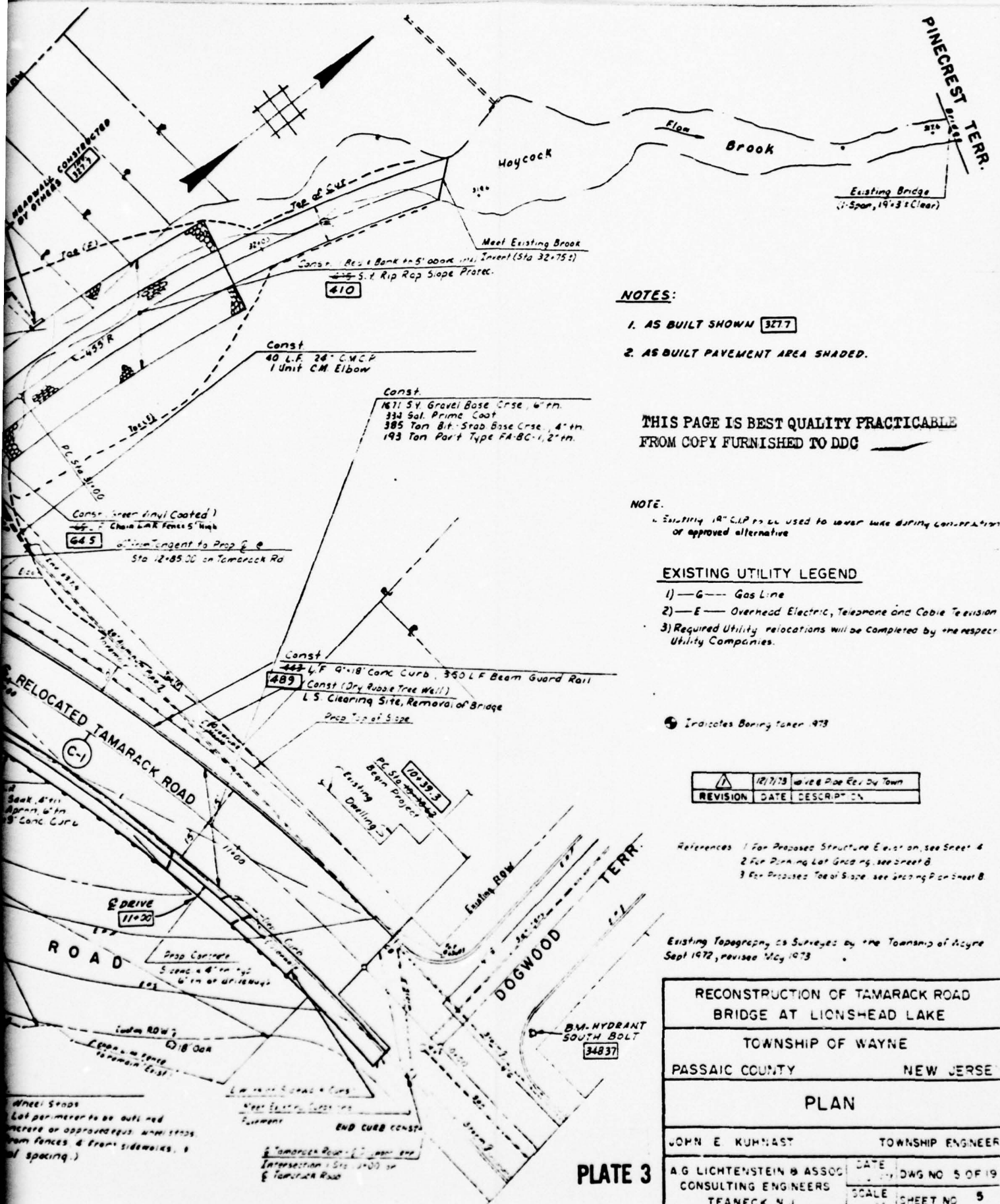


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CURVE DATA				
NO	L	R	Δ	T
C-1	317.58	667.92	27°29'40"	161.83

PLAN

Const  
50 Unit Wheel  
Parking Lot  
with concrete  
Set 6' from  
at equal sp



**NOTES:**

- 1. AS BUILT SHOWN [3277]
- 2. AS BUILT PAVEMENT AREA SHADED.

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**NOTE:**

Existing 18" CIP to be used to lower lake during construction or approved alternative

**EXISTING UTILITY LEGEND**

- 1) — G — Gas Line
- 2) — E — Overhead Electric, Telephone and Cable Television
- 3) Required Utility relocations will be completed by the respective Utility Companies.

Indicates Boring Log #73

REVISION	DATE	DESCRIPTION
	12/7/73	as per Prop. E. by Town

- References: 1 For Proposed Structure E. list on, see Sheet 4
- 2 For Planning Lot Grading, see Sheet 8
- 3 For Proposed Top of Slope, see Grading Plan Sheet 8

Existing Topography as Surveyed by the Township of Wayne Sept 1972, revised May 1973

<b>RECONSTRUCTION OF TAMARACK ROAD BRIDGE AT LIONSHEAD LAKE</b>	
TOWNSHIP OF WAYNE	
PASSAIC COUNTY	NEW JERSEY
<b>PLAN</b>	
JOHN E. KUHNAST	TOWNSHIP ENGINEER
AG LICHTENSTEIN & ASSOC CONSULTING ENGINEERS TEANECK, N.J.	DATE: _____ SCALE: _____ DWS NO 5 OF 19 SHEET NO 5

**PLATE 3**

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330

CHAIN LINK FENCE

EXIST TAMARACK RD

RELOCATED TAMARACK RD

EL. 344.64'

343.47

WEIR CREST EL. 343.2'

LOW FLOW CREST EL. 343.2'

343.25

EXCAVATE AND BACKFILL WHERE REQ'D  
EXIST. EARTH DAM TO ELEV. 343.0'

340

EXISTING CORE WALL (FOR TREATMENT  
SEE DETAILS, SHEET NO. 4)

330

APPROX EXIST GROUND

-10.0%

ELEV. 325.0'

NOTE:

PROP. WALL FOOTING NOT SHOWN

6" CRUSHED STONE BED

CLASS "D" CONCRETE  
TOE

ELEV. 322.0'

326.0'

DATUM EL. 322.0'

328.0

336.3

343.3

348.0

345.3

333.3

329.6

326.65

324.7

324.8

28+00

29+00

30+00

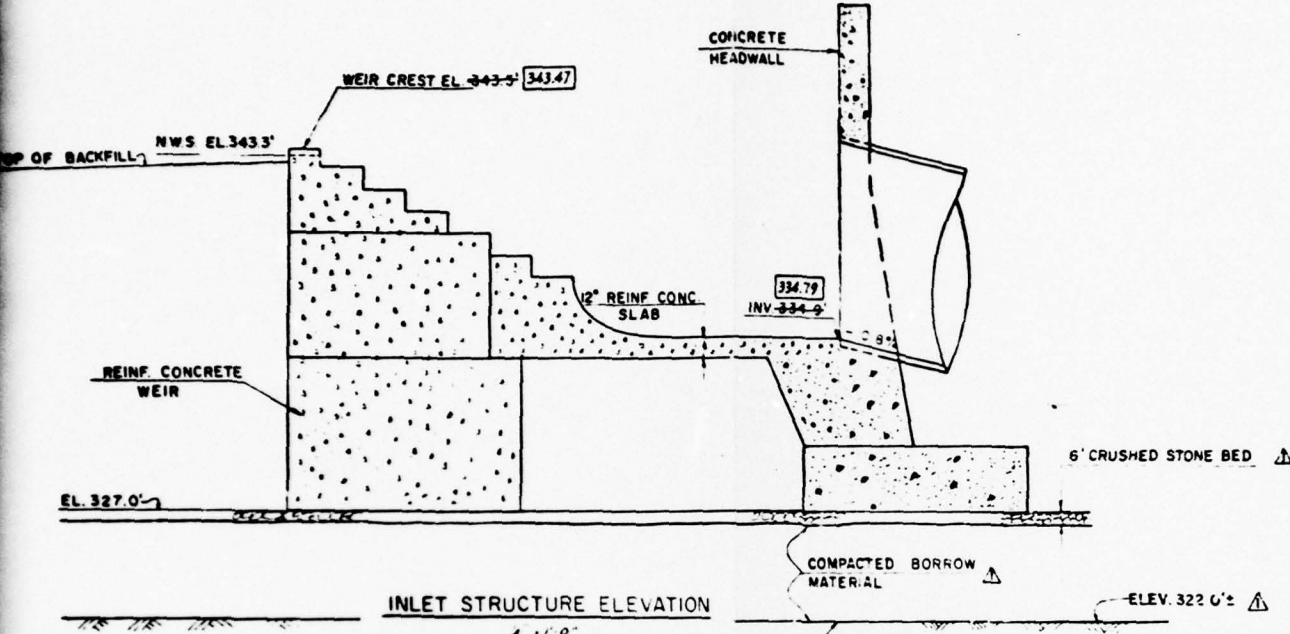
31+00

PROFILE ALONG & OUTLET STRU

Horiz - 1"=20'  
Vert - 1"=2'



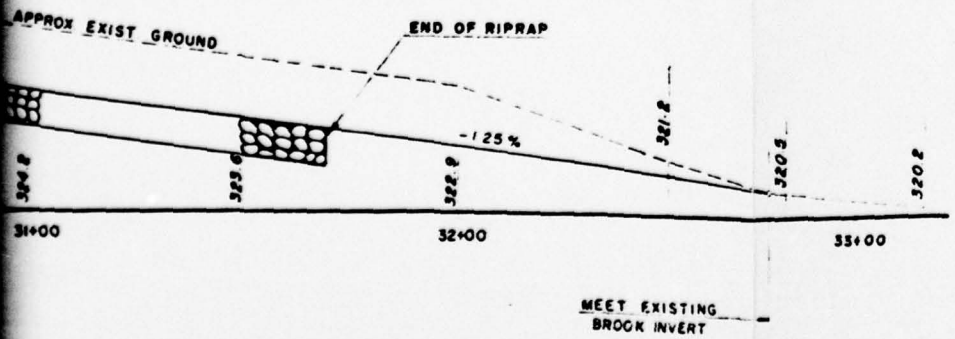
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NOTE:  
REIN. STEEL NOT SHOWN

REFUSAL LINE  
(FIELD CONDITION)

NOTE:  
AS BUILT ELEVATIONS SHOWN 34347

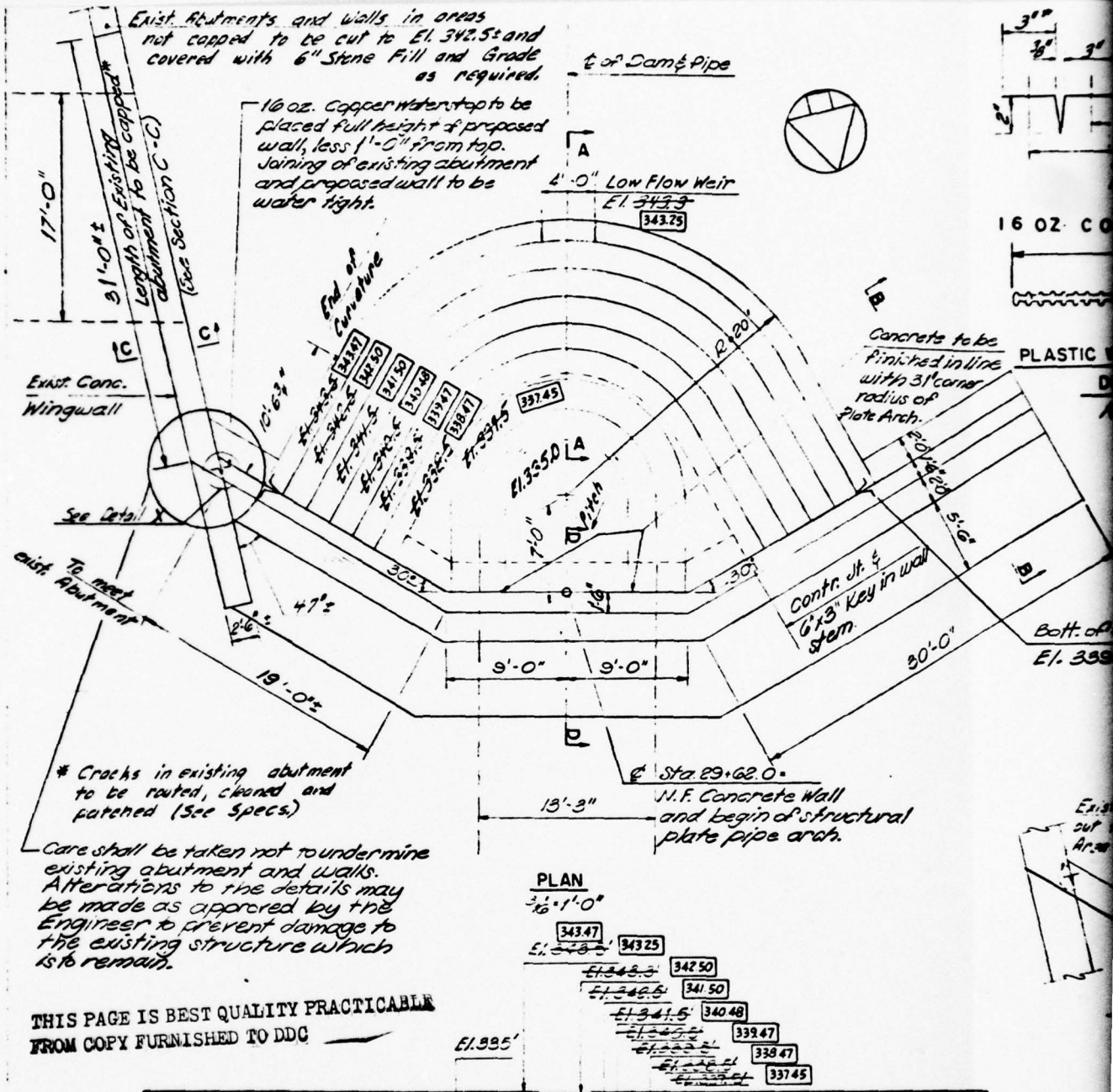


STRUCTURE @ HAYCOCK BROOK

REV. 1. 12/7/73 FOUNDATION REV. FOR ACTUAL CONDITION  
AS PER MEETING WITH STATE 1/30/73

RECONSTRUCTION OF TAMARACK ROAD BRIDGE AT LIONSHEAD LAKE	
TOWNSHIP OF WAYNE PASSAIC COUNTY NEW JERSEY	
STREAM PROFILE	
JOHN E. KUHNAST	TOWNSHIP ENGINEER
A. G. LICHTENSTEIN & ASSOC. CONSULTING ENGINEERS TEANECK, N.J.	DATE DWG. NO. 7 OF 9 SHEET NO. 7

PLATE 4



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ELEVATION  
3/16 x 1'-0"

Note: Wingwalls not shown.

+2970' NAD

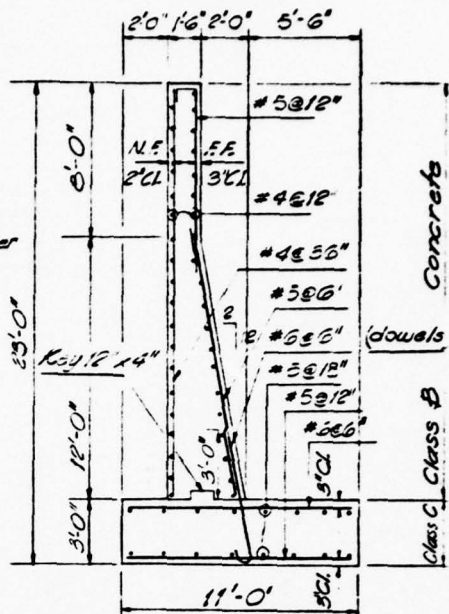
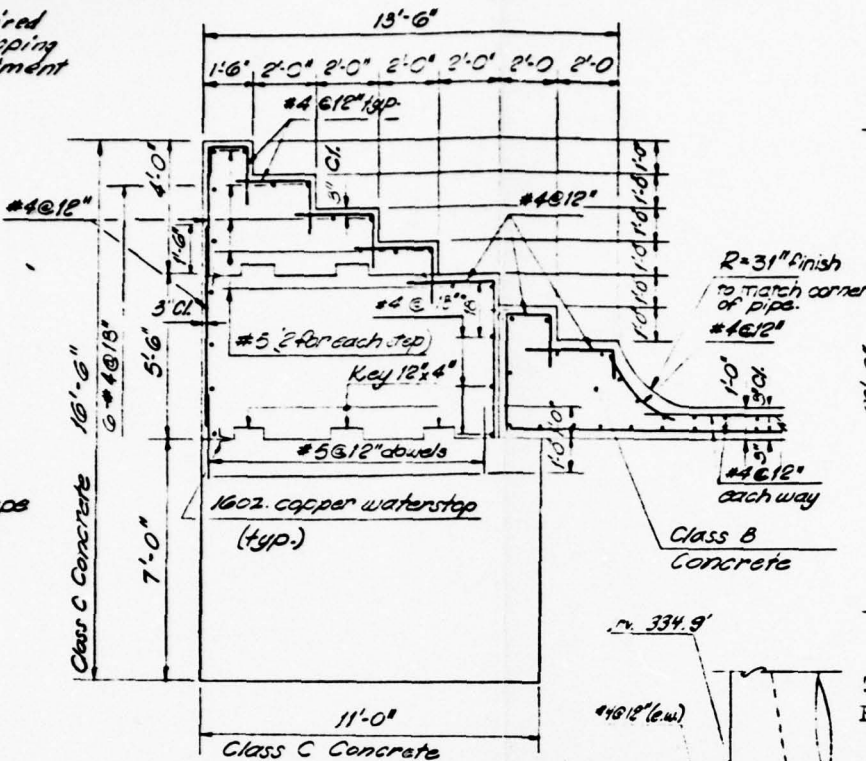
NOTE  
45

\*3" if required after chipping exist. abutment

12" holes @ 2" centers (full length)

COPPER  
6"  
C WATER STOP  
DETAILS

N.T.S.  
Note = Either type is acceptable for use.

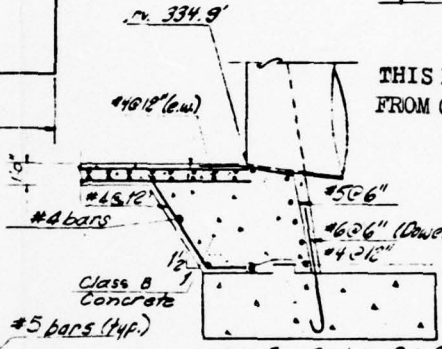


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of waterstop  
39.5 (2 req'd)

SECTION A-A  
3/8" = 1'-0"

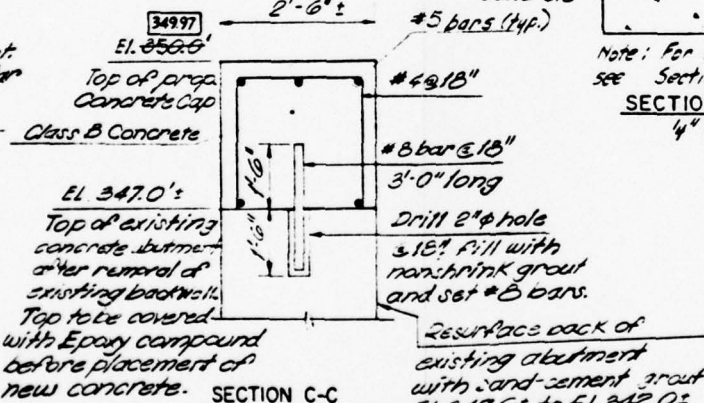
SECTION B-B  
1/4" = 1'-0"



SECTION D-D  
1/4" = 1'-0"

Exist. Abut. to be chipped out for waterstop imbedment. Area to be filled with mortar

DETAIL X  
N.T.S.

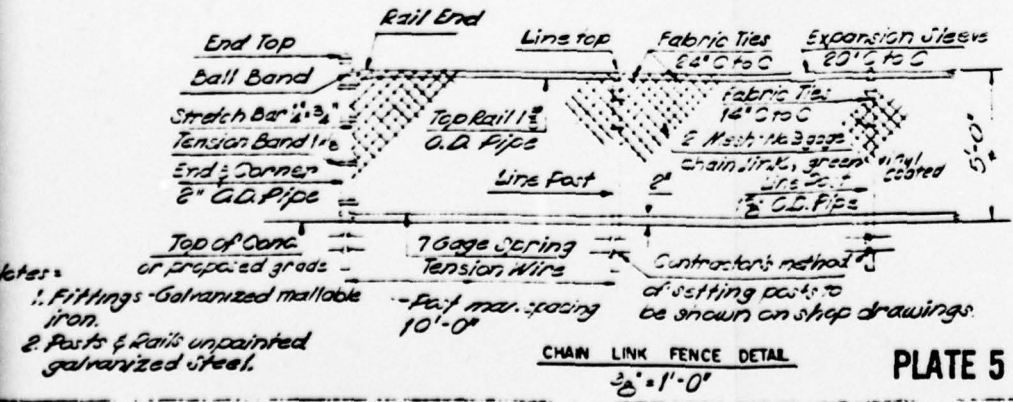


SECTION C-C  
N.T.S.

MATERIAL NOTES:

- Concrete:
    - Ultimate compressive strength = 3,000 @ 28 days.
    - Extreme fiber in compression = 1,000 psi
  - Reinforcement steel:
    - Grade 40,  $f_s = 20,000$  psi
  - Cover:
    - Against earth = 3"
    - Other = 2" unless otherwise noted
  - Chamfer: all exposed edges 1/2" x 1/2"
- References:  
1. For Foundation Excavation Ray Limits (See Sheet 14)

NOTE: AS BUILT ELEVATIONS SHOWN 34325



CHAIN LINK FENCE DETAIL  
3/8" = 1'-0"

PLATE 5

RECONSTRUCTION OF TAMARACK ROAD  
BRIDGE AT LIONSHEAD LAKE

TOWNSHIP OF WAYNE  
PASSAIC COUNTY NEW JERSEY

**INLET STRUCTURE**

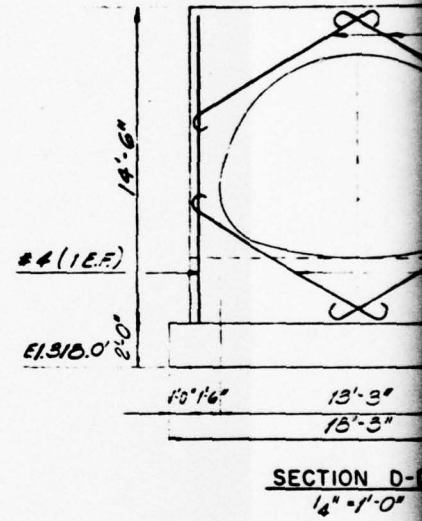
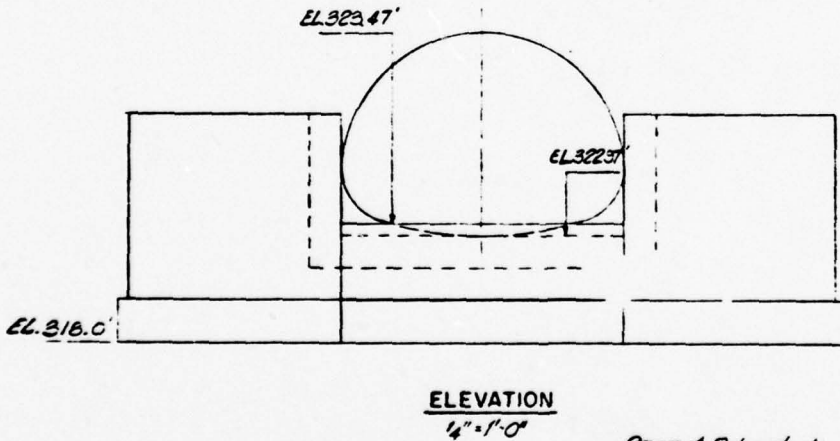
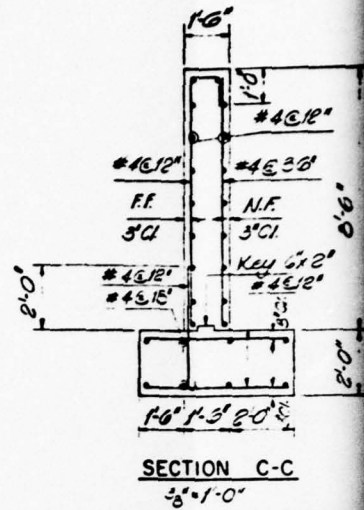
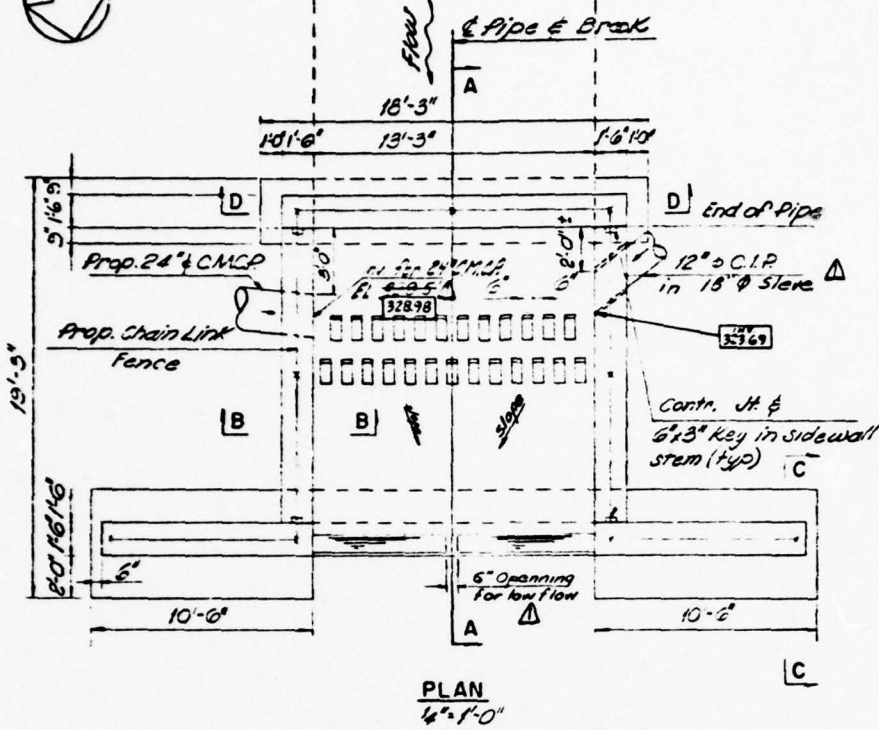
JOHN E. KUHNAST TOWNSHIP ENGINEER

A.G. LICHTENSTEIN & ASSOC.  
CONSULTING ENGINEERS  
TEANECK, N.J.

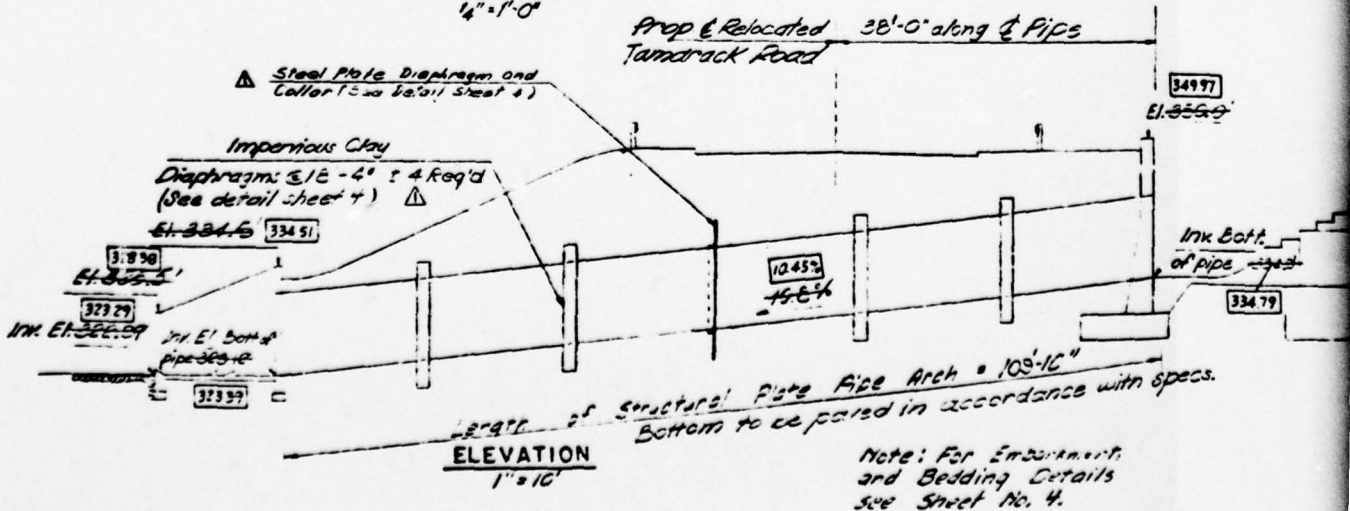
DATE: \_\_\_\_\_  
SCALE: \_\_\_\_\_  
DWG NO 13 OF 19  
SHEET NO 13

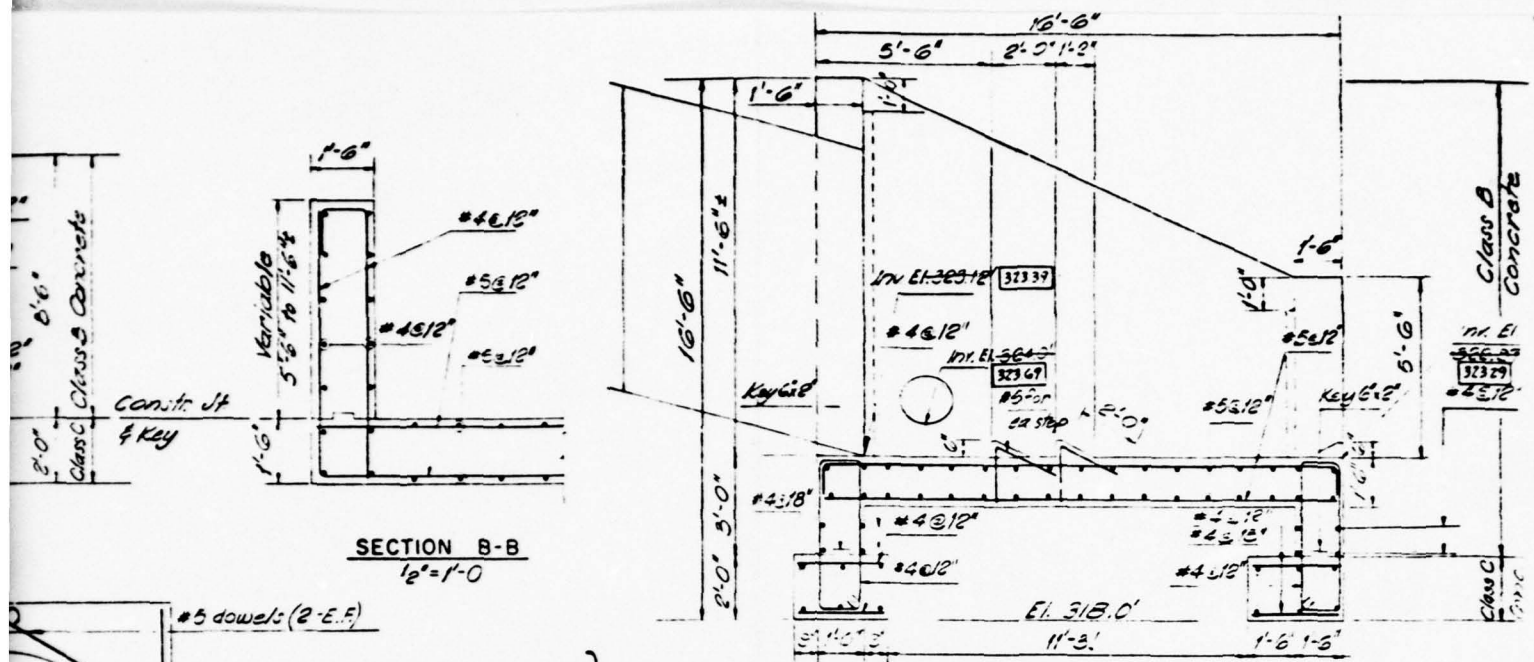


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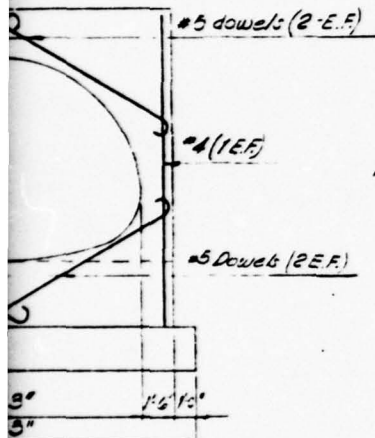
For Foundation E  
Limits in vicinity  
core wall, see de



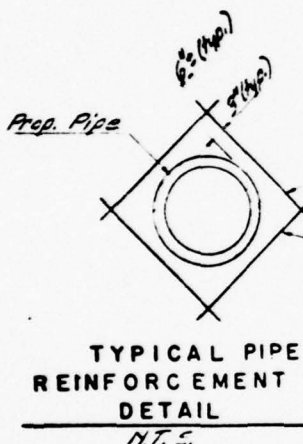


**SECTION B-B**  
12" = 1'-0"

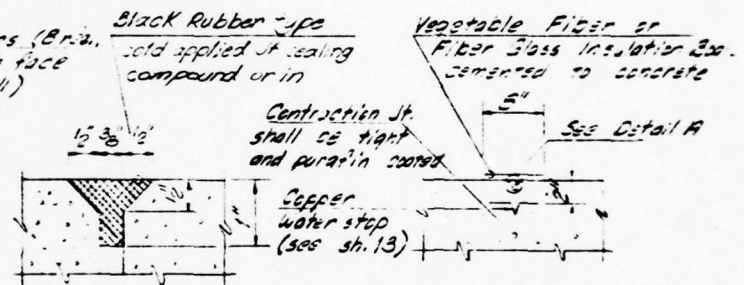
**SECTION A-A**  
3/8" = 1'-0"



**D-D**  
1" = 1'-0"



**TYPICAL PIPE REINFORCEMENT DETAIL**  
N.T.S.

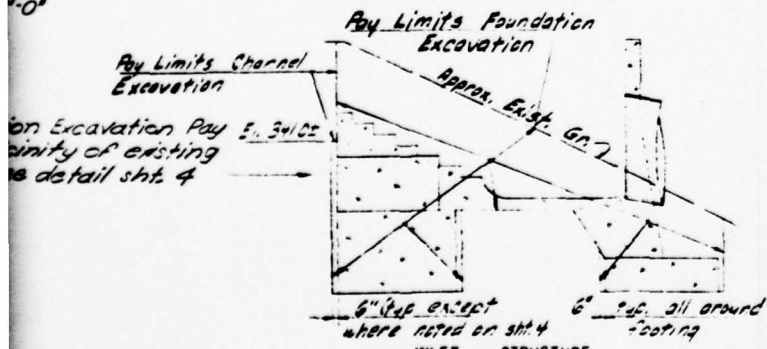


**DETAIL A**  
N.T.S.

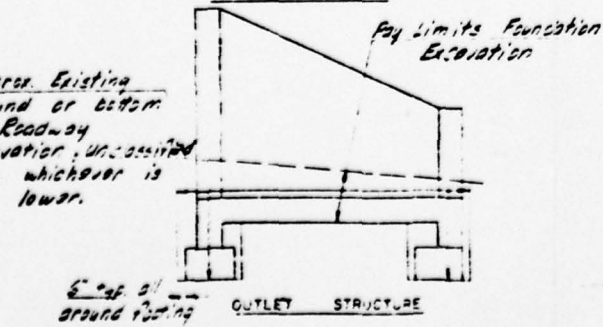
**CONTRACTION JOINT**  
N.T.S.

**NOTE:**  
AS BUILT ELEVATIONS SHOWN 32369

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**INLET STRUCTURE**



**PAY LIMITS FOR FOUNDATION EXCAVATION**  
N.T.S.

REV. Δ	11/27/73	ADD STEEL DIAPHRAGM - OUTLET STRUCTURE
RECONSTRUCTION OF TAMARACK ROAD BRIDGE AT LIONSHEAD LAKE		
TOWNSHIP OF WAYNE		
PASSAIC COUNTY		NEW JERSEY
OUTLET STRUCTURE & ELEVATION		
JOHN E. KUHNAST		TOWNSHIP ENGINEER
AG LICHTENSTEIN & ASSOC CONSULTING ENGINEERS TEANECK, N. J.	DATE	DWG. NO. 14 OF 19
	SCALE	SHEET NO. 14

PHOTOGRAPHS

31

0



DETAILED PHOTOGRAPH DESCRIPTIONS

Overall View of Dam - View Downstream at Spillway Culvert and Head Wall (Roadway Embankment Dam in Background) - 13 June 1978

Photo 1 - View Upstream (Southeast) Over Lionshead Lake From Left (West) Side of Inlet Weir - 13 June 1978

Photo 2 - View East at Wing Wall on West Side of Parking Area at Right (East) End of Dam (Inlet Weir in Left Center of Photo) - 13 June 1978

Photo 3 - View East at Inlet Weir (Culvert Inlet off Left Side of Photo) - 13 June 1978

Photo 4 - View Northeast at Culvert Inlet - 13 June 1978

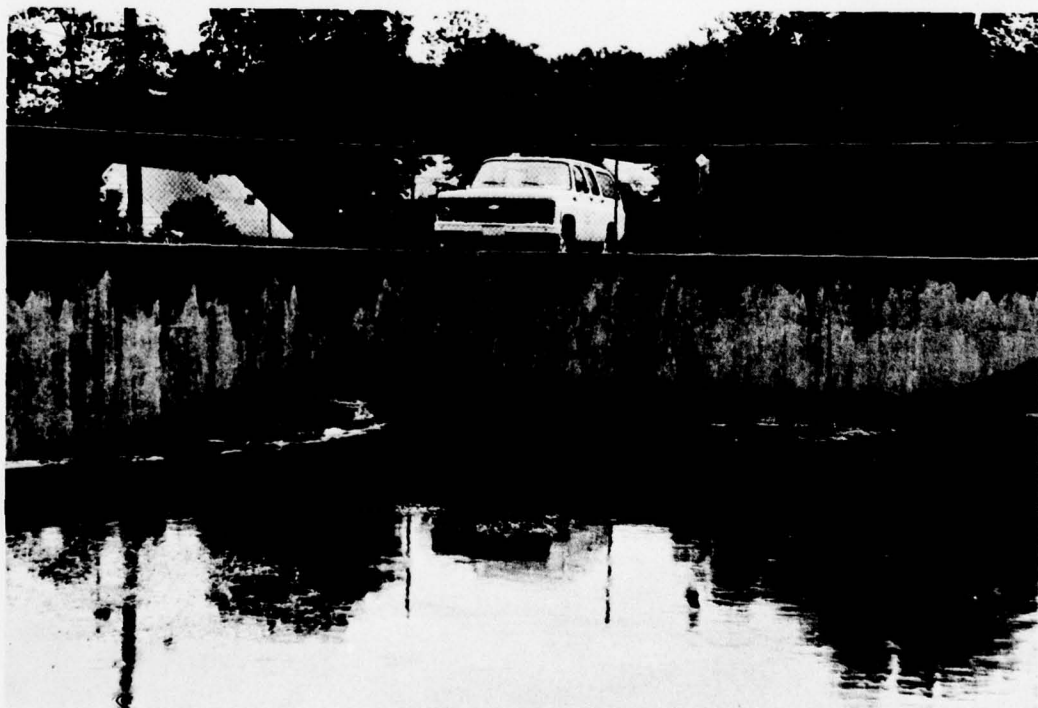
Photo 5 - View Upstream (South) at Culvert Outlet Showing Trash and Debris in Outlet Channel - 13 June 1978

Photo 6 - View Downstream (North) Along Outlet Channel From Crest of Downstream Slope of Dam (Culvert Outlet Headwall at Bottom Center of Photo. Riprap on Stream Banks Extends 85 Feet Downstream From Culvert Outlet. The Riprap Lines the Slopes to a Height of Five Feet Above the Streambed Level.) - 13 June 1978

NAME OF DAM: LIONSHEAD LAKE DAM



**PHOTO 1**



**PHOTO 2**

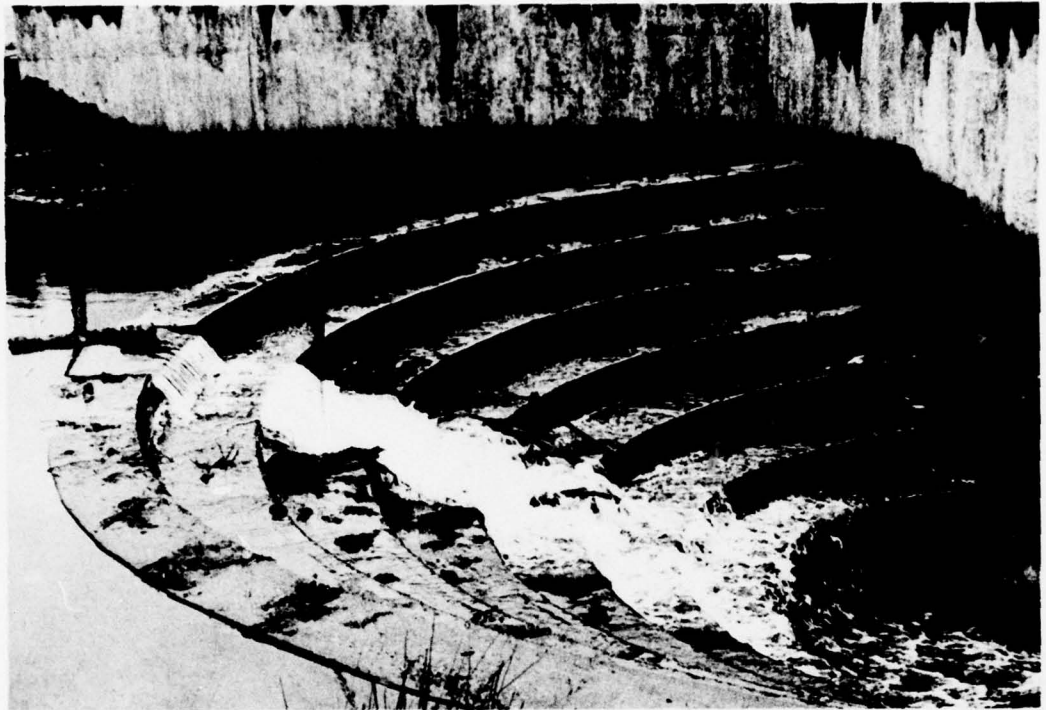


PHOTO 3

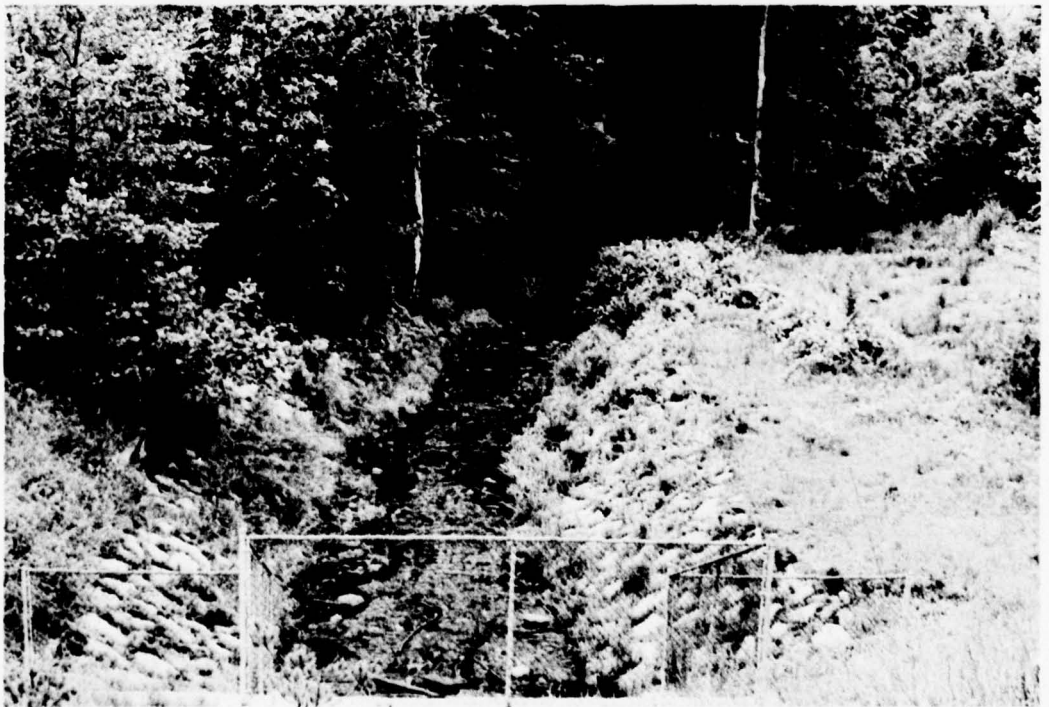


PHOTO 4





**PHOTO 5**



**PHOTO 6**

APPENDIX A

CHECK LIST - VISUAL INSPECTION

Check List  
Visual Inspection  
Phase 1

Name Dam Lionshead Lake Dam County Passaic State New Jersey Coordinates Lat. 40° 58.5'  
Long. 74° 15.6'

Date Inspection 13 June 1978 Weather Cloudy with Rain Showers Temperature 60°F.

66

Pool Elevation at Time of Inspection 343.5 M.S.L. Tailwater at Time of Inspection M.S.L.

Low flow weir crest El. 343.25 from "as built" drawings. No tailwater as such at time of inspection. Culvert outlet  
Flow 0.2 foot over 4.0 feet wide, 1.5 feet long low flow inlet weir at time of inspection. invert El. 323.69 from "as built" drawings.

Inspection Personnel:

- E. U. Gingrich
  - Michael Baker, Jr., Inc.
  - T. J. Dougan
  - Michael Baker, Jr., Inc.
  - J. V. Hamel
  - Michael Baker, Jr., Inc.
- Dennis Hamilton  
Wayne Township Waterways Inspector

J. V. Hamel Recorder



CONCRETE/MASONRY HEADWALL OF C.M.P. ARCH CULVERT

Lionshead Lake Dam

**VISUAL EXAMINATION OF** \_\_\_\_\_ **OBSERVATIONS** \_\_\_\_\_ **REMARKS OR RECOMMENDATIONS**

SEE PAGE ON LEAKAGE

**STRUCTURE TO  
ABUTMENT/EMBANKMENT  
JUNCTIONS**

Minor erosion in sand-gravel fill at  
left end of head wall.

40

**DRAINS**

None

**WATER PASSAGES**

None

**FOUNDATION**

Not visible

CONCRETE/MASONRY HEADWALL C.M.P. ARCH CULVERT

Lionshead Lake Dam

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS CONCRETE SURFACES	None observed	
STRUCTURAL CRACKING	None observed	
VERTICAL AND HORIZONTAL ALIGNMENT	No problems observed	
MONOLITH JOINTS	No problems observed	
CONSTRUCTION JOINTS	No problems observed	

EMBANKMENT

Lionshead Lake Dam

VISUAL EXAMINATION OF OBSERVATIONS REMARKS OR RECOMMENDATIONS

SURFACE CRACKS

None observed

UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE

None observed

SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES

Minor erosion in sand-gravel embankment fill at several locations along crests of upstream and downstream slopes. Only erosion of significance is around left (west) end culvert headwall--area approximately four feet wide by one foot maximum depth. Several small erosion channels on upstream side embankment at left abutment contact 50 feet southwest of culvert inlet.

Slopes well vegetated. The grass is periodically mowed. Minor grading and seeding of eroded area on the upstream slope, left abutment area. Consider riprap for upstream face embankment left culvert inlet if public access would not be adversely affected.

VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST

No problems observed.

RIPRAP FAILURES

None observed.

The only riprap is along the downstream channel extending 85 feet downstream from the culvert outlet. Both sides are covered from stream level to five feet above stream level.



EMBANKMENT

Lionshead Lake Dam

VISUAL EXAMINATION OF OBSERVATIONS REMARKS OR RECOMMENDATIONS

JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM

No problems were observed.

ANY NOTICEABLE SEEPAGE

No seepage was observed in the embankment. It had rained earlier 13 June 1978 and showered during the inspection. A small seepage area was observed at the contact of the downstream slope and the downstream toe of the right abutment, approximately 40 feet east of culvert outlet. Seepage was also observed at the toe of fill behind the house at #115 Tamarack Road (downstream right bank).

Both seepage areas are inferred to be natural groundwater flows from the hill to the east of the dam. This inference is based upon: the low hydraulic head on the dam, the permeability of the material in the embankment and abutment regions, the distance the seepage would have to travel through the dam, and the relative elevation of the seepage areas compared to the pool elevation. Although no seepage was observed in the embankment, future inspections should check the embankment in dry weather. Also, the future inspections in dry weather should verify if the seepage areas observed were the result of the rain prior to inspection of 13 June 1978 or natural groundwater flow.

STAFF GAGE AND RECORDER

None

DRAINS

None except the 13.0 feet by 9.0 feet C.M.P. arch culvert under roadway.

OUTLET WORKS

Lionshead Lake Dam

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	See notes on "UNGATED SPILLWAY" Sheet.	
INTAKE STRUCTURE	See notes on "UNGATED SPILLWAY" Sheet.	
OUTLET STRUCTURE	The C.M.P. arch culvert outlet has a reinforced concrete head wall approximately 11 feet high with reinforced concrete wing walls on both sides. A 12 inch diameter cast-iron pipe outlet with invert at approximately El. 324 is located at the base of the left (west) wing wall approximately three feet downstream from the arch culvert outlet. Flow estimated at three to four g.p.m. was discharging from the 12 inch pipe at the time of inspection.	The valved 12 inch cast-iron pipe has not been used for drawdown of the lake to the best knowledge of Dennis Hamilton, the Wayne Township Waterways Inspector. Mr. Hamilton also indicated that the valve is non-operational.
OUTLET CHANNEL	See notes on "UNGATED SPILLWAY" Sheet.	
EMERGENCY GATE	None	

UNGATED SPILLWAY

Lionshead Lake Dam

VISUAL EXAMINATION OF

OBSERVATIONS

REMARKS OR RECOMMENDATIONS

CONCRETE WEIR

Minor concrete spalling thru 1/2 step down from top on right (east) side semicircular inlet weir--probable surficial ice damage.

Chip out spalled concrete and patch.

APPROACH CHANNEL

No approach channel. The lake spills over semicircular weir into C.M.P. arch culvert (13 feet three inches by nine feet zero inches) beneath roadway embankment.

DISCHARGE CHANNEL

Tree branches and other debris in channel. Carefully placed granite boulder riprap extends 85 feet downstream from culvert outlet. Both sides are covered from stream level to five feet above stream level.

Routine maintenance and clean debris from channel. No riprap problems observed.

BRIDGE AND PIERS

No bridge or piers. Concrete head wall at culvert in good condition.

OUTLET CULVERT  
(13' x 9' C.M.P.  
ARCH)

Minor seepage and iron oxide stains (flow less than one g.p.m.) culvert joint located approximately one foot above invert, right (east) side approximately 35 feet upstream from culvert outlet. This seepage is not considered detrimental to the structure.

Asphalt paving (three inches thick) eroded approximately four feet wide and 12 feet back from culvert outlet. Both the culvert joint and the asphalt paving should be repaired as a part of general maintenance of the outlet culvert.



**GATED SPILLWAY**

Lionshead Lake Dam

<b>VISUAL EXAMINATION OF</b>	<b>OBSERVATIONS</b>	<b>REMARKS OR RECOMMENDATIONS</b>
<b>CONCRETE SILL</b>	Not Applicable	
<b>APPROACH CHANNEL</b>	Not Applicable	
<b>DISCHARGE CHANNEL</b>	Not Applicable	
<b>BRIDGE AND PIERS</b>	Not Applicable	
<b>GATES AND OPERATION EQUIPMENT</b>	Not Applicable	

**INSTRUMENTATION**

Lionshead Lake Dam

**VISUAL EXAMINATION**

**OBSERVATIONS**

**REMARKS OR RECOMMENDATIONS**

**MONUMENTATION/SURVEYS**

No instrumentation as such.

**OBSERVATION WELLS**

None

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**WEIRS**

Low flow inlet weir--4.0 feet long, 1.5 feet wide flowing  
0.2 foot deep at time of inspection.

**PIEZOMETERS**

None

**OTHER**

None

**RESERVOIR**

Lionshead Lake Dam

<b>VISUAL EXAMINATION OF</b>	<b>OBSERVATIONS</b>	<b>REMARKS OR RECOMMENDATIONS</b>
<b>SLOPES</b>	Glacial moraine and ice contact granular soils, well vegetated--stable from both soil mechanics and hydraulic standpoints.	
<b>SEDIMENTATION</b>	Minor erosion and sedimentation at several locations around lakeshore. No problems of significance were observed from upper and lower ends of lake.	



DOWNSTREAM CHANNEL

Lionshead Lake Dam

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
<p>CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)</p>	<p>Some tree branches and debris near outlet C.M.P. culvert. Granite pegmatite boulder riprap extends 85 feet downstream from culvert outlet, five feet above stream level on both sides. Glacial moraine or till boulders (six feet maximum) along both sides of the stream channel downstream of riprap to bridge. Small fieldstone wall last 60 feet on right bank to bridge at Pinecrest Terrace. Bridge 20 feet long by 17 feet wide; clear opening on bridge three feet above present stream level, four feet streambed to bridge; width 19 feet, abutment to abutment, approach channel only 10 feet wide.</p>	<p>Routine maintenance, remove branches and debris.</p> <p>Spring flow (one to two g.p.m.) from beneath left bank riprap 80 feet downstream from culvert. One foot above stream level--iron oxide stains--probably natural spring flow from left bank slope, no problem.</p>
<p>CHANNEL SLOPES</p>	<p>Channel slopes are moderately flat consisting of glacial moraine and till partially lined with numerous natural riprap boulders. The slopes are highly vegetated. The slopes are stable from both soil mechanics and hydraulics standpoints. Locally some fill along stream banks from upslope house construction.</p>	
<p>APPROXIMATE NO. OF HOMES AND POPULATION</p>	<p>Several (eight to 10) homes in reach from culvert outlet to Pinecrest Terrace Bridge--minimum basement level five feet above stream level (by eye); more homes located further downstream from bridge to Pines Lake Reservoir.</p>	<p>Estimate approximately 100 houses, 500 people along bank and Haycock Brook, Lionshead Dam to Pines Lake.</p>

APPENDIX B

CHECK LIST - ENGINEERING DATA

56

Lionshead Lake Dam

**CHECK LIST  
ENGINEERING DATA  
DESIGN, CONSTRUCTION, OPERATION**

<u>ITEM</u>	<u>REMARKS</u>
-------------	----------------

<b>PLAN OF DAM</b>	A complete set of "as built" drawings are available from Wayne Township. Various pertinent "as built" drawings are included as Plates with the Phase I Inspection Report.
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<b>REGIONAL VICINITY MAP</b>	See the Location Plan included in this report.
------------------------------	--

<b>CONSTRUCTION HISTORY</b>	Original dam constructed in 1939. This consisted of a dam and a bridge. In 1973, the existing dam and roadway embankment were constructed immediately downstream of the previous structure. At this time, the bridge was removed and replaced with backfill including a 36 inch vertical clay core. The original embankment dam with a concrete core wall was removed down to El. 343.0 feet.
-----------------------------	---

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<b>TYPICAL SECTIONS OF DAM</b>	Typical sections are included as Plates with the Phase I Inspection Report.
<b>HYDROLOGIC/HYDRAULIC DATA</b>	See Hydrologic and Hydraulic data check list.

<b>OUTLETS - PLAN</b>	See Wayne Township "as built" drawings, some of which are included as
- DETAILS	Plates with the Phase I Inspection Report.

- CONSTRAINTS	None
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- DISCHARGE RATINGS	Not readily available.
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<b>RAINFALL/RESERVOIR RECORDS</b>	No information available.
-----------------------------------	---------------------------



Lionshead Lake Dam

ITEM

REMARKS

**DESIGN REPORTS**

No design information on the dam was available for the Phase I Inspection.

**GEOLOGY REPORTS**

No geology reports on the dam were available.

**DESIGN COMPUTATIONS**

**HYDROLOGY & HYDRAULICS**

None available.

**DAM STABILITY**

**SEEPAGE STUDIES**

5  
2

**MATERIALS INVESTIGATIONS**

**BORING RECORDS**

**LABORATORY**

**FIELD**

None readily available.

**POST -CONSTRUCTION SURVEYS OF DAM**

Post-construction survey performed by Osborne M. Campbell & Associates, Mendham, New Jersey. Information from survey incorporated in "as built" drawings.

**BORROW SOURCES**

No information available.

Lionshead Lake Dam

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

MONITORING SYSTEMS	None
--------------------	------

**MODIFICATIONS** Present dam and roadway a revision of dam constructed in 1939. No modifications to present structure since construction.

**HIGH POOL RECORDS** None readily available

53

**POST-CONSTRUCTION ENGINEERING STUDIES AND REPORTS** Original dam and bridge inspection report dated 1970. (This was prior to construction of existing structure.)

**PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS** No reported accidents or failures.

**MAINTENANCE OPERATION RECORDS** None readily available

Lionshead Lake Dam

ITEM

REMARKS

**SPILLWAY PLAN**      Included as Plates in the Phase I Inspection Report.

**SECTIONS**

**DETAILS**

**OPERATING EQUIPMENT  
PLANS & DETAILS**

No operating equipment



CHECK LIST  
HYDROLOGIC AND HYDRAULIC DATA  
ENGINEERING DATA

2.04 square miles of northern New Jersey glacial  
terrain. (1.82 square miles of which is controlled  
by Point View Reservoir.)

DRAINAGE AREA CHARACTERISTICS: \_\_\_\_\_

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): 343.5 (60 acre-feet)

ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): Not Applicable

ELEVATION MAXIMUM DESIGN POOL: 349.0

ELEVATION TOP DAM: 349.0

CREST: Semicircular Weir

- a. Elevation 343.5
- b. Type Semicircular weir outletting into C.M.P. arch culvert
- c. Width Not Applicable
- d. Length 63 feet
- e. Location Spillover Right center of dam
- f. Number and Type of Gates Not Applicable

OUTLET WORKS: Not Applicable

- a. Type \_\_\_\_\_
- b. Location \_\_\_\_\_
- c. Entrance inverts \_\_\_\_\_
- d. Exit inverts \_\_\_\_\_
- e. Emergency draindown facilities \_\_\_\_\_

HYDROMETEOROLOGICAL GAGES: None

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

MAXIMUM NON-DAMAGING DISCHARGE Not Available

Lionshead Lake Dam

APPENDIX C

POINT VIEW DAM HYDRAULIC CALCULATIONS

Note: This appendix was prepared from the microfiche file of the New Jersey Department of Environmental Resources for Point View Dam (NJ 00236), State File ID #555.

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Possioic Valley Water Commission

PMP Inflow Hydrograph

With allowance for reservoir storage, the proposed spillway is adequate even during runoff from the ~~maximum~~ probable maximum precipitation storm.

JCR

4-11-62



Pointview Reservoir, Dam Appl. No. 555

Summary of findings:

1. Gravity Spillway section is structurally stable. *RDW*
2. Earth fill sections comply with rules and regulations. Stability check not possible because of lack of information regarding analysis of soils to be used. However, plans and specifications show that sound engineering practices were followed in design. *RDW*
3. Hydrology and Hydraulics (checked by J.C.R.)  
Dam designed for <sup>2067</sup> ~~2522~~ cfs which is in excess of the probable maximum precipitation storms

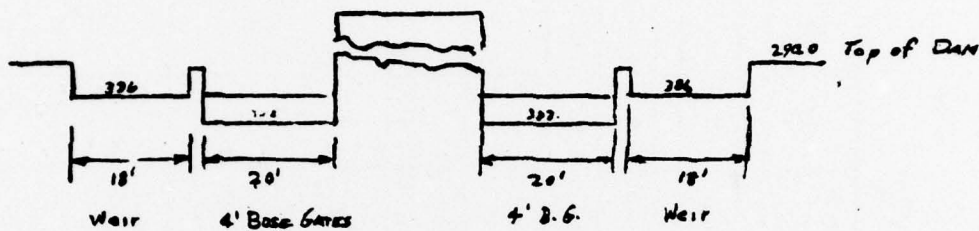
*RA Webster*

May 16, 1962

Raw 6/8/62  
CHKD BY Passaic Valley Water Comm.

Check on Spillway Discharge

9



1. Spillway Elev. 322.0 Bascule Gates Down

Broad crested Weir  $L = 40'$   
 $Q = C L H^{3/2}$   $C = 2.63$   
 $H = 4'$   $H^{3/2} = 8.0$

$Q = 2.63 \times 40 \times 8.0 = 542$  cfs. 464 csm

2. Spillway Elev. 326.0 Bascule Gates up

C value for Gates = 3.40 to 3.60 (Ref. Charlotsburg Dam)  
 C " " Weir = 3.31  
 Use average C = 3.40  
 $L = 76'$   $H = 4'$   $H^{3/2} = 8.0$

$Q = 3.60 \times 76 \times 8.0 = 2067$  cfs 1126 csm

3. Bascule Gates inoperative & Down (No Freeboard)

$H_u = 4.0$   $H_u^{3/2} = 8.0$   $L = 36$   $C = 3.31$   
 $H_{86} = 8.0$   $H_{86}^{3/2} = 22.63$   $L = 40$   $C = 2.63$

$2Q = (3.31 \times 36 \times 8.0) + (2.63 \times 40 \times 22.63) = 3333$  cfs, 1835 csm  
 953 2380

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Myer's Rating

Pasadic Valley Water Commission

Dam	Abroad	Design Flood Recur. Int.	Estimated Flood	Max. Spill Disch. #	DA	DA's	Myer's Coeff. #
Wanaguc	extreme						5720
Charlottesville							2810
Echo Lake							1300
Clinton							1140
Carrollton							2180
Oak Lodge							2000
Acanton							695
Split Rock							790
Longwood Valley							1240
Swimming Creek							1970
Spruce Run	extreme						3750
Point View	extreme						
Gatesdown							
design flood (by applicant)							
				2012	1.82	1.35	1490
			2218	2627			1185
				2700			2000

\* See report on Charlottesville dam (Dam Appl. No. 516)

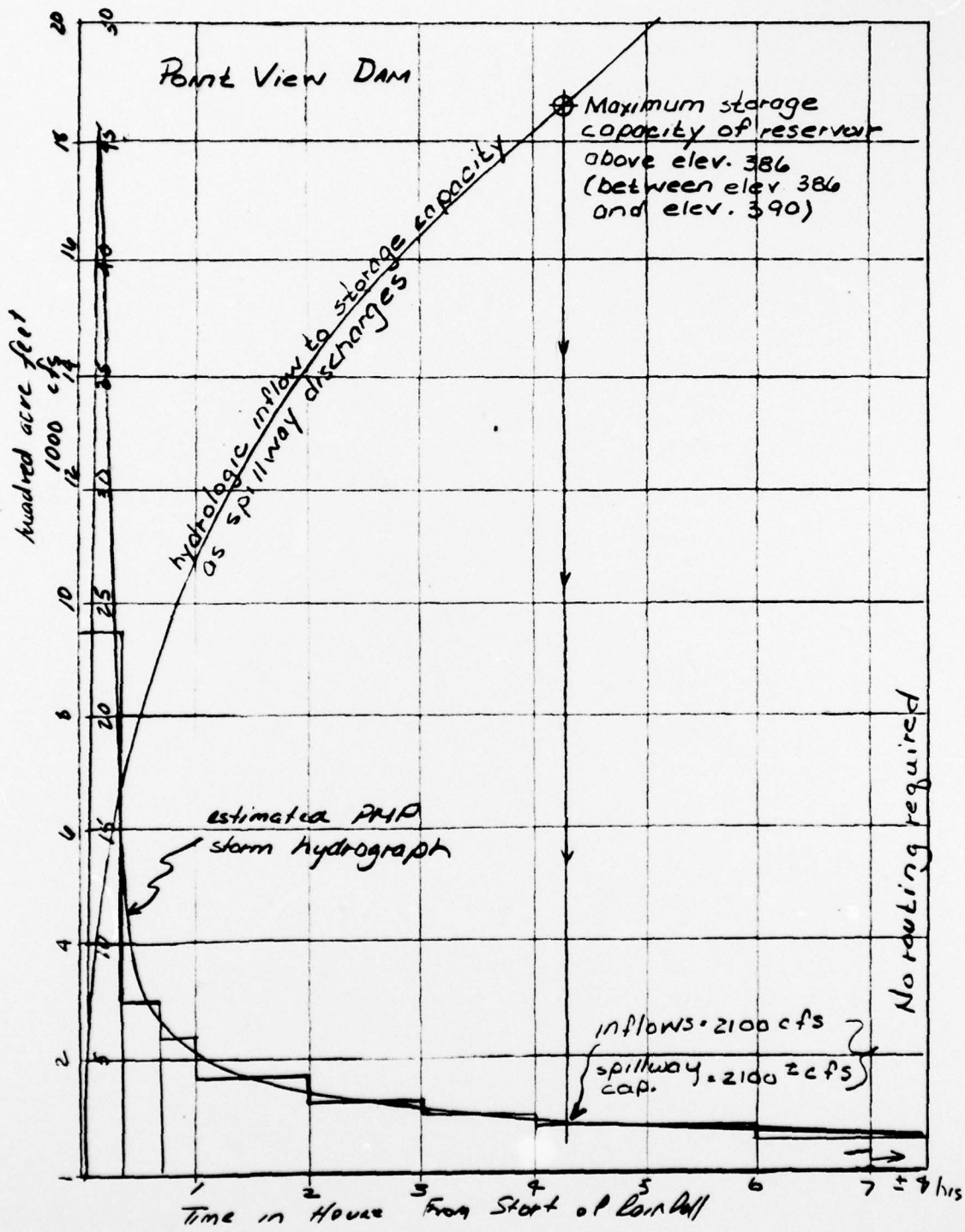


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*Passaic Valley Water Commission Dam*

A	B	C:AS	D	E	F	G	H	J	K	L	M	N	P	Q
5 7 0 R	Point Intensity	Total Storm Point	Inches start of Point	inches Point	Δ time hours	more mental Point inches	Point Coff	more mental Point inches	more mental Point feet	more mental Point feet	more mental Point feet	more mental Point feet	more mental Point feet	more mental Point feet
hour	in/hr	in/hr	hours	inches	hours	inches		inches	feet	feet	feet	feet	feet	seconds
0			0			8.5	0.80	6.8	0.57	664	664	28.92	1200	24100
1/3	25.6	8.5	1/3	8.5	1/3	2.8		2.2	0.18	210	874	9.15	1200	7625
2/3	17.0	11.3	2/3	11.3	2/3	2.1		1.7	0.14	163	1037	7.19	1200	5912
1	13.4	13.4	1	13.4	1	4.4		3.5	0.29	338	1375	14.72	3600	4089
2	8.9	17.8	2	17.8	1	3.2		2.6	0.22	256	1631	11.15	3600	3097
3	7.6	21.0	3	21.0	1	2.6		2.1	0.17	198	1829	8.62	3600	2394
4	5.9	23.6	4	23.6	2	4.0		3.2	0.27	515	2144	13.72	7200	1906
6	4.6	27.6	6	27.6	2	2.8		2.2	0.18	210	2354	9.15	7200	1271
8	3.8	30.4	8	30.4	4	5.6		4.5	0.37	431	2785	18.77	14400	1303
10	3.0	36.0	12	36.0	3	3.0		2.4	0.20	233	3018	10.15	10800	940
15	2.6	34.0	15	39.0	9	6.6		5.3	0.44	513	3531	22.35	32400	640
24	1.9	45.6	24	45.6	24	12.0		9.6	0.80	932	4463	40.60	96400	470
48	1.2	57.6	48	57.6										





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