Do Not Remove From
Dam Inspection Office

BUCKEYE LAKE DAM
LICKING, FAIRFIELD AND
PERRY COUNTIES, OHIO
FEDERAL INVENTORY NUMBER OH-474
STATE FILE NUMBER 9723-004

PREPARED BY
GAI CONSULTANTS, INC.

JULY 1978

PHASE 1 INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

U.S. ARMY ENGINEER DISTRICT, PITTSBURGH
CORPS OF ENGINEERS
PITTSBURGH, PENNSYLVANIA

APPENDIX A

PERTINENT DATA

1.1 Pertinent Data

1. Drainage Area: 41.95 sq. miles

2. Discharge at Dam Site:

   Maximum known flood at dam site: 1913, unknown water level; January 1959, water level was 11 inches above the flashboards due to melting snow and 2 inches of rain with 2 gates open; May 1968, water level near crest (had to sandbag low spots) with all gates closed. In all of the above cases, the discharge is unknown.

   Maximum non-damaging discharge through outlet works: Unknown

   Maximum non-damaging discharge through outlet works and spillway: Unknown

   Warm water outlet at pool elevation: N/A

   Diversion tunnel low pool outlet at pool elevation: N/A

   Diversion tunnel outlet at pool elevation: N/A

   Gated spillway capacity at pool elevation: N/A

   Gated spillway capacity at maximum pool elevation: N/A

   Ungated spillway capacity at maximum pool elevation: 3,175 cfs (Includes 5 outlet works gates)

   Total spillway capacity at maximum pool elevation: 3,175 cfs (Includes 5 outlet works gates)

3. Elevation (feet above MSL):

   Top of dam: 894.4 effective top at low spots; 895.0 generally about top elevation elsewhere

   Maximum pool-design surcharge: Unknown

   Full flood control pool: 892.5

   Recreation pool: 892.5 (spillway crest elevation; the pool is generally maintained about 6 inches below this elevation during the summer)

   Spillway crest (ungated): 892.5

   Upstream portal invert diversion tunnel: N/A

Downstream portal invert diversion tunnel: N/A

Streambed at centerline of dam: 880.5

Maximum tailwater: Not known

4. Reservoir:

Length of maximum pool: Not required

Length of recreation pool: 7.0 miles

Length of flood control pool: 7.0 miles

5. Storage (acre-feet):

Recreation pool: about 11,200

Flood control pool: about 11,200

Design surcharge: about 7,288

Top of dam: about 18,488

6. Reservoir Surface (acres):

Top of dam: about 3,030

Maximum pool: about 3,030

Flood control pool: about 2,800

Recreation pool: about 2,800

7. Dam:

Type: Earthfill with concrete and stone masonry, or sheetpile shore protection wall

Length: 4.1 miles

Height: 14.5 feet maximum hydraulic height
13.0 feet maximum structural height

Top width: 10 to 30 feet

Side slopes: upstream - vertical to below water
downstream - typically 2H:1V except where locally steeper cuts have been made by homeowners

Zoning: None

Impervious core: None

Cutoff: Sheetpile wall

Grout curtain: None

8. Diversion and Regulating Tunnel: None

Type: N/A

Length: N/A

Closure: N/A

Access: N/A

Regulating facilities: N/A

9. Spillway

Type: strength drop

Length of weir: 10 bays, 5.5 feet each

Crest elevation: 892.5

Gates: N/A

U/S channel: Lake

D/S channel: Weir 600 feet downstream maintains a minimum tailwater of 1.8 feet

10. Regulating Outlets: Five gates, each 5 feet by 4 feet, within spillway structure below crest; gate bottom elevation is 880.5, and top elevation is 885.5.

11. Hydrometeorological Gages:

Type: Rain gage (read once daily)

Location: At park manager's office

Records: From 1938 to present at parks manager's office

1.2 Engineering Data

1.2.1 Design -

It is unlikely that any formal design was ever undertaken on the original embankment. Design information on the spillway outlet works structure is lost. Design of the steel sheetpile wall repair was done by ODNR Division of Engineering (see Drawings in Appendix D).

a. Availability - Only for recent sheetpile wall repairs at the ODNR, Division of Engineering.

b. Adequacy - Only construction drawings are available; no design calculations or specifications exist.

c. Validity - Cannot determine.

1.2.2 Construction -

Initial dam was constructed in 1825, the present spillway in 1909 (or 1914); sheetpile wall repairs have been made at various times from the 1930's to the present.

a. Availability - No records available.

b. Adequacy - Sheetpile wall is poorly constructed and has holes at the water level which appear to allow significant seepage.

c. Validity - Dam has probably already outlived its design life.

1.2.3 Operation -

Slope protection wall is maintained by ODNR, crest areas are maintained by individual property owners. The park manager determines the number of gates to open in order to regulate the water level.

a. Availability - Verbal from park manager.

b. Adequacy - Park manager is hampered by residents on the dam and shore telling him how to regulate the water level. In 1968 the park management decided to risk overtopping and possible breaching rather than opening the outlet gates and causing further flooding downstream. The decision whether or not to open the outlet gates should be made at the higher level than that of park manager.

c. Validity - Visual observations seemed to confirm the verbal information received.

APPENDIX B

CHECK LIST - VISUAL INSPECTION

Check List
Visual Inspection
Phase I

Name Dam BUCKEYE LAKE DAM County LICKING Co. FAIRFIELD Co. PERRY Co. State OHIO ID # Federal # OH-474
State # 9723-004

Type of Dam EARTHFILL Hazard Category HIGH

Date(s) Inspection 7/7 & 7/8 1978 Weather HOT - OCCN. SHOWERS Temperature 80-90

Pool Elevation at Time of Inspection 892 M.S.L. Tailwater at Time of Inspection 882.3 M.S.L.

Inspection Personnel: (Representing)

PERCY WIMBERLY (GAI)
KHALID KHILJI (GAI)
PAUL CASS (GAI)
ROY WINKLE (ODNR - DIV OF WATER)
GEORGE MILLS (ODNR - DIV OF WATER)
MELVIN PILLOW (ODNR - DIV. OF PARKS & RECREATION)
MARSHALL FAUSOLD (PITTSBURGH DIST. CORPS OF ENGR.)
STUART B. LONG (PITTSBURGH DIST. CORPS OF ENGR.)
GENE McCOY (HUNTINGTON DISTRICT CORPS OF ENGR.)

PAUL CASS Recorder

Others Present: (Representing)

B-1

EMBANKMENT

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	UPSTREAM CONCRETE AND MASONRY AND/OR SHEETPILE WALL IS BULDGING AND/OR MOVING OUTWARD CAUSING SETTLEMENT OF THE CREST BEHIND THE WALL	- SEE RECOMMENDATIONS ASSOCIATED WITH THE SHEET PILE WALL.
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	VERTICAL - SEE ATTACHED EXISTING DIKE PROFILE (FIGS. 7&8 IN APPENDIX D) HORIZONTAL - BULDGING AND MOVEMENT OF THE UPSTREAM WALL. - DOWNSTREAM SLOPE MOVEMENT HAS OCCURRED AT LOCATIONS WHERE HOMEOWNERS HAVE EXCAVATED AND HAVE NOT PROVIDED ADEQUATE RETAINING WALLS.	- FOR MASONRY AND CONCRETE WALLS PROVIDE A PROPERLY INSTALLED ANCHORED SHEET PILE WALL. - FOR SHEET PILE WALLS SEE RECOMMENDATIONS ASSOCIATED WITH SHEET PILE WALLS (SH 3/3)

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
RIPRAP FAILURES	CONCRETE AND MASONRY WALL HAS MOVED OUT OVER THE FOUNDATION IN MANY LOCATIONS. WAVES ARE UNDERCUTTING THE BACKFILL AND PORTIONS OF THE STONE WALL.	SEE RECOMMENDATIONS UNDER HORIZONTAL ALIGNMENT OF THE CREST
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	GOOD - NO PROBLEMS NOTED	
ANY NOTICEABLE SEEPAGE	AT ISOLATED LOCATIONS SEEPAGE WAS OCCURRING THROUGH THE DOWNSTREAM TOE, KEEPING YARDS WET AND IN SOME CASES ENTERING BASEMENTS. SEEPAGE APPEARED TO CORRELATE WITH LAKE LEVEL AND WITH PAST REMOVAL OF TREES ON THE CREST. WHEN THE LAKE LEVEL REACHES WALER LEVEL SEVERAL OCCUPANTS NOTICE SEEPAGE (WALER LEVEL IS APPROX. AT TOP OF FLASHBOARDS). SEVERAL OCCUPANTS SAID THAT FOLLOWING REMOVAL OF TREES ON THE CREST - (CONTINUED SH 3)	WHERE SEEPAGE IS SIGNIFICANT (VISIBLE) DETERMINE THE CAUSE AND TAKE APPROPRIATE ACTIONS SUCH AS; 1) SEALING THE HOLES IN THE SHEETPILE WALL 2) EXCAVATION AND BACKFILLING 3) GROUTING THE HOLES 4) INSTALLING OR REPAIRING SHEETPILE WALL 5) INSTALLING SLURRY TRENCH
STAFF GAGE AND RECORDER	PARK PERSONNEL MEASURE WATER LEVEL DAILY AT THE SPILLWAY; RECORDS AVAILABLE FROM 1938 TO PRESENT	A CONTINUOUS RECORDER SHOULD BE INSTALLED, AT LEAST UNTIL REMEDIAL MEASURES ARE IMPLEMENTED, THIS WILL PROVIDE USEFUL DATA FOR REDESIGN AND ALSO DURING HIGH FLOW PERIODS.

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
DRAINS	- SOME RESIDENTS HAVE INSTALLED TILE DRAINS NEAR THE TOE OF SLOPE. - NO OVERALL DRAIN SYSTEM EXISTS	
ADDITIONAL COMMENTS Holes or Low Spots in The Crest	- MANY LOW SPOTS OR HOLES WERE SEEN ON THE CREST SOME OF WHICH WERE PROBABLY CAUSED BY TREE REMOVAL AND DECAYING ROOT SYSTEMS; OTHERS BY MOVEMENT OF THE OUTER SHEETPILE WALL DUE TO PERHAPS MOVEMENT OF THE STONE WALL (DEADMAN) OR TIE ROD FAILURE. AT STILL OTHER LOCATIONS WHERE AN OUTER STONE WALL EXISTED, IT HAD MOVED OUTWARD OVER THE LOWER PORTION. THIS MOVEMENT AND/OR STONE REMOVAL HAS LEFT A GAP THROUGH WHICH MATERIAL CAN BE PIPED FROM BEHIND THE WALL. - MANY CHIPMUNK HOLES ON CREST AND SLOPES - IT IS REPORTED THAT A HOLE IN THE CREST IN THE VICINITY OF "BALLARDS ADDITION"* WAS OF SUCH MAGNITUDE THAT A LADY FELL IN AND HAD TO BE HELPED OUT. - MANY PEOPLE WERE CONTINUALLY FILLING DEPRESSIONS IN THE CREST	WHERE VOIDS ARE ENCOUNTERED THE SURROUNDING AREA SHOULD BE EXCAVATED, DECAYED MATTER REMOVED, AND THE HOLE BACKFILLED WITH COMPACTED CLAY. * SEE FIG. 1, APPENDIX D FOR LOCATION.
ANY NOTICABLE SEEPAGE (CONT'D)	THE DECAYED ROOT SYSTEMS SERVED AS CONDUITS FOR THE SEEPAGE. MANY HOMEOWNERS HAVE INSTALLED TILE DRAIN SYSTEMS ALONG THE DOWNSTREAM SLOPE AND AROUND THE FOUNDATIONS OF THE HOUSES TO DIVERT THE SEEPAGE	
SHEETPILE WALL	- WELDS ON SHEETPILING WERE POOR; INSUFFICIENT PENETRATION WAS OBSERVED WHERE THE WELDS HAD FAILED. - TIERODS DID NOT SUFFICIENTLY FILL THE HOLES IN THE SHEETPILING ALLOWING WATER TO GET BEHIND THE PILING	PROPER ANCHORING SHOULD BE INSTALLED TO PREVENT FURTHER MOVEMENT, AND WHERE APPROPRIATE SHEETING SHOULD BE REMOVED AND REPLACED. HOLES IN THE PILING AROUND THE TIERODS SHOULD BE SEALED. BROKEN TIERODS SHOULD BE REPLACED. WELDING SHOULD BE DONE AS REQUIRED TO ASSURE THE INTEGRITY OF THE SYSTEM.

OUTLET WORKS

1. DISCHARGE GATES UNDER SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
	(Underline or circle all applicable information shown in addition to other comments)	
CRACKING AND SPALLING OF CONCRETE SURFACES ~~IN OUTLET CONDUIT~~	CONDITION OF FLOW PASSAGES: GOOD; POOR; ACCEPTABLE; ERODED; DETERIORATED BY WEATHER OR BY WATER QUALITY; CAVITATED; MAYBE CAVITATED; OTHER (DESCRIBE OR SKETCH) SCALING AND EXTENSIVE HEXAGONAL CRACKING PATTERNS ON ALL CONCRETE SURFACES. REINFORCING STEEL EXPOSED AT MANY PORTIONS	
INTAKE STRUCTURE AND CONDUIT(S)	CONDUIT INFORMATION: CIRCULAR; RECTANGULAR; SQUARE; OVAL; OTHER (SKETCH) NUMBER (5) OF CONDUITS; NUMBER (5) GATED PASSAGES/CONDUITS; CLEAN OR CLOGGED APPEARING TRASHRACK, IF VISIBLE; GATE SLOTS OR FILLERS, IF KNOWN; EFFICIENT ENTRANCE OR PROJECTING INLET OR SQUARE EDGED INLET NO TRASHRACK	
OUTLET STRUCTURE WEIR 600 FEET DOWNSTREAM OF THE SPILLWAY MAINTAINS A 1.8 FT TAILWATER DURING LOW FLOW. THE REACH BETWEEN THE SPILLWAY & WEIR WILL ACT AS A STILLING BASIN. MOST ENERGY DISSIPATION SHOULD OCCUR NEAR SPILLWAY END OF REACH WHERE CHANNEL WIDTH IS NEARLY UNIFORM.	STILLING BASIN: IMPACT TYPE; HORIZONTAL TYPE; PLUNGE POOL TYPE; SLOPING TYPE; FLIP; BUCKET; STRAIGHT DROP TYPE; SAF OR USBR TYPE; PARABOLIC APRON; STEPPED; OTHER (SKETCH) BASIN APPURTENANCES: ____ ROWS OF BAFFLES; STEPPED OR SLOPING END SILL; DIVERGING OR CONVERGING SIDES; UNIFORM WIDTH; WALLS HIGH OR LOW; CAN SEE MATERIAL DEPOSITED IN BASIN; BASIN LOOKS CLEAN; OTHER (SKETCH) ENERGY DISSIPATION: CONDUIT OBSERVED DISCHARGING AT DEPTH ___ BELOW CROWN: ACTION WAS CONFINED IN BASIN; ACTION EXTENDS BEYOND BASIN; BASIN JUDGED EFFECTIVE OR INEFFECTIVE (NO DISCHARGE OBSERVED).	
OUTLET CHANNEL	AT END OF BASIN: SIGNS OF UNDERCUTTING; NO SIGNS OF UNDERCUTTING DOWNSTREAM: NO ENCROACHMENTS DOWNSTREAM WHICH WOULD RAISE NORMAL TAILWATER;* SUSPECT SIGNIFICANT EFFECT FROM CHANNEL ENCROACHMENT (DESCRIBE)	

* OTHER THAN WEIR MENTIONED ABOVE.

OUTLET WORKS

1. DISCHARGE GATES UNDER SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
EMERGENCY GATE		

ADDITIONAL COMMENTS

OPERATING PROCEDURES: AUTOMATIC; MANUAL; REMOTE; OTHER (DESCRIBE)

ANY RECOMMENDED MODIFICATIONS (DESCRIBE)

OTHER COMMENTS:

OUTLET WORKS ARE OPERATED SUCH THAT THE WATER LEVEL MAINTAINS AT ±6 INCHES BELOW THE FLASHBOARDS DURING THE SUMMER. AND APPROX. 3 FEET BELOW THE FLASHBOARDS DURING THE WINTER.

OUTLET WORKS

2. CHANNEL TO FISH HATCHERY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
	(Underline or circle all applicable information shown in addition to other comments)	
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	CONDITION OF FLOW PASSAGES: GOOD; POOR; ACCEPTABLE; ERODED; DETERIORATED BY WEATHER OR BY WATER QUALITY; CAVITATED; MAYBE CAVITATED; OTHER (DESCRIBE OR SKETCH) WHAT WAS VISIBLE WAS ACCEPTABLE.	
INTAKE STRUCTURE AND CONDUIT(S)	CONDUIT INFORMATION: CIRCULAR; RECTANGULAR; SQUARE; OVAL; OTHER (SKETCH) NUMBER ( ) OF CONDUITS; NUMBER ( ) GATED PASSAGES/CONDUITS; CLEAN OR CLOGGED APPEARING TRASHRACK, IF VISIBLE; GATE SLOTS OR FILLERS, IF KNOWN; EFFICIENT ENTRANCE OR PROJECTING INLET OR SQUARE EDGED INLET NOT VISIBLE	
OUTLET STRUCTURE NO STRUCTURE, OUTLETS DIRECTLY INTO CANAL TO THE FISH HATCHERY	STILLING BASIN: IMPACT TYPE; HORIZONTAL TYPE; PLUNGE POOL TYPE; SLOPING TYPE; FLIP; BUCKET; STRAIGHT DROP TYPE; SAF OR USBR TYPE; PARABOLIC APRON; STEPPED; OTHER (SKETCH) BASIN APPURTENANCES: ____ ROWS OF BAFFLES; STEPPED OR SLOPING END SILL; DIVERGING OR CONVERGING SIDES; UNIFORM WIDTH; WALLS HIGH OR LOW; CAN SEE MATERIAL DEPOSITED IN BASIN; BASIN LOOKS CLEAN; OTHER (SKETCH) ENERGY DISSIPATION: CONDUIT OBSERVED DISCHARGING AT DEPTH ___ BELOW CROWN: ACTION WAS CONFINED IN BASIN; ACTION EXTENDS BEYOND BASIN; BASIN JUDGED EFFECTIVE OR INEFFECTIVE	
OUTLET CHANNEL	AT END OF BASIN: SIGNS OF UNDERCUTTING; NO SIGNS OF UNDERCUTTING DOWNSTREAM: NO ENCROACHMENTS DOWNSTREAM WHICH WOULD RAISE NORMAL TAILWATER; SUSPECT SIGNIFICANT EFFECT FROM CHANNEL ENCROACHMENT (DESCRIBE)	

LOW BANK FREEBOARD ALONG CANAL TO FISH HATCHERY.

OUTLET WORKS

2. CHANNEL TO FISH HATCHERY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
EMERGENCY GATE	N/A	

ADDITIONAL COMMENTS

OPERATING PROCEDURES: AUTOMATIC; MANUAL; REMOTE; OTHER (DESCRIBE)

ANY RECOMMENDED MODIFICATIONS (DESCRIBE)

OTHER COMMENTS:

TWO GATES REQD. TO RELEASE WATER TO THE FISH HATCHERY. THE OPENINGS ARE RELATIVELY SMALL; THE DIFFERENTIAL HEAD AVAILABLE TO CAUSE FLOW IS NORMALLY ABOUT 4 FEET. THEREFORE, DISCHARGE FROM THIS FACILITY IS CONSIDERED INSIGNIFICANT. FURTHERMORE, APPRECIABLE DISCHARGE INTO CHANNEL JUST DOWNSTREAM OF THE EMBANKMENT WOULD CAUSE FLOODING ALONG THAT CHANNEL.

UNGATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
	(Underline or circle all applicable information shown in addition to other comments)	
CONCRETE WEIR OR OTHER TYPE - See Photographs 12,13 & 14, Appendix E - Straight Drop	TYPE CREST: OGEE; FLAT OR SLOPED; BROAD CREST; MORNING GLORY; SIPHON; FUSE PLUG; SADDLE; DROP; CHUTE; SIDE CHANNEL; OTHER (SKETCH); ROUNDED, MITERED, OR SQUARE UPSTREAM EDGE; OTHER (SKETCH); HAS; HAS NOT FLASHBOARDS CONDITION OF FLOW WAYS: GOOD; POOR; ACCEPTABLE; ERODED; DETERIORATED BY WEATHER OR WATER QUALITY; OTHER (DESCRIBE) ABUTMENTS: EARTH; CONCRETE; MASONRY; ROUNDED; SQUARE EDGE; SLOPING; OTHER (DESCRIBE)	
APPROACH CHANNEL - Lake	ALIGNMENT: STRAIGHT; CURVED; UNOBSTRUCTED; OBSTRUCTED; OTHER (DESCRIBE)	
DISCHARGE CHANNEL Weir 600 Ft. Downstream of the Spillway Maintains a 1.8 Ft. Tailwater During Low Flow	STILLING BASIN, IF ANY: IMPACT TYPE; HORIZONTAL; PLUNGE POOL; SLOPING; FLIP; BUCKET; STRAIGHT DROP; SAF OR USBR TYPE; PARABOLIC APRON; STEPPED; OTHER (SKETCH) BASIN ELEMENTS: (___) ROWS OF BAFFLES; STEPPED OR SLOPING END SILL; DIVERGING OR CONVERGING SIDES; UNIFORM WIDTH; HIGH OR LOW WALLS; BASIN LOOKS CLEAN; CAN SEE MATERIAL IN BASIN; OTHER (SKETCH) ENERGY DISSIPATION: NO FLOW OBSERVED; DISCHARGE OBSERVED; BASIN ACTION CONFINED; ACTION EXTENDS BEYOND BASIN; BASIN JUDGED EFFECTIVE OR INEFFECTIVE AT END OF BASIN: UNDERCUTTING SIGNS; NO UNDERCUTTING SIGNS DOWNSTREAM: NO SIGNIFICANT ENCROACHMENTS TO REDUCE FLOW; ENCROACHED (DESCRIBE)	
BRIDGE AND PIERS	Ohio Route 79 Bridge 600 Ft Downstream, Not A Significant Encroachment	
Recommendations	Conduct Detailed Investigation To Determine The Structural Integrity of The Spillway; Repair or Replace As Required. (Work Should Be Done In Conjunction With Any Work Recommended On The Basis of Hydrologic and Hydraulic Analyses)	

INSTRUMENTATION

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	None	
OBSERVATION WELLS	None	
WEIRS	None	
PIEZOMETERS	None	

INSTRUMENTATION

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
OTHER	None	Install A Warning System To Alert Residents Downstream In Case of Possible Overtopping or Large Discharges

RESERVOIR

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	FLAT	
SEDIMENTATION	NOT OBSERVED	
ADDITIONAL COMMENTS	MR. MELVIN PILLOW, PARK MANAGER, REPORTED THAT LOWERING THE WATER LEVEL 1 FOOT WOULD ESSENTIALLY ELIMINATE RECREATION USAGE AT THE EAST, WEST AND SOUTH SIDES OF THE LAKE. RAISING THE WATER LEVEL 6 INCHES CAUSES SEEPAGE PROBLEMS THROUGH THE DAM AND FLOODING ALONG THE SOUTH SIDE OF THE LAKE	

DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	AREA NORTH OF THE RESERVOIR PRESENTLY FLOODS. SHOULD BUCKEYE DAM BREACH, IT WOULD COMPOUND THE PRESENT PROBLEM DOWNSTREAM.	
SLOPES	STREAM BOTTOM - FLAT (LESS THAN ½%) SIDE SLOPES FLAT TO MODERATE DEPTH OF CHANNEL APPX. 10 FT	
APPROXIMATE NUMBER OF HOMES AND POPULATION	TOWN OF BUCKEYE LAKE & LAKESIDE ARE ADJACENT TO THE DAM HEBRON AND NEWARK ARE DOWNSTREAM ESTIMATED POPULATION WHICH MAY BE AFFECTED BY EMBANKMENT FAILURE IS 5,000, PARTICULARLY IF FAILURE OCCURRED IN CONJUNCTION WITH A LARGE INTENSE STORM.	ALL MAY SUFFER PROPERTY DAMAGE AND POTENTIAL LOSS OF LIFE, PARTICULARLY IF THE DAM BREACHED DURING A HEAVY STORM. IN NEWARK THE DAMAGE AND POTENTIAL LOSS OF LIFE SHOULD BE CONFINED PRIMARILY TO LOW LYING AREAS NEAR THE RIVER.
ADDITIONAL COMMENTS	DOWNSTREAM FLOODING — DOWNSTREAM AREAS ARE CURRENTLY FLOODED BY MODERATELY SEVERE STORMS AND/OR LESS THAN MAXIMUM DISCHARGE THROUGH THE SPILLWAY AND OUTLET WORKS.	RECOMMEND INVESTIGATION BE PREFORMED TO DISCERN POSSIBLE CORRECTIVE MEASURES TO ALLEVIATE THE DOWNSTREAM FLOODING PROBLEMS. ANY INCREASE IN SPILLWAY CAPACITY WILL NECESSITATE DOWNSTREAM CHANNEL IMPROVEMENT.

APPENDIX C

CHECK LIST - ENGINEERING DATA

NAME OF DAM BUCKEYE LAKE DAM

ID # Federal OH-474
State 9723-004

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

ITEM	REMARKS
AS-BUILT DRAWINGS	– DESIGN DRAWINGS FOR SHEETPILE REPAIR WORK (SEE REF. 8)
REGIONAL VICINITY MAP	– USGS 7½ MIN. QUADS. FOR MILLERSPORT AND THORNVILLE
CONSTRUCTION HISTORY	1825 (REF'S. ①, ②, & ③) A POST-GLACIAL SWAMP WAS INUNDATED TO FORM LICKING SUMMIT RESERVOIR FOR THE OHIO-ERIE CANAL. LAKE USED FOR MAKE-UP WATER FOR CANAL FROM CARROLL TO NEWARK & BOATS PASSED ACROSS LAKE AS THEY CROSSED THE DIVIDE BETWEEN THE SCIOTO AND MUSKINGUM RIVER BASINS.
TYPICAL SECTIONS OF DAM	1909 (REF. ⑦) OR 1914 (REF ②) PRESENT SPILLWAY & OUTLET WORKS BUILT. 1930'S TO PRESENT (REF. ⑧) SHEETPILE WALL INSTALLED IN FRONT OF OR BEHIND THE OLDER CONCRETE-MASONRY WALL – SEE REFS. ⑧ & ②.
OUTLETS – PLAN	– FIG. 5, APPENDIX D.
– DETAILS	– FIGS. 6A & 6B, APPENDIX D, AND REFS. ② & ④
– CONSTRAINTS	– GATES (SEE FIGS. 6A & 6B, APPENDIX D, AND REFS. ② & ④
– DISCHARGE RATINGS	– REF. ④
RAINFALL/RESERVOIR RECORDS	– RAIN GAGE (READ ONCE DAILY) AT PARK MGR'S. OFFICE WATER LEVEL MEASURED RELATIVE TO SPILLWAY CREST DAILY RECORDS FOR ABOVE AT PARK MGR'S. OFFICE (1938 TO PRESENT)

REFERENCES

① ODNR BROCHURE ON BUCKEYE LAKE STATE PARK
② INSPECTION REPORT BY J.J. KONRAD DATED MARCH 14 & 15, 1939.
③ REPORT ON 1968 FLOODING BY M.W. WOOD, CHIEF OF OPERATIONS DIVISION, HUNTINGTON DIST., CORPS OF ENGRS. DATE 1968
④ REPORT BY A.J. MOORS OF HYDRAULICS AND REPORTS SECTION, U.S. ENGINEER OFFICE (CORPS OF ENGRS.), HUNTINGTON, W. VA., DATED MARCH 29, 1939.
⑤ AD HOC TASK FORCE REPORT ON THE SOUTH LICKING WATERSHED (≈ 1972)
⑥ FLOOD ROUTING BY C.L. HAHN OF ODNR IN 1977.
⑦ MISCELLANEOUS LETTERS & MEMOS ON BUCKEYE LAKE – OBTAINED FROM ODNR
⑧ MISCELLANEOUS REPAIR DRAWINGS & DIKE CREST PROFILE – OBTAINED FROM ODNR (SEE FIGURES 7 THROUGH 17, APPENDIX D)

NOTE: ABOVE REFERENCES ARE AVAILABLE FROM ODNR & ARE NOT INCLUDED HEREIN.

ITEM	REMARKS
DESIGN REPORTS	NO DESIGN REPORTS AVAILABLE ON INITIAL CONSTRUCTION ONLY PLANS AVAILABLE FOR SHEET PILE WALL CONSTRUCTION
GEOLOGY REPORTS	- NONE - RESERVOIR AREA WAS INITIALLY A POST-GLACIAL SWAMP — REF. 1
DESIGN COMPUTATIONS	
HYDROLOGY & HYDRAULICS	- 1939 REPORT BY MOORS (AVAILABLE FROM ODNR) — REF. 4
DAM STABILITY	- NONE
SEEPAGE STUDIES	- NO STUDY EXCEPT THAT PRIOR INSPECTION REPORTS (1939, 1968) INDICATE SEEPAGE IN MANY PLACES REF 2 REF. 3
MATERIALS INVESTIGATIONS	- NONE
BORING RECORDS	
LABORATORY	
FIELD	
POST-CONSTRUCTION SURVEYS OF DAM	- LEVEL ON CREST OF DAM AND TOP OF WALL ELEVATIONS TAKEN EVERY 100 FEET (1972) } REF. 8
BORROW SOURCES	- UNKNOWN; PROBABLY LOCALLY

ITEM	REMARKS
MONITORING SYSTEMS	LAKE LEVEL MEASURED DAILY AT THE SPILLWAY
MODIFICATIONS	- 1914 (REF. 7) - NEW SPILLWAY (MAY BE 1909 (REF. 7)) - 1930's TO PRESENT (REF. 8) - INSTALLATION OF SHEET PILE WALL
HIGH POOL RECORDS	- SUPPOSEDLY NEVER BEEN OVERTOPPED 1913, HIGHEST FLOOD CONDITION OF DAM IS UNKNOWN JAN 1959, WATER LEVEL 11 INCHES ABOVE FLASHBOARDS WITH MELTING SNOW + 2 INCHES RAIN AND 2 GATES OPENED MAY 1968, HAD TO SANDBAG CREST OF DAM, BUT DID NOT OVERTOP AND ALL GATES CLOSED (REF. 3). } FROM HIGH WATER RECORDS.
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	- FLOOD ROUTING IN 1939 BY A.J. MOORS OF U.S. ENGINEERS OFFICE (AVAILABLE FROM ODNR) — REF 4. - STORAGE-ELEVATION, OUTFLOW-ELEVATION IN 1977 (REF. 6) - AD-HOC TASK FORCE REPORT ON SOUTH LICKING WATERSHED 1972 - DISCUSSED ALTERNATIVE SPILLWAYS AND DOWNSTREAM CHANNELS (REF. 5).
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	- NO SERIOUS DAM FAILURES, ONLY SEEPAGE AND LAKE WALL WHICH IS REPAIRED OR CONSTRUCTED AS NEEDED
MAINTENANCE	- PROPERTY OWNERS MOW CREST AND DO AS THEY WISH TO THE DOWNSTREAM SLOPE, PARK REPAIRS AND/OR CONSTRUCTS THE LAKESIDE WALL
OPERATION RECORDS	- PARK MANAGER OPERATES OUTLET GATES ON SPILLWAY; FISH HATCHERY OPENS GATES NEAR SELLERS POINT TO GET WATER FOR THEIR USE. PARK MANAGERS JUDGEMENT NORMALLY CONTROLS THE LAKE LEVEL. - DAILY RECORDS IN PARK MANAGERS OFFICE COVERING: 1) INCHES OVER OR BELOW THE SPILLWAY; 2) WIND; 3) WEATHER; 4) TEMPERATURE; 5) RAIN; 6) NUMBER OF GATES OPENED

ITEM	REMARKS
SPILLWAY PLAN	- SEE PHOTOGRAPHS 12, 13, & 14, APPENDIX E, AND FIGURES 5, 6A, & 6B, APPENDIX E.
SECTIONS	
DETAILS	
OPERATING EQUIPMENT PLANS & DETAILS	- NOT AVAILABLE - PHOTOGRAPH OF GATES IN APPENDIX E (PHOTOGRAPHS 12, 13 & 14) - GATES ARE MANUALLY OPERATED

APPENDIX D

GENERAL DRAWINGS AND LOCATION MAP

APPENDIX D
GENERAL DRAWINGS AND LOCATION MAP

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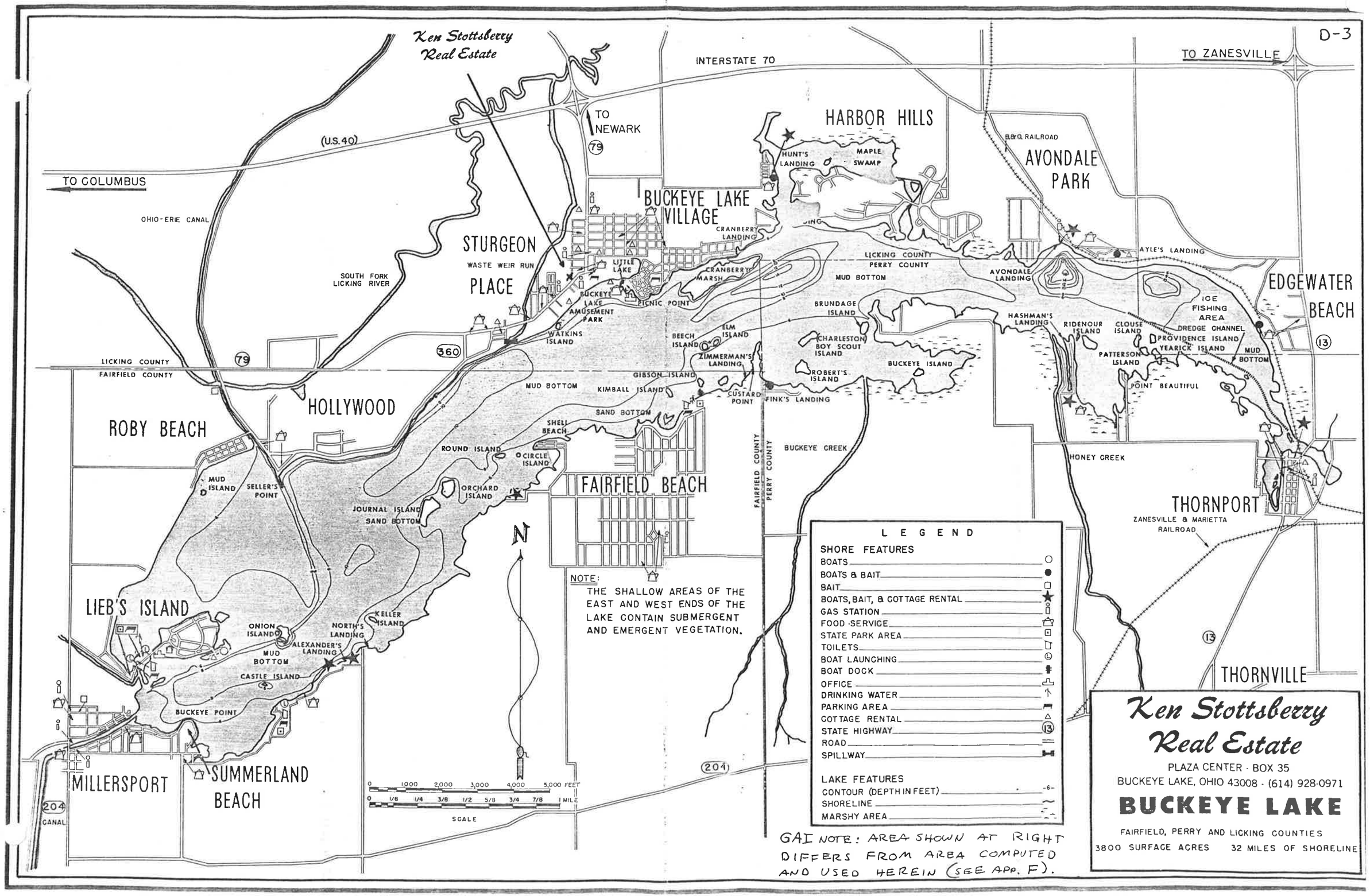
River
OHIO
PENN CENTRAL
LICKING CO.
FAIRFIELD CO
Trailer Park
BM 905
BUCKEYE LAKE
DRAINAGE AREA BOUNDARY
Lakeside
Sellers Point
Mud Island
BUCKEYE STATE LAKE PARK
BUCKEYE LAKE
Liebs Island
Keller Island
27
East Millersport
Castle Island
Millersport
(BM 904)
Cem
A L N U T
ABANDONED
MILLERSPORT, OHIO
N3952.5—W8230/7.5
1961
PHOTOREVISED 1972
AMS 4463 I NE—SERIES V852

DRAINAGE AREA BOUNDARY
SPILLWAY
BUCKEYE LAKE
Buckeye Lake
Harbor Hills
Maple Bay
Cranberry Marsh
BUCKEYE STATE LAKE PARK
Firemans Park
Edgewater Beach
Fairfield Beach
Shell Beach
Thornport (Thornville Sta)
Sewage Disposal
Landing Field
Trailer Park
Community Ch
LICKING CO
FAIRFIELD CO
Round Island
Circle Island
Orchard Island
Journal Island
Gibson Island
Kimball Island
Beach Island
Elm Island
Custers Point
Charleston Island
Brundage Island
Ridenour Island
Hickory Island
Sherman
Peterson Island
Bope Island
Gravel Pit
Gas Well
Creek
ELEVATION 892
T 19 N
T 18 N
BM 906
BM 899
THORNVILLE, OHIO
N3952.5—W8222.5/7.5
1961
PHOTOREVISED 1972 AND 1975
AMS 4563 IV NW—SERIES V852


Ken Stottsberry Real Estate
INTERSTATE 70
TO ZANESVILLE
TO NEWARK
79
(U.S.40)
TO COLUMBUS
OHIO-ERIE CANAL
SOUTH FORK LICKING RIVER
STURGEON PLACE
WASTE WEIR RUN
HARBOR HILLS
HUNT'S LANDING
MAPLE SWAMP
B&O RAILROAD
AVONDALE PARK
BUCKEYE LAKE VILLAGE
CRANBERRY LANDING
LITTLE LAKE
CRANBERRY MARSH
PICNIC POINT
BUCKEYE LAKE AMUSEMENT PARK
WATKINS ISLAND
LICKING COUNTY
PERRY COUNTY
MUD BOTTOM
AVONDALE LANDING
AYLE'S LANDING
EDGEWATER BEACH
ICE FISHING AREA
BRUNDAGE ISLAND
HASHMAN'S LANDING
RIDENOUR ISLAND
CLOUSE ISLAND
DREDGE CHANNEL
PROVIDENCE ISLAND
YEARICK ISLAND
PATTERSON ISLAND
MUD BOTTOM
13
BEECH ISLAND
ELM ISLAND
CHARLESTON BOY SCOUT ISLAND
ZIMMERMAN'S LANDING
BUCKEYE ISLAND
ROBERT'S ISLAND
360
LICKING COUNTY
FAIRFIELD COUNTY
GIBSON ISLAND
MUD BOTTOM
KIMBALL ISLAND
CUSTARD POINT
FINK'S LANDING
POINT BEAUTIFUL
HOLLYWOOD
ROBY BEACH
SAND BOTTOM
SHELL BEACH
ROUND ISLAND
CIRCLE ISLAND
BUCKEYE CREEK
FAIRFIELD COUNTY
PERRY COUNTY
HONEY CREEK
MUD ISLAND
SELLER'S POINT
ORCHARD ISLAND
FAIRFIELD BEACH
JOURNAL ISLAND
SAND BOTTOM
THORNPORT
ZANESVILLE & MARIETTA RAILROAD
N
LIEB'S ISLAND
ONION ISLAND
NORTH'S LANDING
KELLER ISLAND
ALEXANDER'S LANDING
MUD BOTTOM
CASTLE ISLAND
BUCKEYE POINT
THORNVILLE
MILLERSPORT
SUMMERLAND BEACH
204
CANAL
0 1,000 2,000 3,000 4,000 5,000 FEET
0 1/8 1/4 3/8 1/2 5/8 3/4 7/8 1 MILE
SCALE
NOTE:
THE SHALLOW AREAS OF THE EAST AND WEST ENDS OF THE LAKE CONTAIN SUBMERGENT AND EMERGENT VEGETATION.
LEGEND
SHORE FEATURES
BOATS
BOATS & BAIT
BAIT
BOATS, BAIT, & COTTAGE RENTAL
GAS STATION
FOOD SERVICE
STATE PARK AREA
TOILETS
BOAT LAUNCHING
BOAT DOCK
OFFICE
DRINKING WATER
PARKING AREA
COTTAGE RENTAL
STATE HIGHWAY
ROAD
SPILLWAY
LAKE FEATURES
CONTOUR (DEPTH IN FEET)
SHORELINE
MARSHY AREA
GAI NOTE: AREA SHOWN AT RIGHT DIFFERS FROM AREA COMPUTED AND USED HEREIN (SEE APP. F).
Ken Stottsberry Real Estate
PLAZA CENTER · BOX 35
BUCKEYE LAKE, OHIO 43008 · (614) 928-0971
BUCKEYE LAKE
FAIRFIELD, PERRY AND LICKING COUNTIES
3800 SURFACE ACRES 32 MILES OF SHORELINE

SUBJECT DAM SAFETY INSPECTION OHIO 474
BY KHH DATE 7-30-78 SHEET NO. 1 OF 6
CHKD. BY PMW DATE 7-30-78 PROJECT NO. 78-505-474

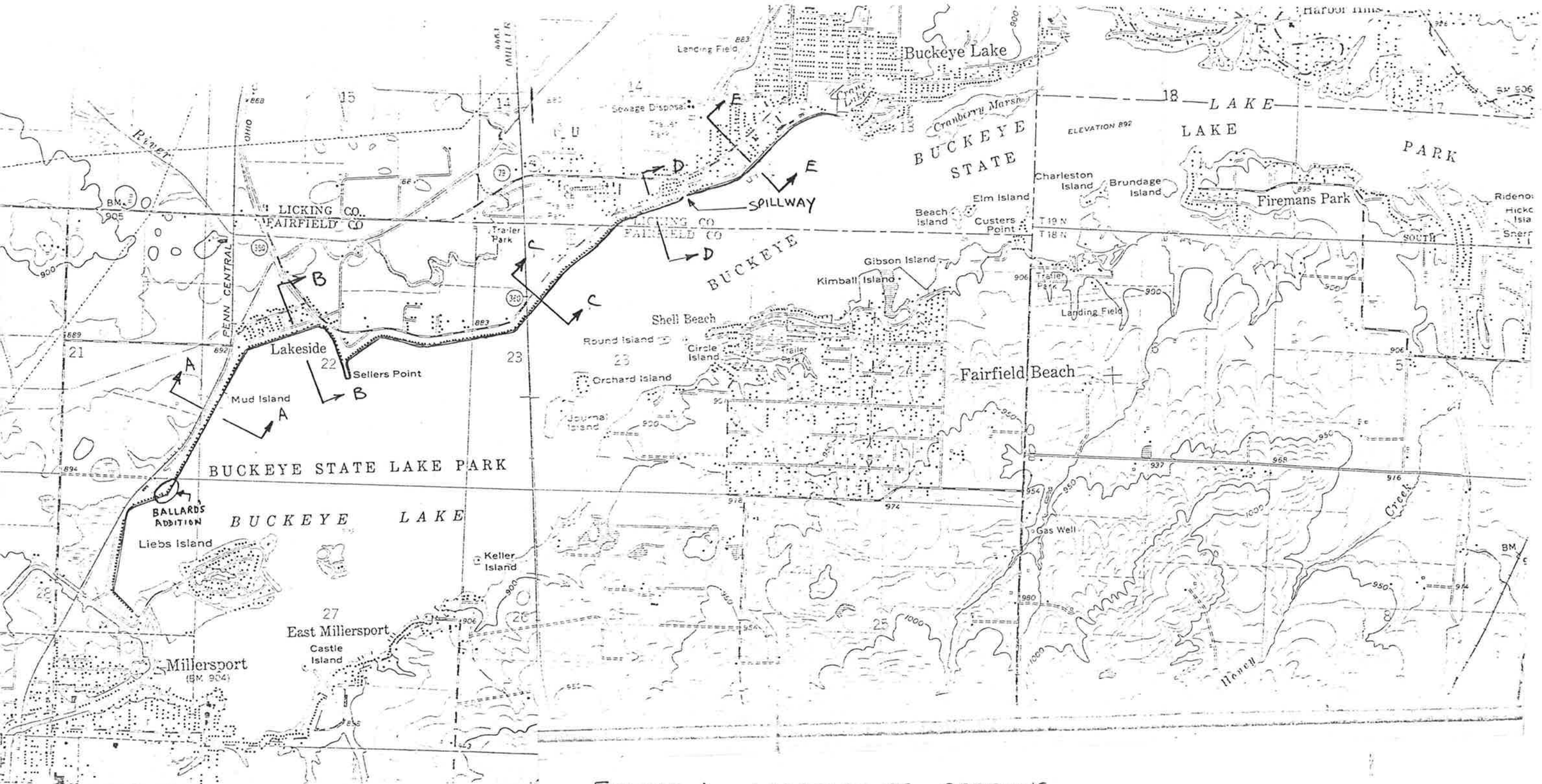


FIGURE 1 - LOCATION OF SECTIONS

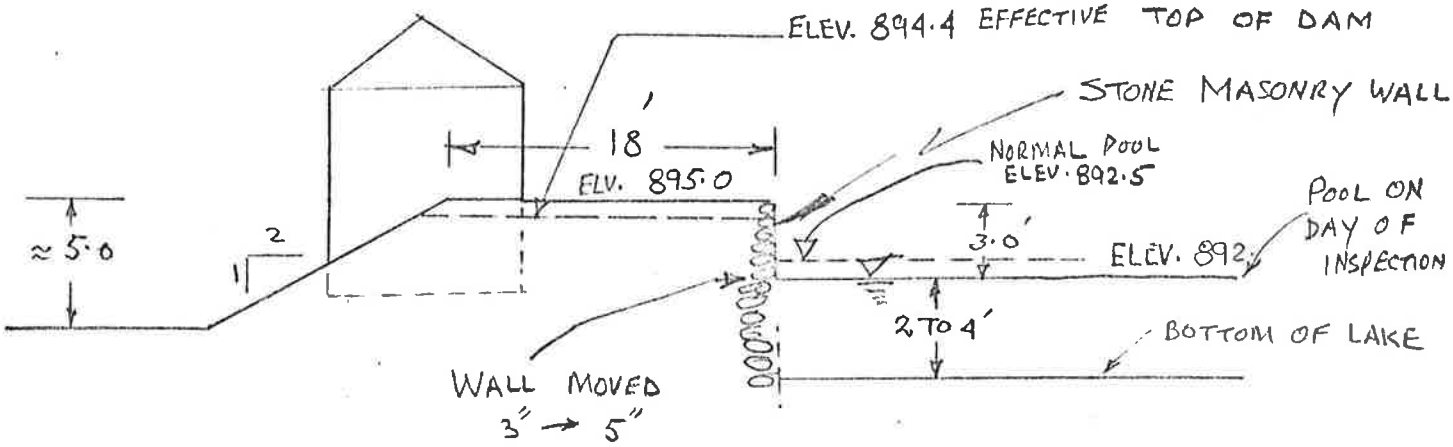
SUBJECT DAM SAFETY INSPECTION OHIO 474

BY KHK DATE 7-30-78 PROJ. NO. 78-565-474

CHKD. BY PMW DATE 7-30-78 SHEET NO. 2 OF 6

D-5

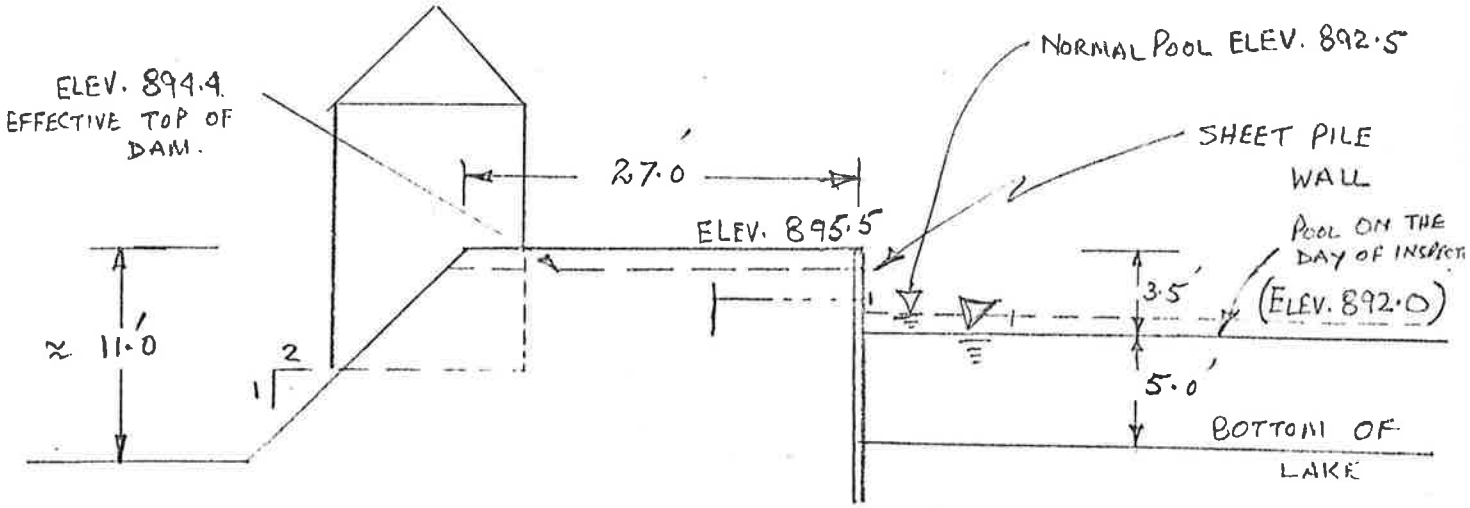
GAI CONSULTANTS, INC.
Engineers • Geologists • Planners
Environmental Specialists



SECTION A-A

SKETCH NOT TO SCALE.

FIGURE 2-A



SECTION B-B

NOTE SKETCH NOT TO SCALE.

FIGURE 2-B

SUBJECT DAM SAFETY INSPECTION OHIO 474

BY KHK DATE 7-30-78 PROJ. NO. 78-565-474

CHKD. BY PMW DATE 7-30-78 SHEET NO. 3 OF 6

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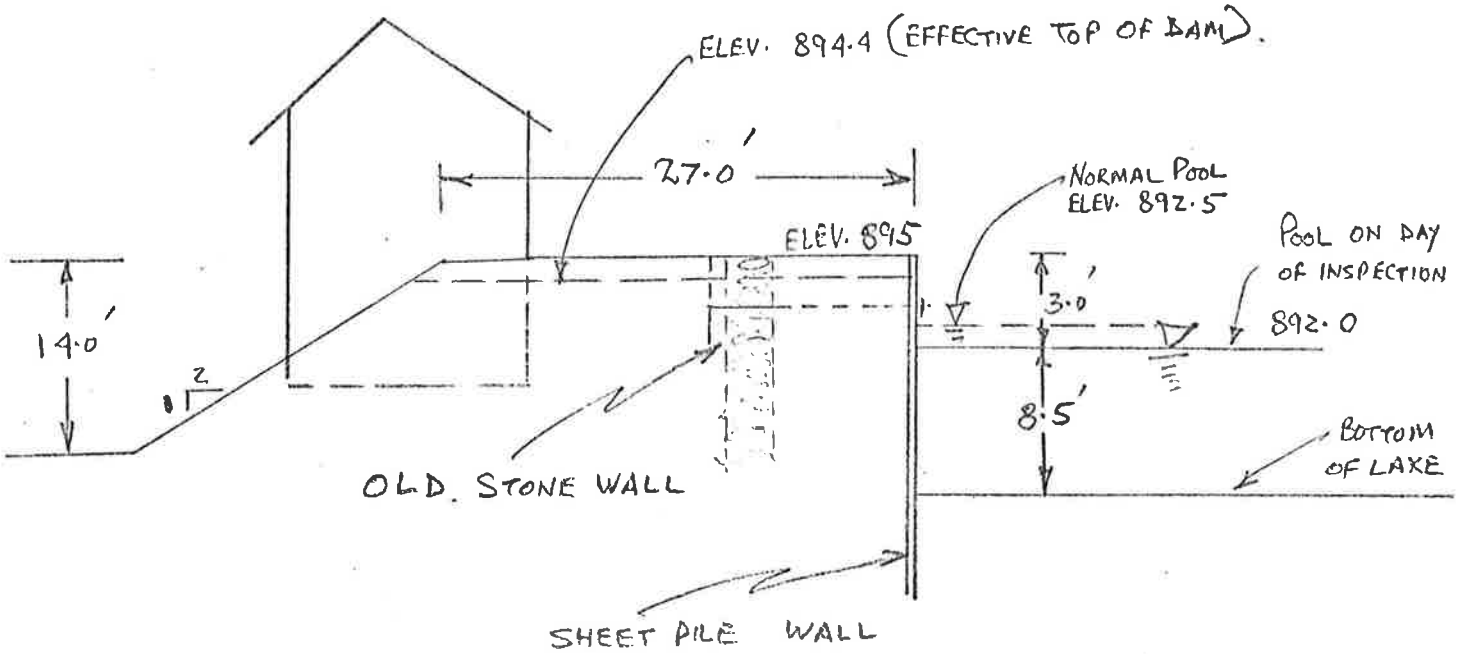
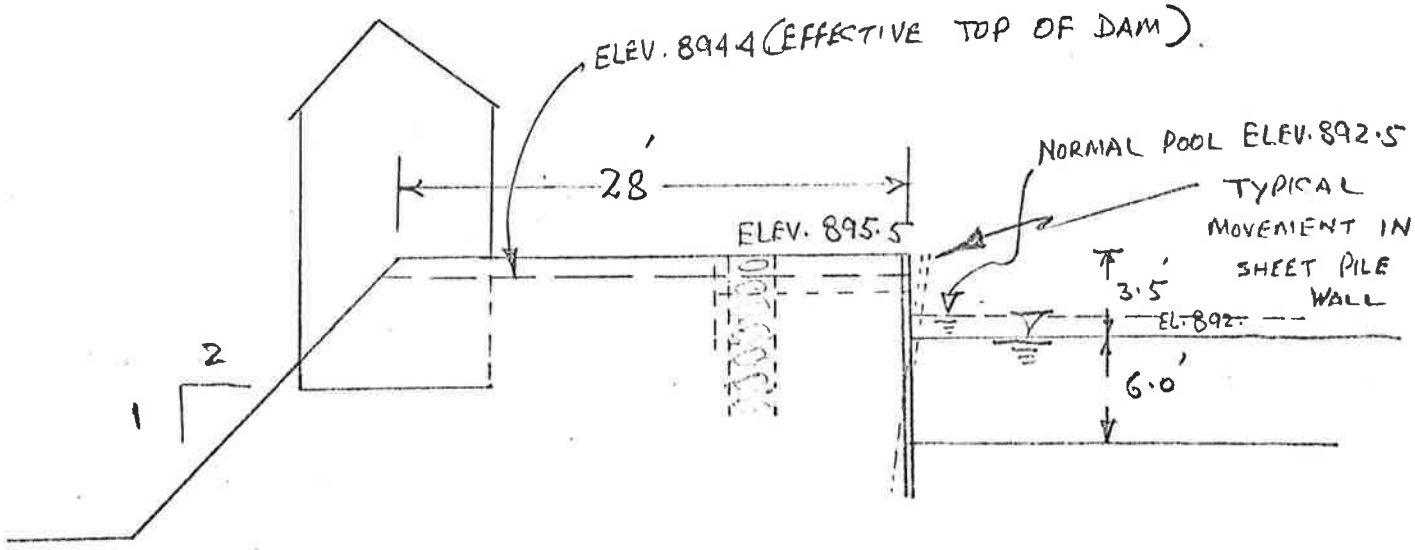
D-6



SECTION C-C

SKETCH NOT TO SCALE.

FIGURE 3-A



SECTION D-D

NOTE: SKETCH NOT TO SCALE.

FIGURE 3-B

SUBJECT DAM SAFETY INSPECTION OHIO 474
BUCKEYE LAKE

BY KHK DATE 7-30-78 PROJ. NO. 78-565-474

CHKD. BY PMW DATE 7-30-78 SHEET NO. 4 OF 6

GAI CONSULTANTS, INC.
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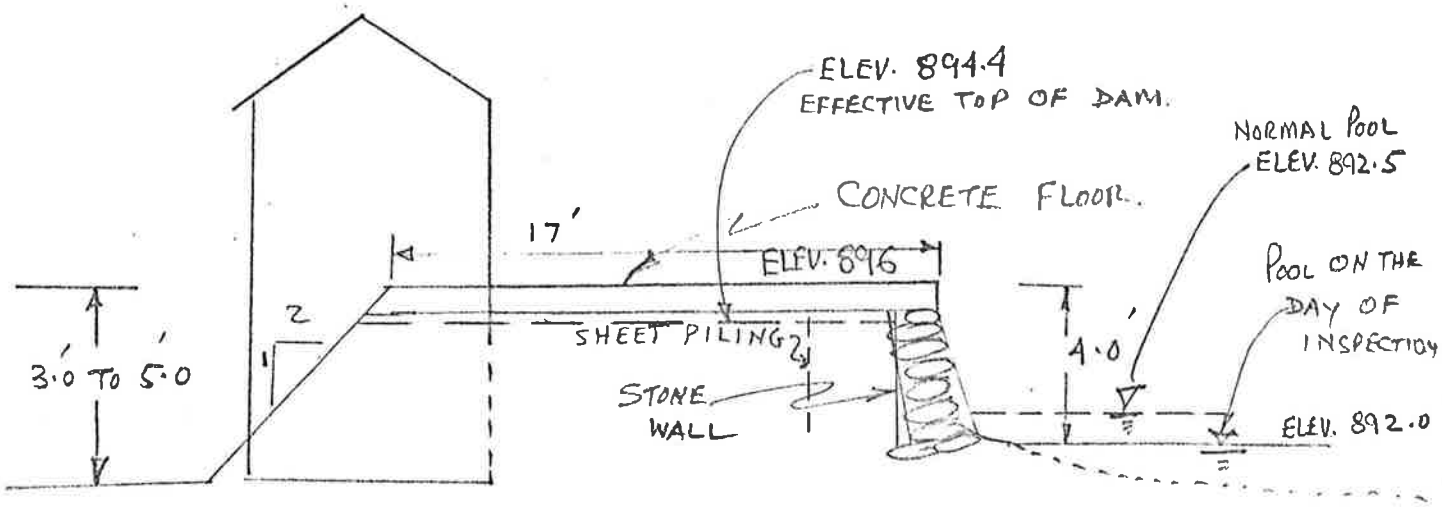
D-7



SECTION E-E

NOTE: SKETCH NOT TO SCALE.

FIGURE 4

SUBJECT DAM SAFETY INSPECTION OHIO 474
BUCKEYE LAKE

BY KHK DATE 7-27-78 PROJ. NO. 78-565-474

CHKD. BY PMW DATE 7-30-78 SHEET NO. 5 OF 6

GAI CONSULTANTS, INC.
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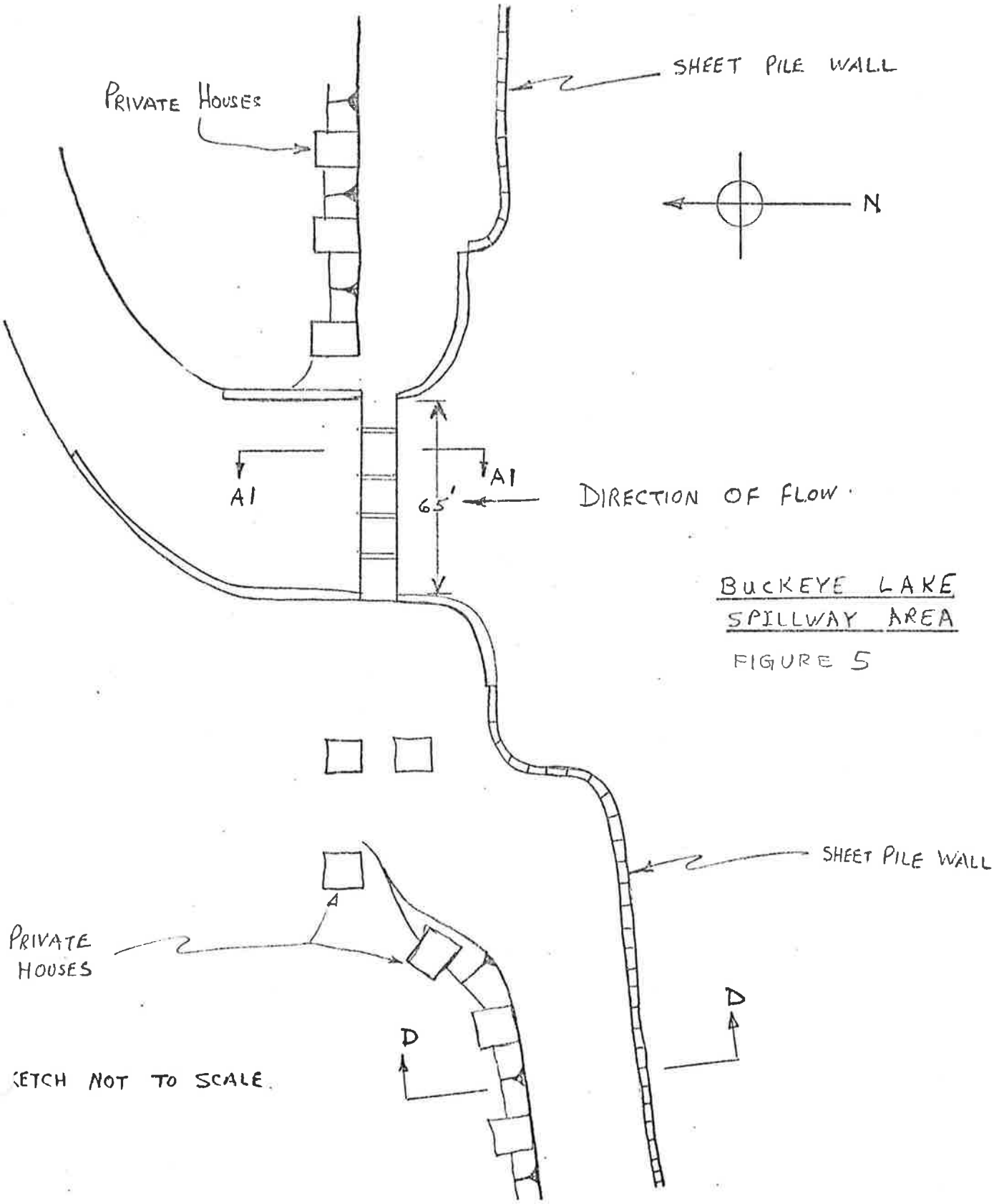
Environmental Specialists

D-8



BUCKEYE LAKE
SPILLWAY AREA
FIGURE 5

SUBJECT DAM SAFETY INSPECTION OHIO-474
BUCKEYE LAKE

BY KHK DATE 7-27-78 PROJ. NO. 78-565-474

CHKD. BY RT DATE 7-29-78 SHEET NO. 6 OF 6

GAI CONSULTANTS, INC.
Engineers • Geologists • Planners
Environmental Specialists

D-9

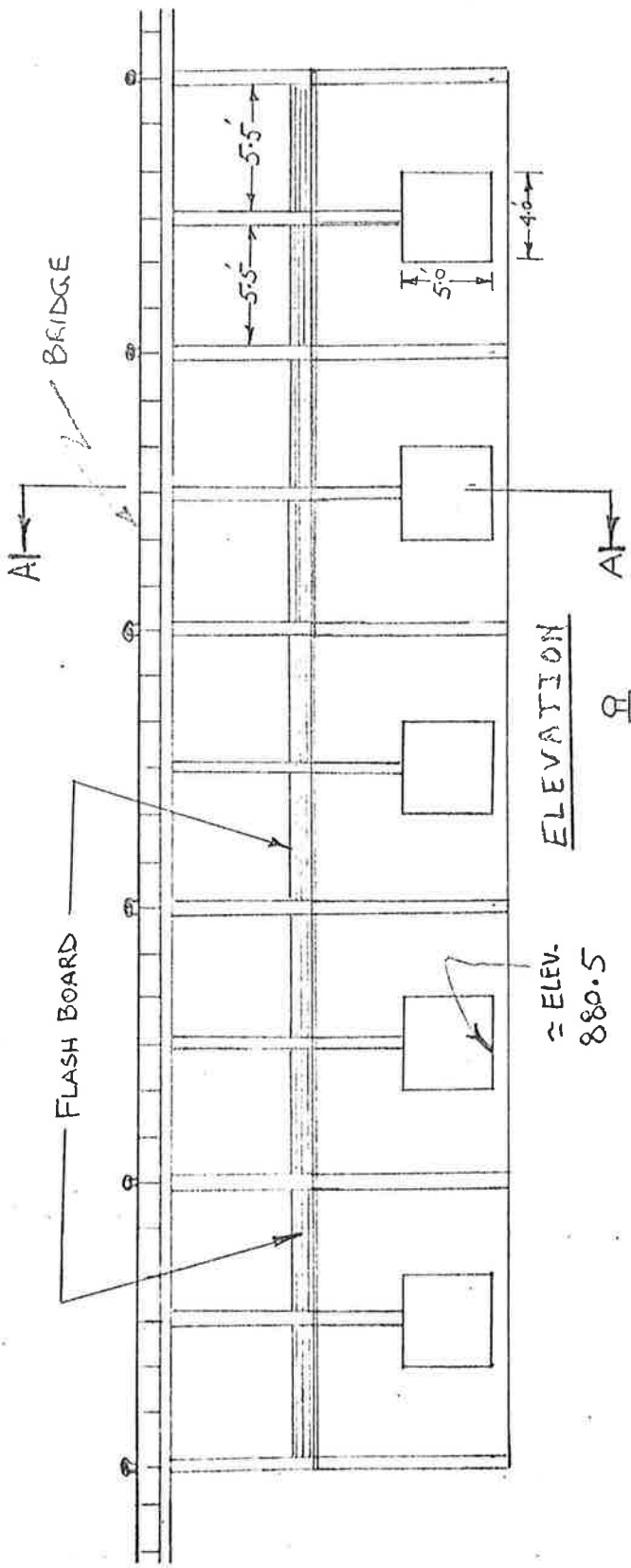


FIGURE 6A - SPILLWAY & OUTLET STRUCTURE - ELEVATION
NOT TO SCALE

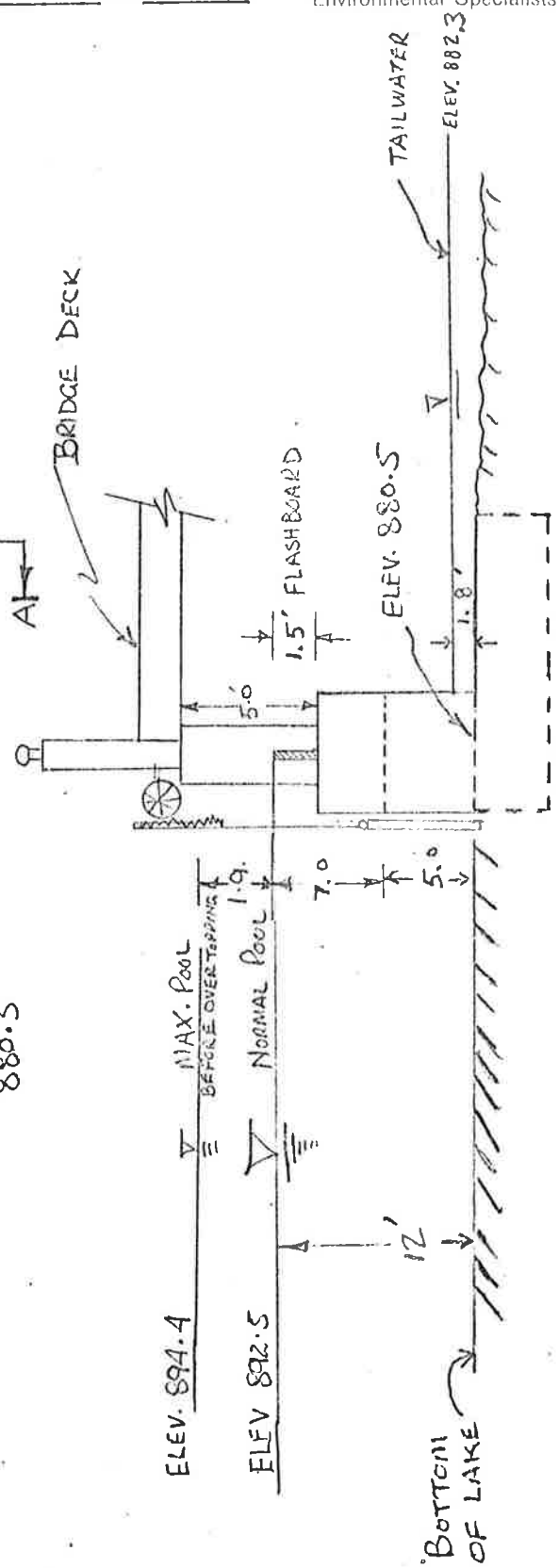
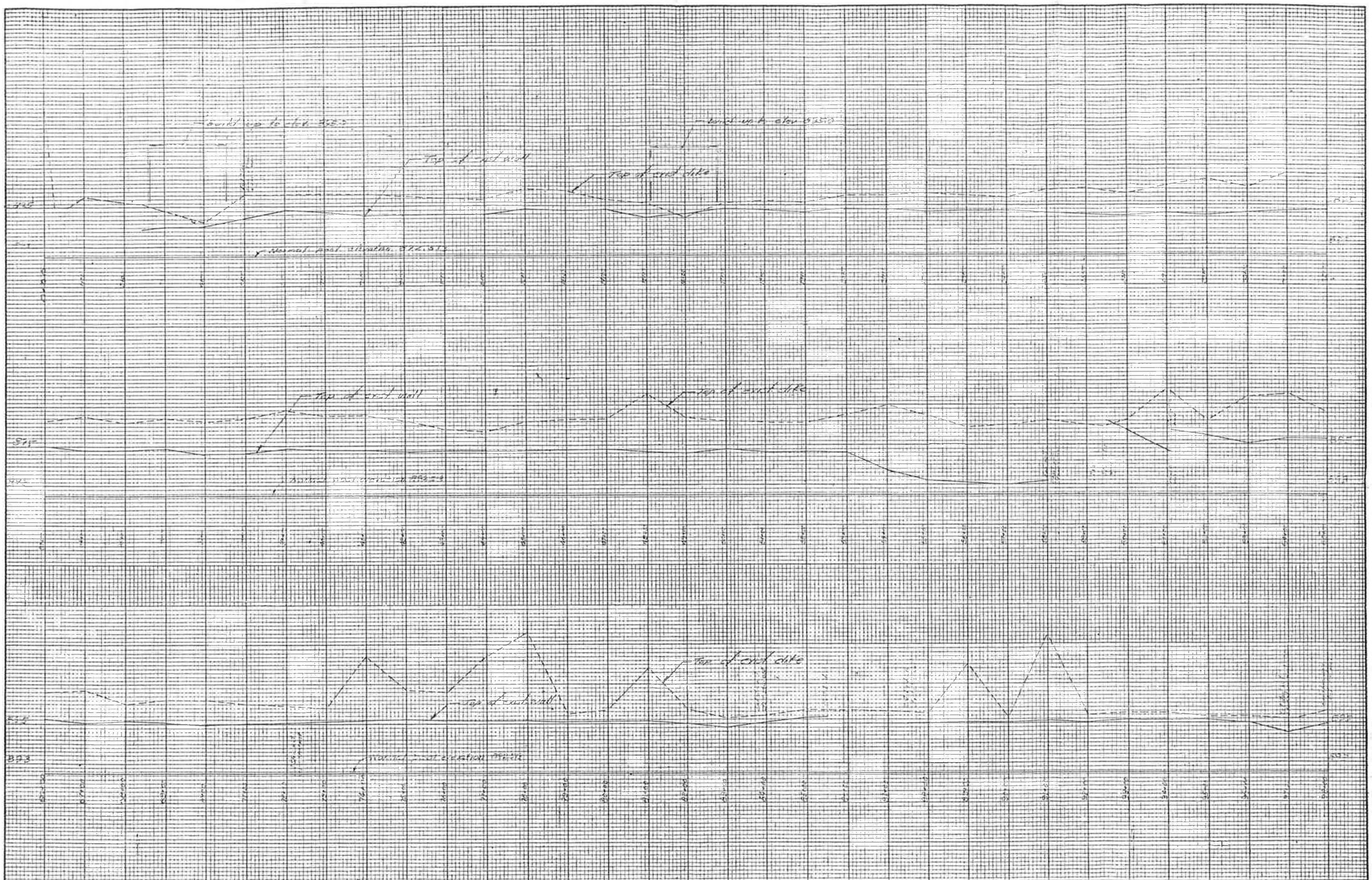


FIGURE 6B - SPILLWAY & OUTLET STRUCTURE-SECTION A1-A1
NOTE. SKETCH NOT TO SCALE



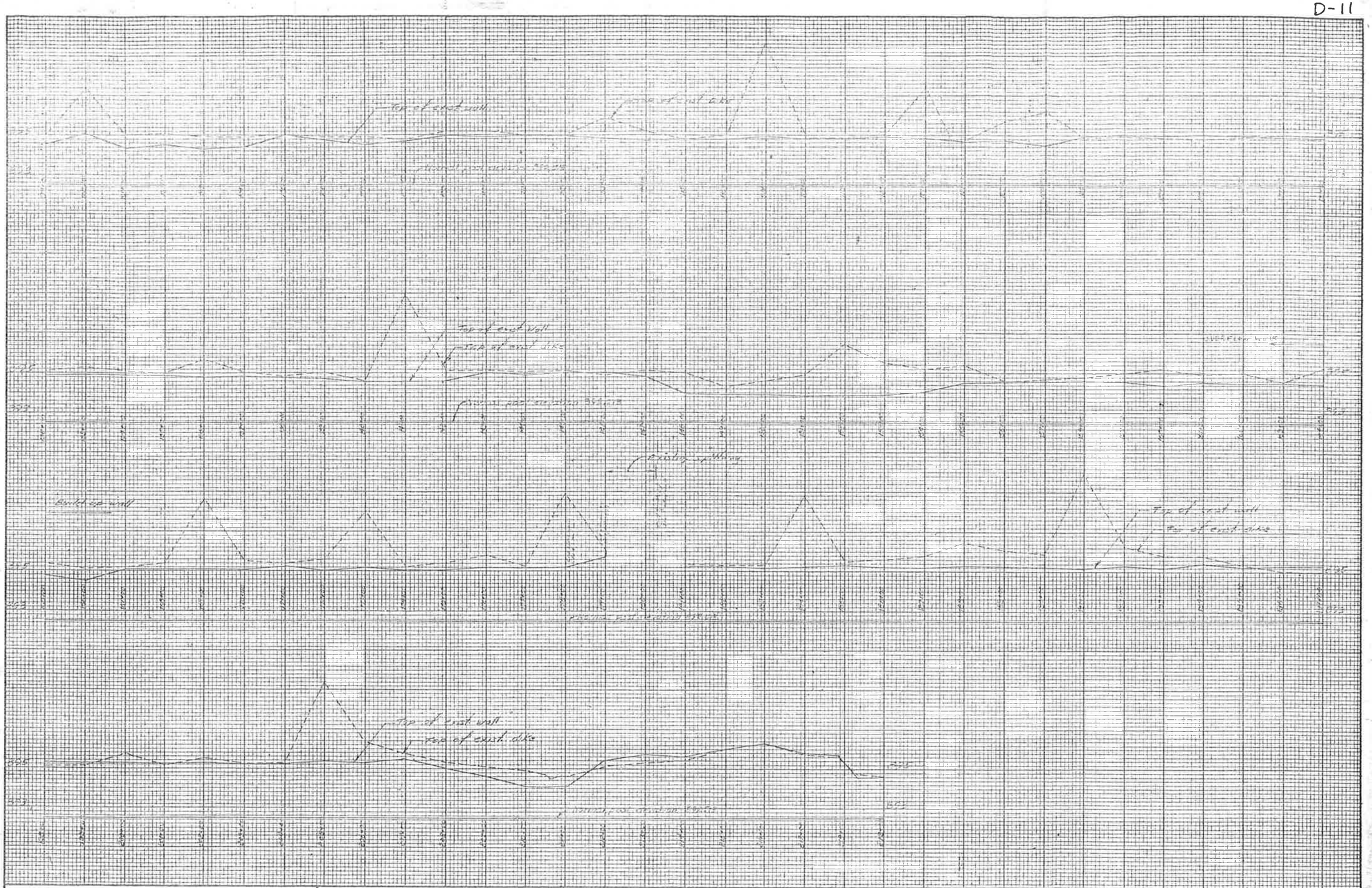
STATE OF OHIO
DEPARTMENT OF NATURAL RESOURCES
OFFICE OF CHIEF ENGINEER

DESIGNED BY	JOB NUMBER
DRAWN BY	SCALE
CHECKED BY	DATE
APPROVED BY	REVISED

Buckeye Lake
Existing Dike Profile

1/2

FIGURE 7



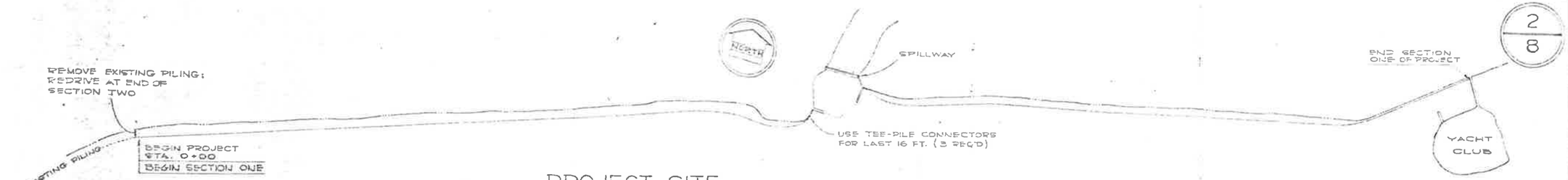
STATE OF OHIO
DEPARTMENT OF NATURAL RESOURCES
OFFICE OF CHIEF ENGINEER

DESIGNED BY	JOB NUMBER
DRAWN BY	SCALE
CHECKED BY	DATE
APPROVED BY	REVISED

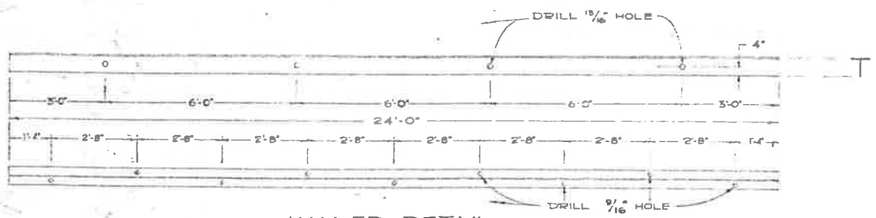
Buckeye Lake
Existing Dike Profile

2/2

FIGURE 8

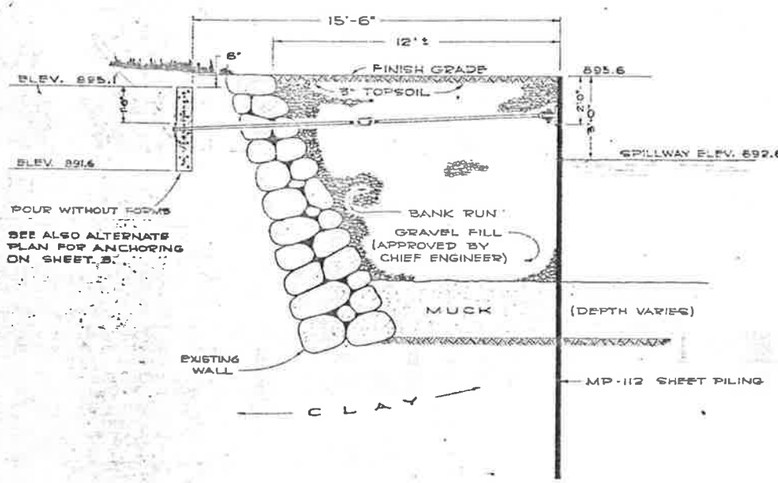


PROJECT SITE
SCALE: 1" = 100'

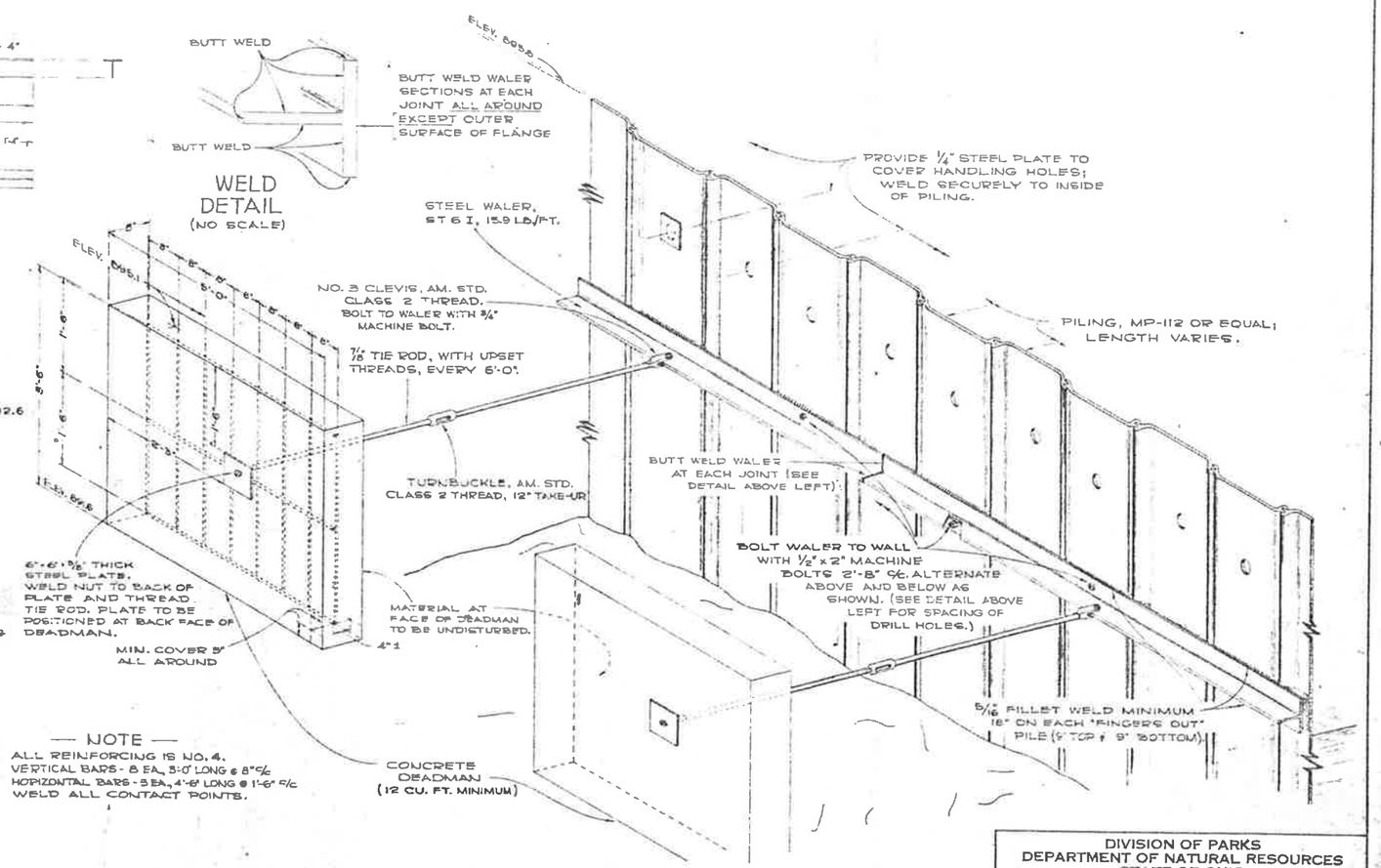


WALER DETAIL
SCALE: 1/2" = 1'

WELD DETAIL
(NO SCALE)



TYPICAL SECTION
SCALE: 3/8" = 1'-0"



— NOTE —
ALL REINFORCING IS NO. 4.
VERTICAL BARS - 8 EA. 3'-0" LONG @ 8" C/C
HORIZONTAL BARS - 3 EA. 4'-6" LONG @ 1'-6" C/C
WELD ALL CONTACT POINTS.

CONSTRUCTION DETAIL
NO SCALE

DIVISION OF PARKS
DEPARTMENT OF NATURAL RESOURCES
STATE OF OHIO

BUCKEYE STATE LAKE
LICKING - FAIRFIELD COUNTIES
RETAINING WALL
CONSTRUCTION DETAILS

Surveyed			Scale: AS SHOWN
Designed	DJ	JAN 62	
Drawn by	LC	JAN 62	
Checked		MAR 62	FILE NO: 23-B-J-7-2-8
Approved		MAR 62	

FIGURE 9

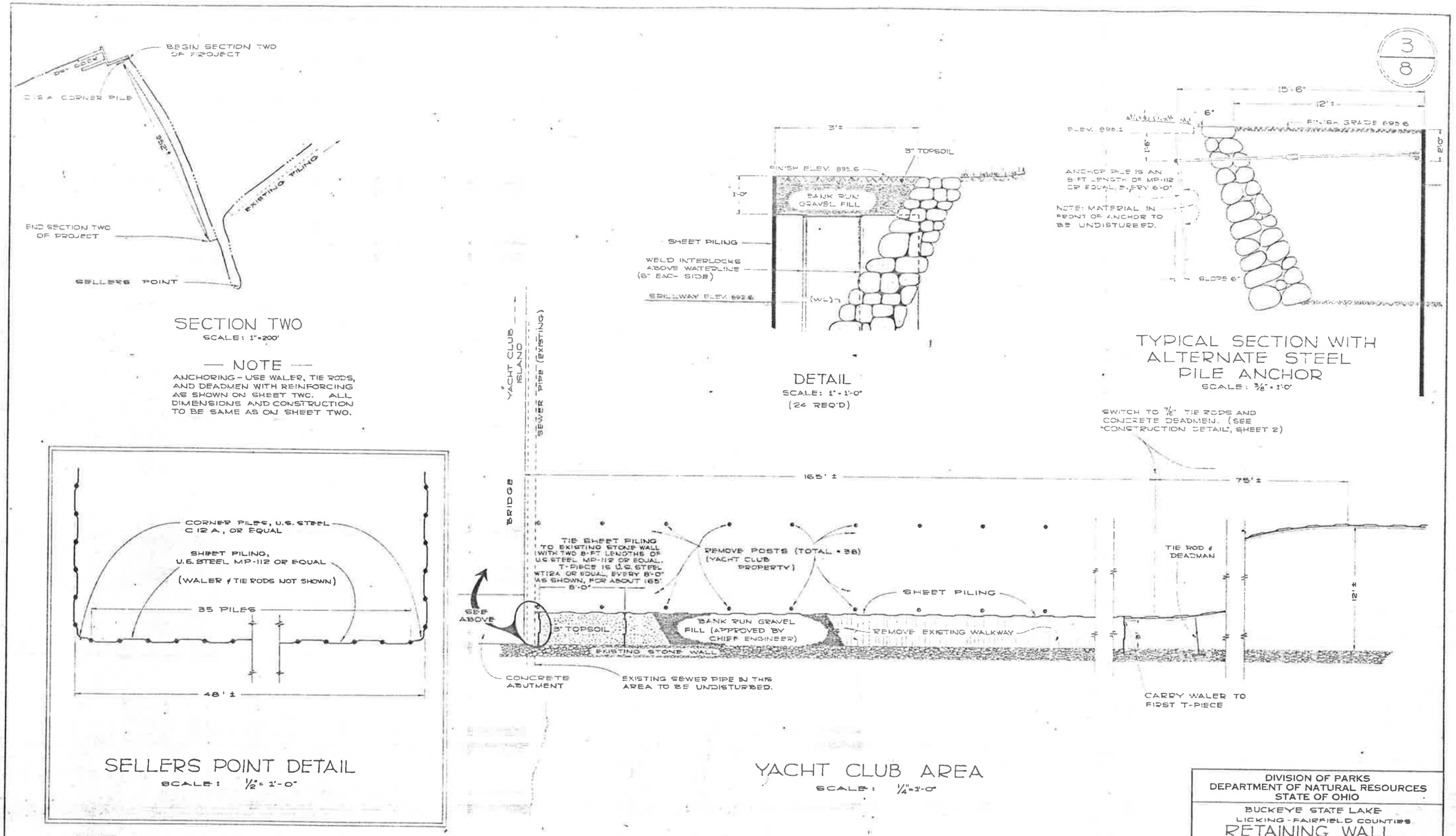

BEGIN SECTION TWO OF PROJECT
C12A CORNER PILE
EXISTING PILING
END SECTION TWO OF PROJECT
SELLERS POINT
SECTION TWO
SCALE: 1"=200'
— NOTE —
ANCHORING - USE WALER, TIE RODS, AND DEADMEN WITH REINFORCING AS SHOWN ON SHEET TWO. ALL DIMENSIONS AND CONSTRUCTION TO BE SAME AS ON SHEET TWO.
3" TOPSOIL
FINISH ELEV. 895.6
BANK RUN GRAVEL FILL
SHEET PILING
WELD INTERLOCKS ABOVE WATERLINE (6" EACH SIDE)
SPILLWAY ELEV. 892.6
DETAIL
SCALE: 1"=1'-0"
(24 REQ'D)
15'-6"
12'±
FINISH GRADE 895.6
ANCHOR PILE IS AN 8 FT LENGTH OF MP-112 OR EQUAL, EVERY 6'-0"
NOTE: MATERIAL IN FRONT OF ANCHOR TO BE UNDISTURBED.
SLOPE 6"
TYPICAL SECTION WITH ALTERNATE STEEL PILE ANCHOR
SCALE: 3/8"=1'-0"
SWITCH TO 7/8" TIE RODS AND CONCRETE DEADMEN. (SEE "CONSTRUCTION DETAIL", SHEET 2)
YACHT CLUB ISLAND
SEWER PIPE (EXISTING)
BRIDGE
165'±
75'±
TIE SHEET PILING TO EXISTING STONE WALL WITH TWO 8-FT LENGTHS OF U.S. STEEL MP-112 OR EQUAL. T-PIECE IS U.S. STEEL WT12A OR EQUAL, EVERY 8'-0" AS SHOWN, FOR ABOUT 165'
REMOVE POSTS (TOTAL = 38) (YACHT CLUB PROPERTY)
SHEET PILING
TIE ROD & DEADMAN
SEE ABOVE
3" TOPSOIL
BANK RUN GRAVEL FILL (APPROVED BY CHIEF ENGINEER)
REMOVE EXISTING WALKWAY
EXISTING STONE WALL
CONCRETE ABUTMENT
EXISTING SEWER PIPE IN THIS AREA TO BE UNDISTURBED.
CARRY WALER TO FIRST T-PIECE
12'±
CORNER PILES, U.S. STEEL C12A, OR EQUAL
SHEET PILING, U.S. STEEL MP-112 OR EQUAL
(WALER & TIE RODS NOT SHOWN)
35 PILES
48'±
SELLERS POINT DETAIL
SCALE: 1/2"=1'-0"
YACHT CLUB AREA
SCALE: 1/4"=1'-0"
NOTE: "SELLERS POINT DETAIL" IS NOT TO BE INCLUDED IN THIS PROJECT.
DIVISION OF PARKS
DEPARTMENT OF NATURAL RESOURCES
STATE OF OHIO
BUCKEYE STATE LAKE
LICKING-FAIRFIELD COUNTIES
RETAINING WALL
CONSTRUCTION DETAILS
Scale: AS SHOWN
FILE NO: 23-B-J-7-3-8

FIGURE 10

STATE OF OHIO

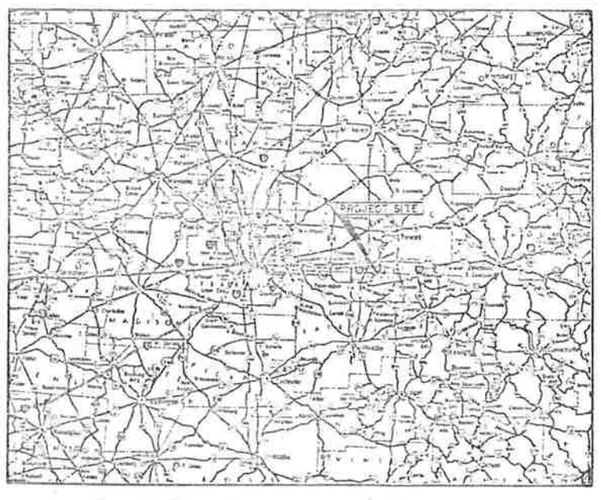
DEPARTMENT OF NATURAL RESOURCES

OFFICE OF CHIEF ENGINEER

BUCKEYE LAKE STATE PARK

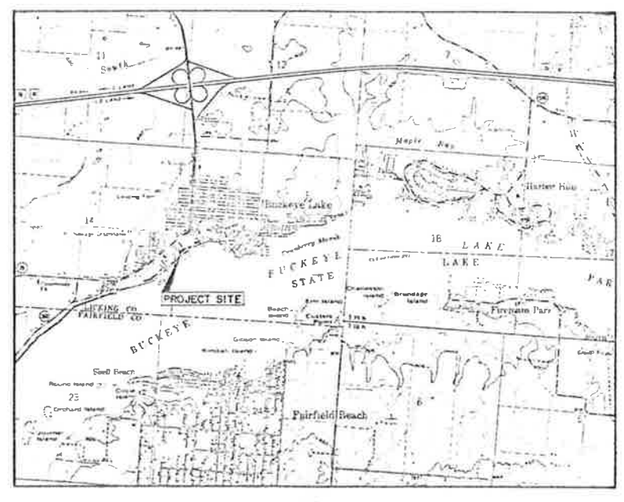
LICKING COUNTY

NORTH BANK REPAIR



VICINITY MAP

0 10 20 40
SCALE IN MILES



LOCATION MAP

0 1 2 4
SCALE IN MILES

APPROVED

CHIEF ENGINEER

Date _____ Department of Natural Resources

DIRECTOR

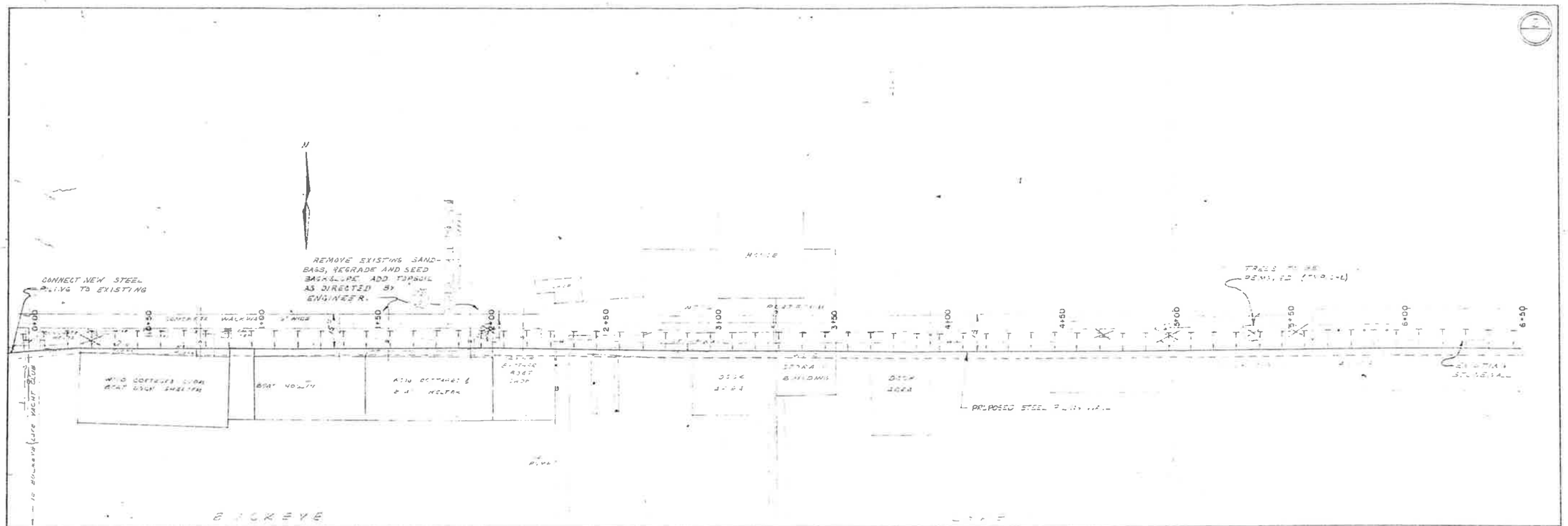
Date _____ Department of Natural Resources

STATE OF OHIO
DEPARTMENT OF NATURAL RESOURCES
OFFICE OF CHIEF ENGINEER

BUCKEYE LAKE STATE PARK
LICKING COUNTY
NORTH BANK REPAIR
TITLE SHEET

DATE 12-10-68	JOB NUMBER [illegible]
DRAWN BY O.B.	SCALE [illegible]
CHECKED BY E.K.R.	REVISED
APPROVED BY J.A.S.	AS BUILT

FIGURE 11

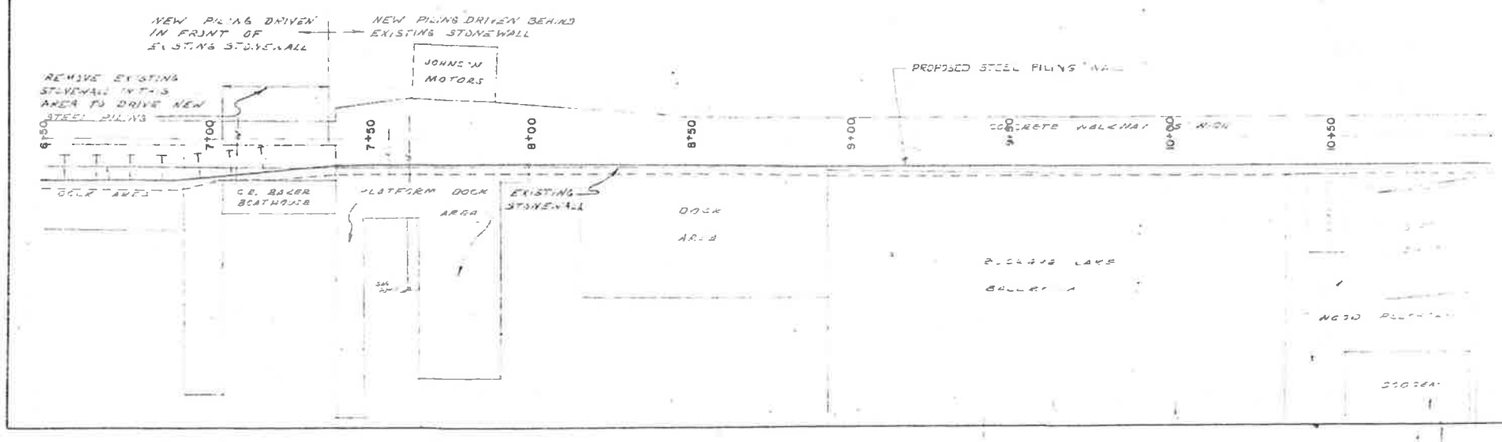


LEGEND

— S — EXIST. SEWER LINE
— W — EXIST. WATER LINE
— G — EXIST. GAS LINE
— E — EXIST. ELECTRIC CONDUIT

NOTE

STONE REMOVED FROM EXISTING WALL SHALL BE STOCKPILED. AFTER STEEL WALL IS IN PLACE, RE-LAY STONE FROM EXPOSED END OF STONE WALL TO FACE OF NEW WALL. (STA 7+35 14+30 & 15+85 ±).



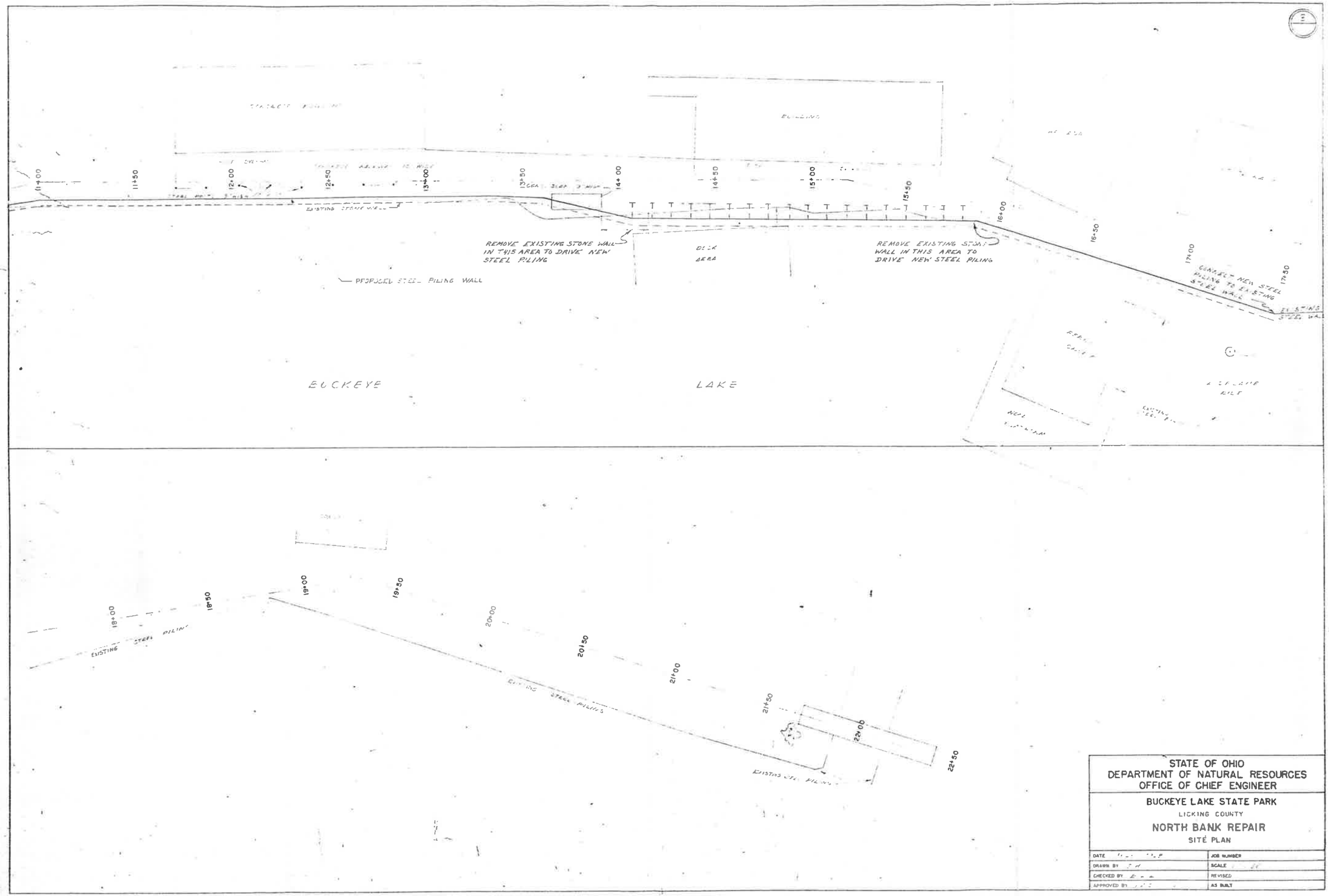
STATE OF OHIO
DEPARTMENT OF NATURAL RESOURCES
OFFICE OF CHIEF ENGINEER

BUCKEYE LAKE STATE PARK
LICKING COUNTY

NORTH BANK REPAIR
SITE PLAN

DATE	JOB NUMBER
DRAWN BY	SCALE
CHECKED BY	REVISED
APPROVED BY	AS BUILT

FIGURE 12



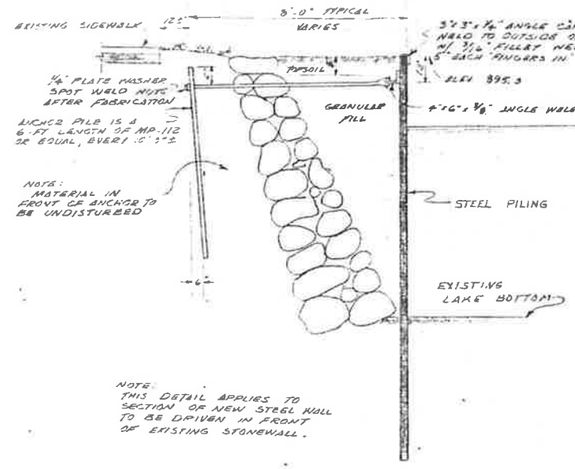
STATE OF OHIO
DEPARTMENT OF NATURAL RESOURCES
OFFICE OF CHIEF ENGINEER

BUCKEYE LAKE STATE PARK
LICKING COUNTY
NORTH BANK REPAIR
SITE PLAN

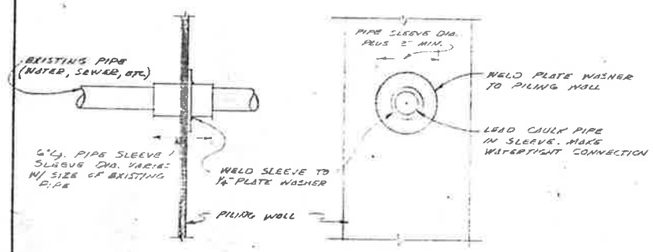
DATE	JOB NUMBER
DRAWN BY	SCALE
CHECKED BY	REVISED
APPROVED BY	AS BUILT

FIGURE 13

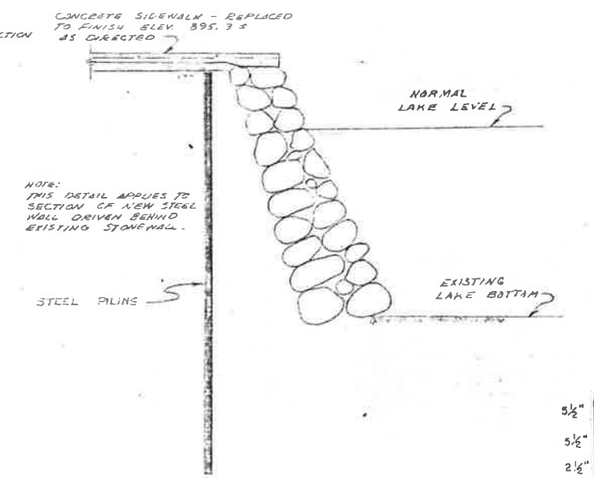
SIDE WALK DETAIL
NO SCALE



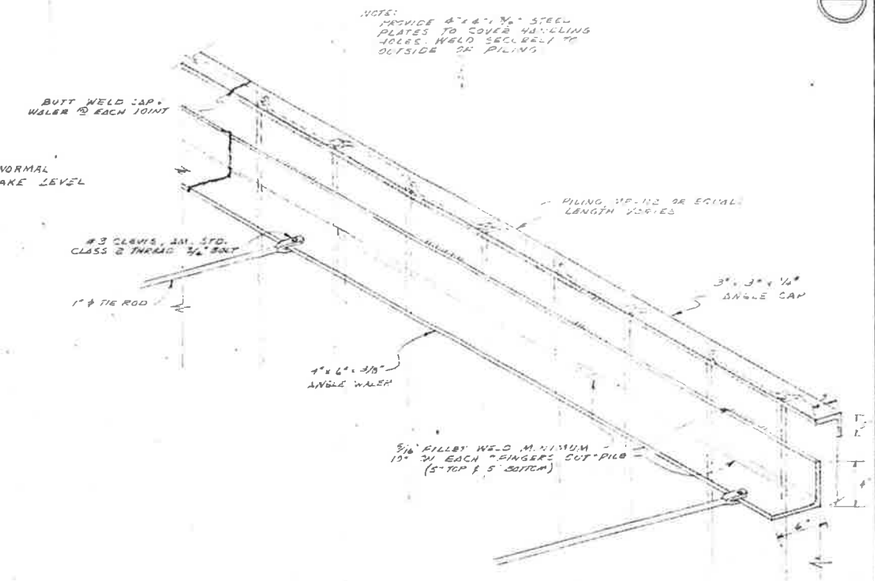
ANCHOR DETAIL
NO SCALE



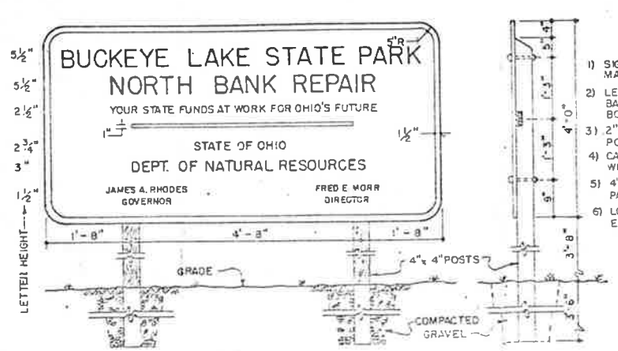
WALL SLEEVE DETAIL
NO SCALE



WALL SECTION DETAIL
NO SCALE



ANGLE CAP & WALER DETAIL
NO SCALE



PROJECT SIGN
SCALE 1/4" = 1'-0"

NOTES

1) SIGN BOARD ~ 4'-0" x 8'-0" x 3/4" MARINE PLYWOOD.
2) LETTERS ~ GREEN ON WHITE BACKGROUND, STRIPE AND BORDER TO BE RED.
3) 2" x 4" CROSS BRACE LET INTO POSTS.
4) CARRIAGE BOLTS 3/8" x 5" WITH WASHERS.
5) 4" x 4" POSTS TREATED AND PAINTED BROWN.
6) LOCATION DETERMINED BY ENGINEER IN THE FIELD.

STATE OF OHIO
DEPARTMENT OF NATURAL RESOURCES
OFFICE OF CHIEF ENGINEER

BUCKEYE LAKE STATE PARK
LICKING COUNTY
NORTH BANK REPAIR
DETAIL SHEET

DATE [illegible]	JOB NUMBER
DRAWN BY [illegible]	SCALE AS SHOWN
CHECKED BY E.K.R.	REVISED
APPROVED BY J.A.S.	AS BUILT

FIGURE 14

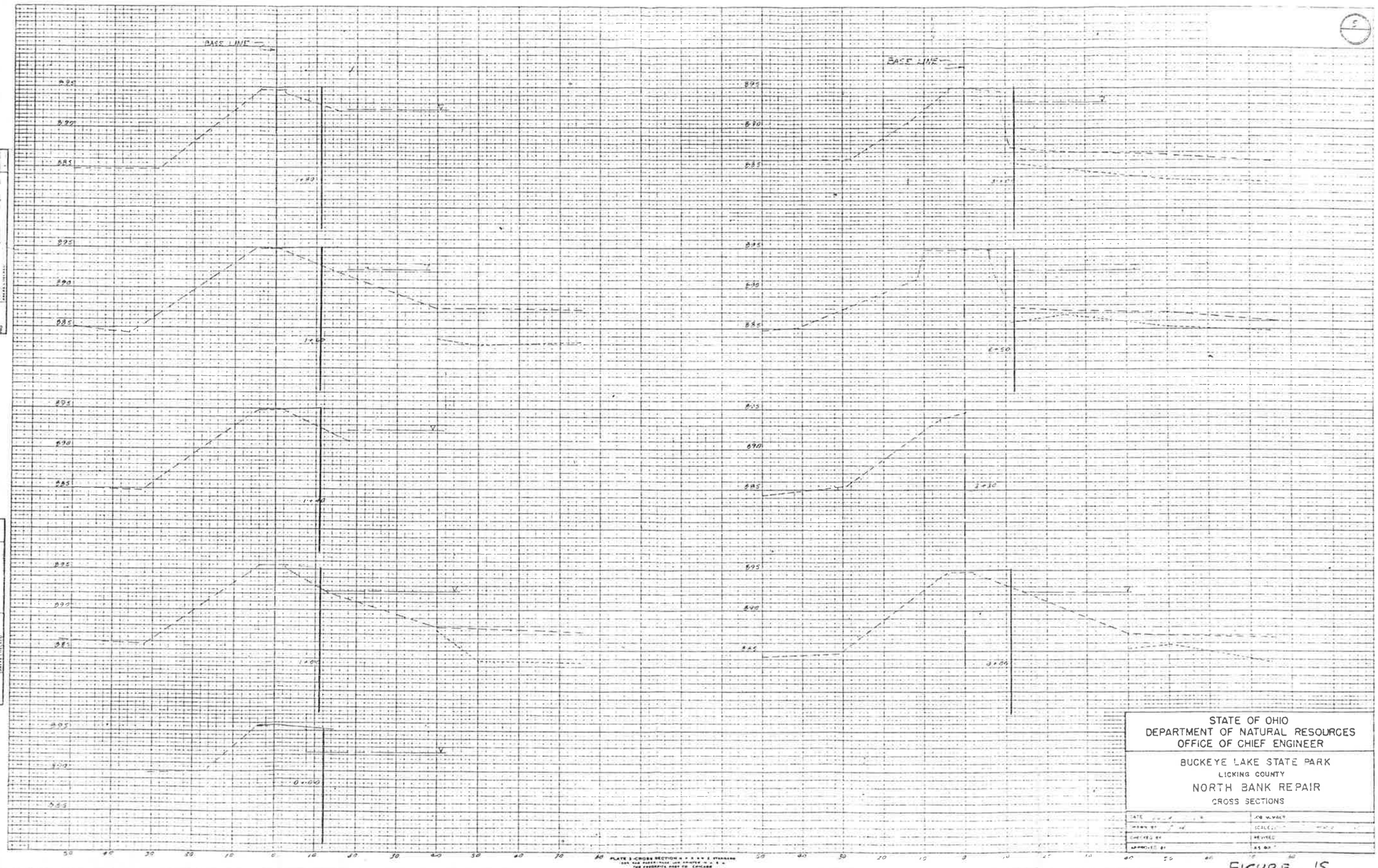
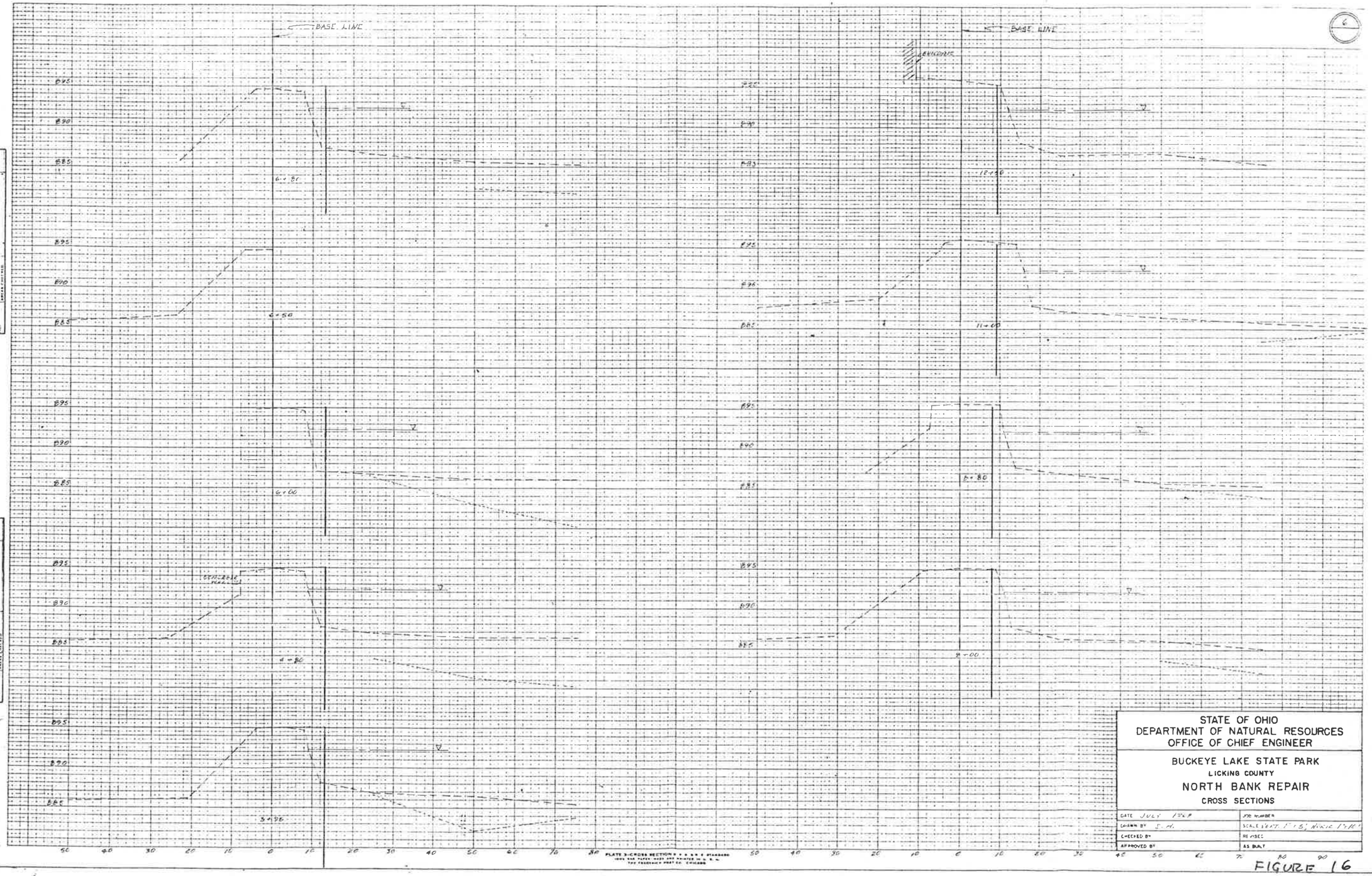

BASE LINE
BASE LINE
FINAL SURVEY
ORIGINAL SURVEY
STATE OF OHIO
DEPARTMENT OF NATURAL RESOURCES
OFFICE OF CHIEF ENGINEER
BUCKEYE LAKE STATE PARK
LICKING COUNTY
NORTH BANK REPAIR
CROSS SECTIONS

FIGURE 15

0-19



FINAL SURVEY

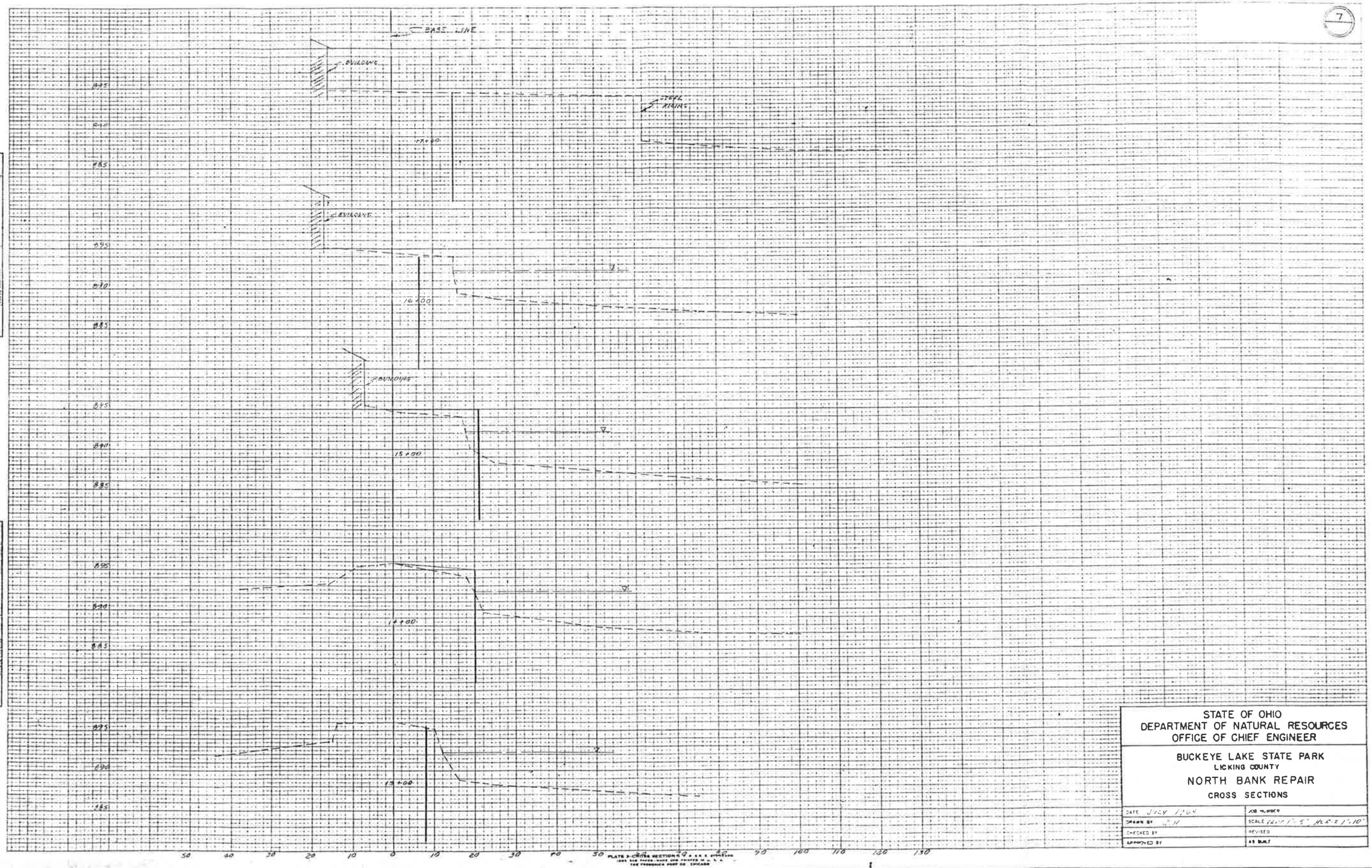
ORIGINAL SURVEY

STATE OF OHIO
DEPARTMENT OF NATURAL RESOURCES
OFFICE OF CHIEF ENGINEER

BUCKEYE LAKE STATE PARK
LICKING COUNTY
NORTH BANK REPAIR
CROSS SECTIONS

DATE JULY 1968	JOB NUMBER
DRAWN BY S.H.	SCALE VERT. 1" = 5' HORIZ. 1" = 10'
CHECKED BY	REVISED
APPROVED BY	AS BUILT

FIGURE 16



STATE OF OHIO
DEPARTMENT OF NATURAL RESOURCES
OFFICE OF CHIEF ENGINEER

BUCKEYE LAKE STATE PARK
LICKING COUNTY

NORTH BANK REPAIR

CROSS SECTIONS

DATE JULY 1968	JOB NUMBER
DRAWN BY	SCALE VERT. 1" = 5' HORZ. 1" = 10'
CHECKED BY	REVISED
APPROVED BY	AS BUILT

FINAL SURVEY

ORIGINAL SURVEY

FIGURE 17

APPENDIX E

PHOTOGRAPHS

PHOTOGRAPH 1 View of the sheetpile wall construction along the north bank of Buckeye Lake. Note the waler is installed just above the water level.

PHOTOGRAPH 2 View of stone masonry wall failing near Ballards Addition (see Figure 1, Appendix D, for approximate location). This wall is scheduled for repair in the fall of 1978.

PHOTOGRAPH 3 View of the repaired masonry wall approximately 300 feet south of Mud Island on West Bank Drive. Water has worked away the soil behind the wall.

1

2

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PHOTOGRAPH 4 View of sump pit underneath the house at 3777 North Bank Drive. The owner has just finished pumping out the hole.

PHOTOGRAPH 5 View of pit installed underneath a house at 3733 North Bank Drive. Tile drains are installed under the sidewalk and yard to remove the water. Presently the water in this pit is about 2 inches deep and flow is approximately 2 gallons per minute. This flow increases dramatically when the lake level rises.

PHOTOGRAPH 6 View of seepage through steps in the North Bank Drive area.

4

5

6

PHOTOGRAPH 7 Crack in the masonry wall at 12530 West Bank Drive. Note that the masonry wall is pushed out 6 inches over its concrete foundation (line of movement is just above the water line).

PHOTOGRAPH 8 View of cracking and tilting of sidewalk near the old amusement park area. A sheetpile wall was driven behind the masonry wall and is below the crack line.

PHOTOGRAPH 9 View of bent railing caused by an insufficient retaining wall at 708 North Bank Drive. Photograph taken from the crest of the dam.

6

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7

PHOTOGRAPH 10 View of saturated and very soft conditions in yard beyond the downstream toe at 3777 North Bank Drive.

PHOTOGRAPH 11 Close-up of concrete deterioration on the spillway. The photograph was taken during February 1978 when the lake level was drawn down.

10

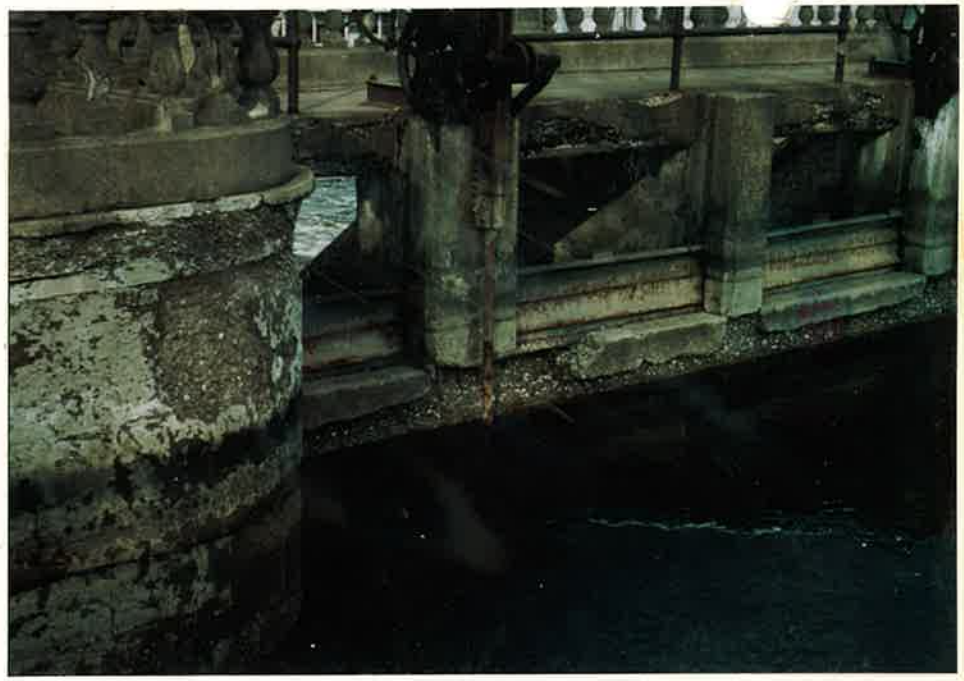
11

PHOTOGRAPH 12 Downstream face of the spillway and outlet works gates. Note the concrete deterioration.

PHOTOGRAPH 13 Left end of the spillway and outlet works structure showing the deterioration of the concrete and the presence of flashboards and gate valves. The photograph was taken during February 1978 when the lake level was drawn down.

PHOTOGRAPH 14 Upstream face of the spillway and outlet works structure. The photograph was taken during February 1978 when the lake level was drawn down.

12



13

14

APPENDIX F

HYDRAULIC AND HYDROLOGIC DATA

Evaluation of Hydraulic and Hydrologic (H&H) Features

1. Design Data -

Hydraulic and hydrologic calculations were presented in the 1939 report by A. J. Moors of the U. S. Engineer Office (Corps of Engineers), Huntington, West Virginia, and additional calculations were done in April 1977 by ODNR. Some errors in measurement and/or the assumptions made rendered the 1939 calculations inappropriate for present use, while the 1977 calculations were rough and somewhat difficult to follow. Therefore, an independent hydraulic and hydrologic evaluation was performed using the methods recommended by the Pittsburgh District, U. S. Army Corps of Engineers.

2. Experience Data -

Records (the inspection report by John J. Konrad, dated March 14 and 15, 1939, and subsequent reservoir level records) indicate that the dam has never been overtopped; however, during the May 1968 flood, the lake came within one inch of overtopping the dam. During this near overtopping, the National Guard had to sandbag portions of the dam; and there was considerable seepage through the embankment. It should be noted that the five gates of the outlet structure remained closed to decrease downstream flooding throughout this period. The 1913 flood is considered to have been worse than the 1968 flood; thus, it is speculated the dam may have overtopped at that time. However, no records exist to indicate that it did.

3. Visual Observations -

The dam crest was relatively uniform at approximately 3 feet above the water level (2.5 feet over the spillway crest) during inspection. The spillway concrete appeared badly deteriorated though functional. It was reported that all five outlets gates could be opened; though due to lack of use, problems may exist in opening two of them.

4. Overtopping Potential -

Since the hazard rating is high and the dam size is intermediate, the Spillway Design Flood (SDF) is the Probable Maximum Flood (PMF) (see "Recommended Guidelines for the Safety Insepction of Dams"). Based upon the empirical curves supplied and the analysis methods recommended by the Pittsburgh District, Corps of Engineers, the peak inflow due to the PMF was calculated to be 44,386 cfs. The combined spillway discharge capacity (includes outlet gates discharge) was calculated to be 3,175 cfs, which indicates that the spillway is inadequate to handle the peak flow from the PMF event. Considering the effects of storage, calculations

indicate that under the PMF conditions the dam will overtop upwards of 27.6 hours to a maximum depth of about 2.0 feet. Under the 1/2 PMF condition, the peak inflow was calculated to be 20,813 cfs. Since the combined spillway capacity is 3,175 cfs, the spillway is also seriously inadequate to handle the peak flow from the 1/2 PMF event. Routing the 1/2 PMF event indicated that the dam will overtop for upwards of 22.5 hours to a maximum depth of about 1.0 feet.

In an effort to gain insight into how seriously inadequate the existing spillway is, the unconservative assumption was made that the spillway gates are opened at time zero; i.e., at the start of the rainfall. This assumption results in the lake initially being drawn down during the first several hours before appreciable runoff begins to refill the lake. The assumption is somewhat unrealistic as it assumes: 1) the accurate prediction of the start of rainfall for the severe storm; and 2) the immediate decision to open the gates and drain the lake down to increase storm runoff storage capacity, in spite of the fact that an unnecessary lowering of the water level results in loss of recreational use of much of the lake with the accompanying pressures from those affected and that a large discharge of water may worsen flooding conditions downstream. Even with this somewhat unrealistic assumption, which results in the lake being able to store a considerable portion of the initial storm runoff, the computed durations and depths of overtopping are still so large that the overall conclusions regarding the danger to the embankment are not changed. In addition, this approach points out the fact that the existing spillway is so seriously inadequate that opening or not opening the gates probably has no real significance in case of large intense storms, such as the PMF and 1/2 PMF, in that it is likely that the embankment will fail due to the severe overtopping with or without the gates open.

It should be noted that if the analysis had been carried out with the assumption that no gates were open or that they were opened much later in the storm, the computed durations and depths of overtopping would be greater; however, no information would then be available as to the possible effect that an early opening of the gates could have.

In general, it should be noted that a large storm over the entire watershed has not occurred during the time since the dam was constructed. Only portions of the watershed at any given time have experienced heavy rainfall; however, it is possible that the Probable Maximum Flood could occur over the entire watershed at essentially any time.

5. Significance of Overtopping Due to SDF -

It is anticipated that overtopping of Buckeye Lake Dam under PMF or 1/2 PMF conditions will cause embankment

failure. The resulting flow may endanger many lives (approximately 5,000) downstream in the towns of Buckeye Lake, Lakeside, Hebron, and Newark (primarily in low lying areas near the river) and may possibly affect the integrity of the Dillon Reservoir, which is further downstream.

6. Spillway Adequacy -

The present spillway is seriously inadequate; therefore, it is recommended that a new spillway be constructed to pass the peak flow from a PMF event. Furthermore, the channel downstream of the spillway and the South Fork Licking River channel should be modified to better handle larger flows and to minimize potential property damage and loss of life.

SUBJECT DAM SAFETY INSPECTION OH-474
BUCKEYE LAKE DAM

BY JDV DATE 10-5-78 PROJ. NO. 78-565-474

CHKD. BY _____ DATE _____ SHEET NO. _____ OF _____

GAI CONSULTANTS, IN
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2	GENERAL STATEMENT CONCERNING HYDROLOGIC ANALYSIS	F3 B
3	DRAINAGE AREA, SURFACE AREA, STORAGE AND HAZARD CLASSIFICATION	F4-F9
4	SPILLWAY DESIGN FLOOD	F10-F11
5	UNIT HYDROGRAPH	F12-F20
6	SPILLWAY CAPACITY	F21-F23
7	ELEVATION-DISCHARGE RELATIONSHIP	F24-F29
8	ELEVATION-STORAGE RELATIONSHIP	F28, F30
9	NOTE ON GATE OPENING ASSUMPTION	F30A-F30E
10	PMF-ROUTING	F31-F37
11	½ PMF-ROUTING	F38-F45
12	REFERENCES	F46-F47

SUBJECT C. of E.-Dam Inspection-Ohio 474
Buckeye Lake

BY GPT DATE 7-28-78 PROJ. NO. 78-565-474

CHKD. BY KWH DATE 7-28-78 SHEET NO. 1 OF 1
8/21/78

F3B

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Hydrologic Analysis:

Because of the unusual configuration and orientation of the streams and sub-drainage areas feeding Buckeye Lake, W. Salesky (PITTSBURGH DIST., CORPS OF ENGRS) and GAI agreed that the hydrologic analysis would proceed as follows:

1. Separate unit hydrographs would be prepared for each of the following sub-basins:

(1) The basin feeding the stream just east of Honey Creek, here-after called the "east basin."

(2) The basin feeding the stream labeled "reservoir feeder", here-after called the "west basin".

(3) The remainder of the basin, hereafter called the "instantaneous basin". [Instantaneous run-off is assumed for this sub-basin, because it consists of the lake surface and land close to the lake.

2. The separate unit hydrographs will be combined and the combined unit hydrograph applied to the PMP for the entire basin.

F4

SUBJECT COE DAM INSPECTION - BUCKEYE
DRAINAGE BASIN AREA

BY RT DATE 7/25/78 PROJ. NO. 78-565-474

Ch. BY DATE SHEET NO. 1 OF 6

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8/21/78

COMPUTATION OF DRAINAGE AREA

MILLERS PORT QUAD

55.59 + 16.91 = 38.68
51.34 + 11.58 = 39.76
52.10 + 12.02 = 40.08
= 118.52 in²

THORNVILLE QUAD

43.60 − 36.18 = 7.42
53.37 − 16.89 = 36.48
86.56 − 15.09 = 71.47
59.82 − 30.32 = 29.5
= 144.87 in²

BALTIMORE QUAD

17.81 − 17.55 = 0.26 = 0.26 in²

PATASKALA QUAD

62.67 − 44.11 = 18.56 = 18.56 in²

RUSHVILLE QUAD

58.10 − 47.12 = 10.98 = 10.98 in²

TOTAL DRAINAGE BASIN AREA = 118.52 + 144.87 + .26 + 18.56 + 10.98 = 293.19 in²

293.19 in² × (2000 ft²/in² × .0000229 ac/ft²) = 26,856.2 acres

26,856.2 × .001562 mi²/ac = 41.95 sq. mi

SUBJECT COE DAM INSPECTION - BUCKEYE
STORAGE - ELEVATION

BY PT DATE 7/25/78 PROJ. NO. 78-565-474
CK. BY [illegible] DATE 7/26/78 SHEET NO. 2 OF 6

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AREAS PLANIMETERED FROM USGS TOPO MAPS : ELEVATIONS 895' AND 900'

① PORTIONS ON THORNVILLE QUAD

EL 895' (WATER SURFACE ELEVATION, AS REPORTED ON THE USGS TOPO MAP, FOR THE LAKE SKETCHED)

29.02
7.75

* ESTIMATED AREAS

21.27 in² = AREA WITHIN SHORELINE OF LAKE SKETCHED ON USGS MAP

ISLANDS

66.55 71.77 69.89 67.05 67.37
66.50 71.75 69.85 67.02 67.35
.05 +.02* + .02 + .04 + .03 +.04* + .02 +.09 +.02*

59.08 75.13 80.68
59.05 74.93 79.62
.03 +.04* +.01* + .20 + 1.06

TOTAL ISLAND AREA = 1.67 in²

NET AREA = 21.27 - 1.67 = 19.6 in²

19.6 x 2000'²/in² x .00002296 ac/ft² = 1795.36 acres

1795.36 ac x .001562 mi²/ac = 2.80 sq mi

EL 900:

23.82 29.76 34.30
16.36 - 29.68 - 34.29
7.46 - .08 - .01 = 7.37 in²

35.35 40.65
15.16 - 40.16
20.19 - .49 - .03* = 19.67 in²

TOTAL 900 EL. AREA = 19.67 + 7.37 = 27.04 in²

27.04 in² x 2000'²/in x .00002296 ac/ft² = 2476.86 acres

2476.86 ac x .001562 mi²/ac = 3.87 sq. mi

SUBJECT COE DAM INSPECTION – BUCKEYE STORAGE – ELEVATION

BY RT DATE 7/25/78 PROJ. NO. 78-565-474

C. BY [illegible] DATE [illegible] SHEET NO. 3 OF 6

[illegible] 8/22/78

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FG

② PORTIONS ON MILLERSPORT QUAD.

ELEV. 892 (WITHIN SHORELINES OF LAKE SKETCHED)

45.02
33.32
11.70 in²

ISLANDS

41.42 40.97 41.61
41.41 40.93 40.48
.01 + .08* + .04 + .04* + .06* + 1.13 = 1.36 in²

NET AREA = 11.70 − 1.36 = 10.34 in²

10.34 in² × 2000'²/in² × .00002296 AC/FT² = 947.14 acres

947.14 ac × .001562 mi²/ac = 1.48 mi²

EL 900:

55.41 56.65
42.03 − 56.60
13.38 − .05 = 13.33 in² = AREA

13.33 in² × 2000'²/in² × .00002296 AC/FT² = 1221.03 acres

1221.03 ac × .001562 mi²/ac = 1.91 mi²

F7

SUBJECT COE DAM INSPECTION - BUCKEYE
STORAGE - ELEVATION

BY RT, JDY DATE 7/25/78, 1/9 PROJ. NO. 78-565-474

( ). BY EMH DATE 7/ 8/22/78, 3/9 SHEET NO. 4 OF 6

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SURFACE AREA AT TOP OF EMBANKMENT

BECAUSE THE USGS TOPO SHEET HAS A 10' CONTOUR INTERVAL, AND BECAUSE THE TOPOGRAPHY BETWEEN EL. 892 AND EL. 900 IS FAIRLY UNIFORM, A LINEAR INTERPOLATION BETWEEN EL 892 & 910 ON THE STORAGE - ELEVATION GRAPH IS JUSTIFIED TO FIND THE STORAGE AT EL. 894.4 (TOP OF DIKE)

TOTALS FROM THORNVILLE & MILLERSPORT QUADS

EL 892

1795.36 + 947.14 = 2742.5 acres

2.80 + 1.48 = 4.28 sq mi

EL 900

1221.03 + 2476.86 = 3697.89 = 3697.9 acres

1.91 + 3.87 = 5.78 sq mi

EL 894.4 (INTERPOLATED FROM FIGURE 1, PAGE F8)

3030 ACRES

SURFACE AREA AT NORMAL POOL:

EL 892.5 (INTERPOLATED FROM FIGURE 1, PAGE F8)

2800 ACRES

SUBJECT COE DAM INSPECTION - BUCKEYE
BY RT, JDV DATE 7/25/78, 1/9 SHEET NO. 5 OF 6
CHKD. BY EPH DATE 7/2[illegible]/78 PROJECT NO. 72-[illegible]-1/74
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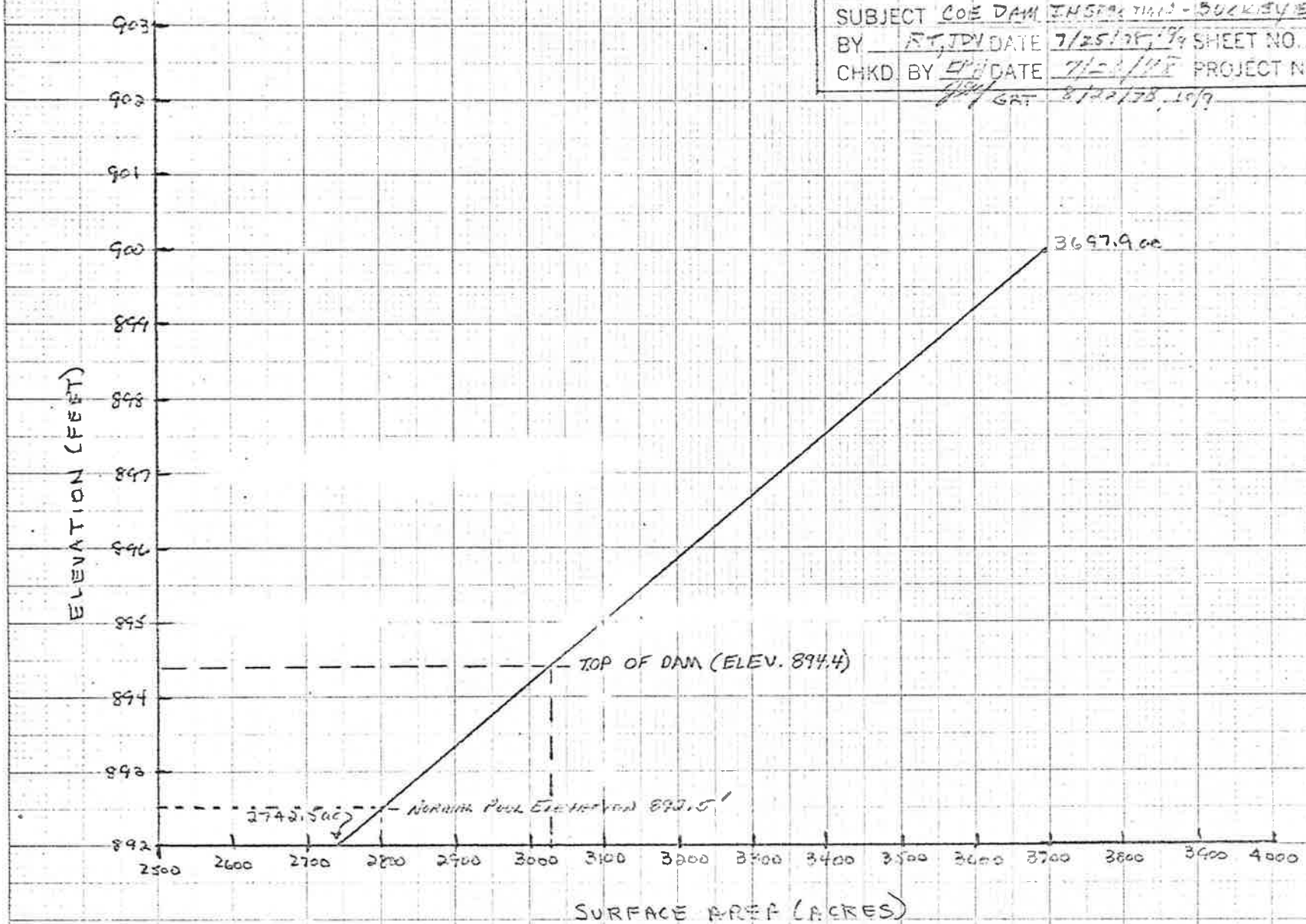

FIGURE 1

SUBJECT COE DAM INSPECTION - OH-494
BUCKEYE LAKE

BY [illegible] DATE 8/21/78 PROJ. NO. 78-565-494

CHKD. BY GRT DATE 8/24/78 SHEET NO. 6 OF 6

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AVAILABLE STORAGE FROM NORMAL POOL TO TOP OF DAM:

$= \frac{2030 \text{ ACRES} + 2830 \text{ ACRES}}{2} (2.5') = 7288 \text{ ACRE FT}$

STORAGE CAPACITY:

NORMAL POOL STORAGE $= \frac{1}{3} HA$

WHERE $H = 12'$ (APPENDIX A, FIGURE 6B)
$A = 2830$ ACRES (PAGE F7)

NORMAL POOL STORAGE $= \frac{1}{3}(12)(2830) = 11,300$ ACRE FT

NOTE: DUE TO THE IRREGULAR SHAPE OF BUCKEYE LAKE, ANOTHER METHODOLOGY WAS ATTEMPTED AND GAVE 14,700 ACRE-FT. THE FINAL RESULTS ARE NOT SENSITIVE TO THE VALUE OF STORAGE CAPACITY BELOW NORMAL POOL.

STORAGE AT TOP OF DAM $= 11,300$ ACRE FT $+ 7288$ ACRE FT

$= 18,488$ ACRE FT

SIZE CLASSIFICATION = INTERMEDIATE (REF. 3, TABLE 1)

HAZARD CLASSIFICATION = HIGH (REF. 3, TABLE 2)

REQUIRED SDF = $\frac{1}{2}$ PMF TO PMF (REF. 3, TABLE 3)
∴ USE PMF

F10

SUBJECT COE Dam Inspection - OH - 444
Buckeye Lake

BY [illegible] DATE 8/21/78, 10/9 PROJ. NO. 78-565-444

CHKD. BY GRT DATE 8/24/78, 10/9 SHEET NO. 1 OF 2

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PMF DETERMINATION: (DRAINAGE AREA = 41.95 SQ. MI., LATITUDE = 39.92°)

NOTE: EVEN THOUGH EACH OF THREE SUB-WATERSHEDS IS BEING TREATED SEPARATELY FROM A HYDROLOGIC STANDPOINT, THE SAME RAINFALL EVENT IS OCCURRING OVER THE ENTIRE WATERSHED. THEREFORE, THE ENTIRE DRAINAGE AREA (41.95 SQ. MI.) SHOULD BE USED TO DETERMINE BOTH THE PMF AND THE APPROPRIATE REDUCTIONS. IN EFFECT, THE SAME RAINFALL PATTERN IS FALLING ON EACH OF THE SUB-WATERSHEDS. NOTE THAT THE METHODOLOGY FOR DETERMINING RUNOFF IS NOT DEPENDENT OF DRAINAGE AREA, AND THUS THE USE OF 41.95 SQ. MI. IS NOT AFFECTING THE INFLOW (RUNOFF) HYDROGRAPH. THE RESULTING INFLOW HYDROGRAPH IS THEREFORE THE SAME FOR ALL SUB-WATERSHEDS, AND IS PRESENTED ON PAGE F11 (FULL PMF).

CHECK AVAILABLE STORAGE:

TOTAL VOLUME OF RUNOFF 26.820 in (41.95 SQ. MI.)(117/12 in)(43,560 SQ. MI.)

= 57,768 ACRE-FT.

AVAILABLE STORAGE = 7288 ACRE-FT (PAGE F9)

AVAILABLE STORAGE < REQUIRED STORAGE ⇒ ROUTING OF PMF IS REQUIRED (ASSUMING THAT TOTAL CAPACITY OF OUTLET WORKS < PEAK INFLOW RATE).

SUBJECT Dam Safety Inspection-OH-424 : Buckeye
BY [illegible] DATE 8/21/78 SHEET NO. 2 OF 2
CHKD. BY G.R.T. DATE 8/24/78 PROJECT NO. 26-065-424

E11

SUPPLEMENTAL HYDROLOGIC AND HYDRAULIC INFORMATION

FOR STATE OF OHIO DAM SAFETY INSPECTION

BUCKEYE LAKE FULL PMP

INPUT DATA

AREA = 41.950000

LATITUDE= 39.920000

RUNOFF BETWEEN	0	HOURS AND	6	HOURS =	0.000	INCHES
RUNOFF BETWEEN	6	HOURS AND	12	HOURS =	0.000	INCHES
RUNOFF BETWEEN	12	HOURS AND	18	HOURS =	0.000	INCHES
RUNOFF BETWEEN	18	HOURS AND	24	HOURS =	0.000	INCHES
RUNOFF BETWEEN	24	HOURS AND	30	HOURS =	0.622	INCHES
RUNOFF BETWEEN	30	HOURS AND	36	HOURS =	2.837	INCHES
RUNOFF BETWEEN	36	HOURS AND	42	HOURS =	19.432	INCHES
RUNOFF BETWEEN	42	HOURS AND	48	HOURS =	0.852	INCHES
RUNOFF BETWEEN	48	HOURS AND	54	HOURS =	0.789	INCHES
RUNOFF BETWEEN	54	HOURS AND	60	HOURS =	0.646	INCHES
RUNOFF BETWEEN	60	HOURS AND	66	HOURS =	0.414	INCHES
RUNOFF BETWEEN	66	HOURS AND	72	HOURS =	0.228	INCHES

TOTAL RUNOFF= 25.820

SUBJECT DAM INSPECTION - BUCKEYE LAKE OH-174

BY RT DATE 7-28-78 PROJ. NO. 78-565-174

CH. BY GRT DATE 7-28-78 SHEET NO. 1 OF 9

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SYNTHETIC UNIT HYDROGRAPH - WEST BASIN

$DA = 99.06 in^2 \times .00002296 \, ac/ft^2 \times (2000 \, ft/in)^2 \times .001562 \, mi^2/ac = 14.17 \, mi^2$
(PLANIMETERED ON QUAD. SHEET)

$L = (21.75 in \times 2000 ft/in) / 5280 ft/mi = 8.24 mi$ FOR E-W DOMINANT STREAM

$0.7L = .7 \times 8.24 = 5.77 mi.$

$x = 7 in \quad y_1 = 14.143 in \quad w/l = x/y_1 = 7/14.143 = 0.495$

$S = (EL. 988' - EL 892.5') / 5.77 mi = 16.55 ft/mi$

FROM REF1:

The final synthetic six hour unit graph equations are as follows:

$$Pk = 10.6909 \times (DA)^{1.2439} \times (w/1)^{-.2286} \times (.7L)^{-.4985} \times (S)^{.5240}$$

$$Wpk = 540.2134 \times (Pk)^{-.9853} \times (DA)^{.9723}$$

$$Tp = 66.2287 \times (Pk)^{-.1699} \times (.7L)^{.3017} \times (S)^{-.4236}$$

Where:

Pk = peak flow in cubic feet per second

Wpk = width of unit graph in hours at 1/2 peak flow

Tp = time to peak in hours from initial runoff

(NOTE: If calculated Tp < 6 hours but > 4 hours, check basin characteristics and if calculated Tp is still in the range of 4 to 6 hours, set Tp equal to 6 hours for the unit graph plot. If Tp < 4 hours use some other accepted method.)

DA = drainage area in square miles

w/1 = ratio of width to length of basin (aligned with predominate stem)

.7L = Seven-tenths of the length of the predominate stem from the point of interest to the end in miles

S = Slope of stream measured from the point of interest to a point seven-tenths of the length of the stream in feet per mile

SUBJECT COE DAM INSPECTION - BUCKEYE LAKE OH-171

BY RT DATE 7-28-78 PROJ. NO. 78-565-171

CHKD. BY GRT DATE 7-28-78 SHEET NO. 2 OF 9

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THUS: $P_K = 616.9$ CFS ≈ 617 CFS

$W_{PK} = 12.66$ HRS

$T_P = 11.50$ HRS

FROM FIG. 1, REF. 1, THE SYNTHETIC UNIT HYDROGRAPH IS CONSTRUCTED:

$0.4(W_{PK}) = 0.4(12.66) = 5.06$ HR.

$T_P - 5.06 = 11.5 - 5.06 = 6.44$ HR

$0.6(W_{PK}) = 0.6(12.66) = 7.60$ HR

$T_P + 7.60 = 11.5 + 7.60 = 19.10$ HR

$0.5 \times P_K = 0.5 \times 617 = 308.6 \cong 309$ CFS

AMOUNT OF WATER ASSOCIATED WITH 1" OF RUNOFF:

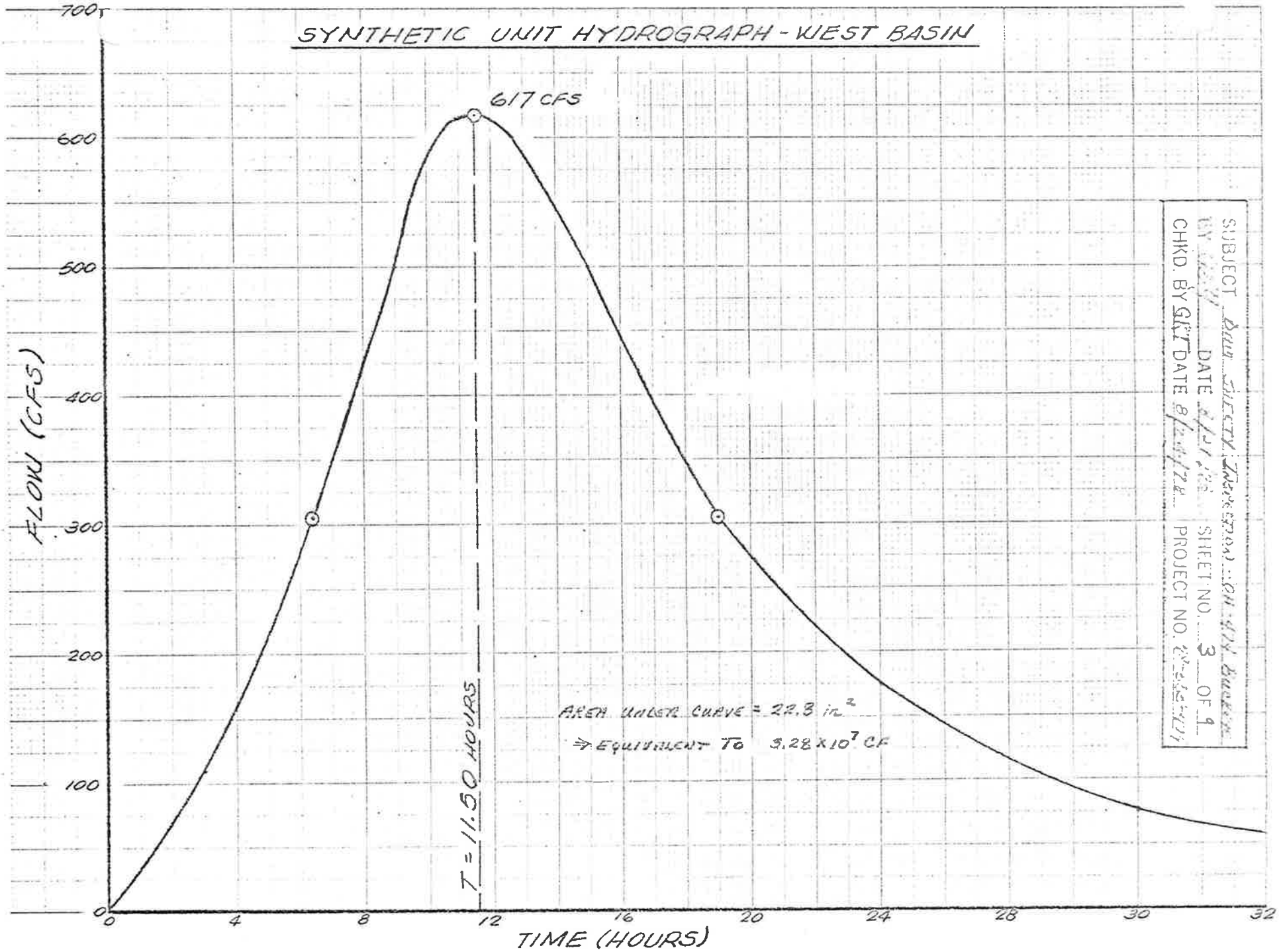
$(14.17\ mi^2)(5280\ FT/mi)^2(1\ IN.\ RUNOFF)(1\ FT/12\ IN) = 3.29 \times 10^7\ FT^3$

ONE SQUARE INCH FOR THE SYNTHETIC UNIT HYDROGRAPH (SEE NEXT SHEET) EQUALS:

$1\ IN^2 = 100\ CFS \times 4\ HR \times 3600\ SEC/HR = 1.44 \times 10^6\ FT^3$

THUS, THE AREA UNDER THE SYNTHETIC UNIT HYDROGRAPH SHOULD EQUAL:

$AREA = 3.29 \times 10^7\ FT^3 / 1.44 \times 10^6\ FT^3/IN^2 = 22.85\ IN^2$


SYNTHETIC UNIT HYDROGRAPH - WEST BASIN
617 CFS
T = 11.50 HOURS
AREA UNDER CURVE = 22.3 in²
⇒ EQUIVALENT TO 3.28 X 10⁷ CF
FLOW (CFS)
TIME (HOURS)
0
100
200
300
400
500
600
700
4
8
12
16
20
24
28
30
32
SUBJECT
BY
DATE
SHEET NO. 3 OF 9
CHKD. BY
DATE
PROJECT NO.

F14

SUBJECT DAM SAFETY INSPECTION OHIO - 474
BUCKEYE LAKE

BY KHK DATE 7-28-78 PROJ. NO. 78-565-474

CHKD. BY RT DATE 7-28-78 SHEET NO. 4 OF 9

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BUCKEYE LAKE (EAST BASIN)

TOTAL DRAINAGE AREA = 41.95 SQ. MILES (PLANIMETERED)

EASTERN SUB. DRAINAGE AREA = 72.32 SQ. IN.

= 10.38 SQ. MILES.

LENGTH OF MAJOR STREAM = 10.50 IN. (TRIBUTARY OF HONEYCREEK)

= 21000 FT

.7L = 14700 = 2.78 MILES

ELEVATION AT .7L = 960.5

SLOPE $= \frac{960.5-892.5}{2.78} = 24.46 \approx 24.5$

WIDTH TO LENGTH RATIO $= \frac{X}{Y} = \frac{6.5}{11.13} = .584$

SIX HOUR SYNTHETIC UNIT GRAPH REF. 1

FOR EQUATIONS SEE PAGE F9 OF THESE CALCS.

SUBJECT DAM SAFETY INSPECTION OHIO-474
BUCKEYE LAKE

BY RT DATE 7-28-78 PROJ. NO. 78-565-474
CHKD. BY KHK DATE 7-28-78 SHEET NO. 5 OF 9

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THUS: $P_K = 713$ CFS $\quad \frac{1}{2} P_K = 356.5$ CFS

$W_{PK} = 8.12$ HR

$T_P = 7.62$ HR

USING FIG. 1, REF. 1, THE SYNTHETIC UNIT HYDROGRAPH IS CONSTRUCTED FROM:

$0.4\, W_{PK} = 0.4\,(8.12) = 3.25$ HR

$T_P - 3.25 = 7.62 - 3.25 = 4.37$ HR

$0.6\, W_{PK} = 0.6\,(8.12) = 4.87$ HR

$T_P + 4.88 = 7.62 + 4.88 = 12.50$ HR.

AMOUNT OF WATER ASSOCIATED WITH 1" OF RUNOFF:

$(10.38\ mi^2)(5280\ FT/mi)^2$ (1 INCH RUNOFF) $(1\ FT/12\ IN) = 2.4 \times 10^7\ FT^3$

ONE SQUARE INCH FOR THE SYNTHETIC UNIT HYDROGRAPH (SEE NEXT SHEET) EQUALS

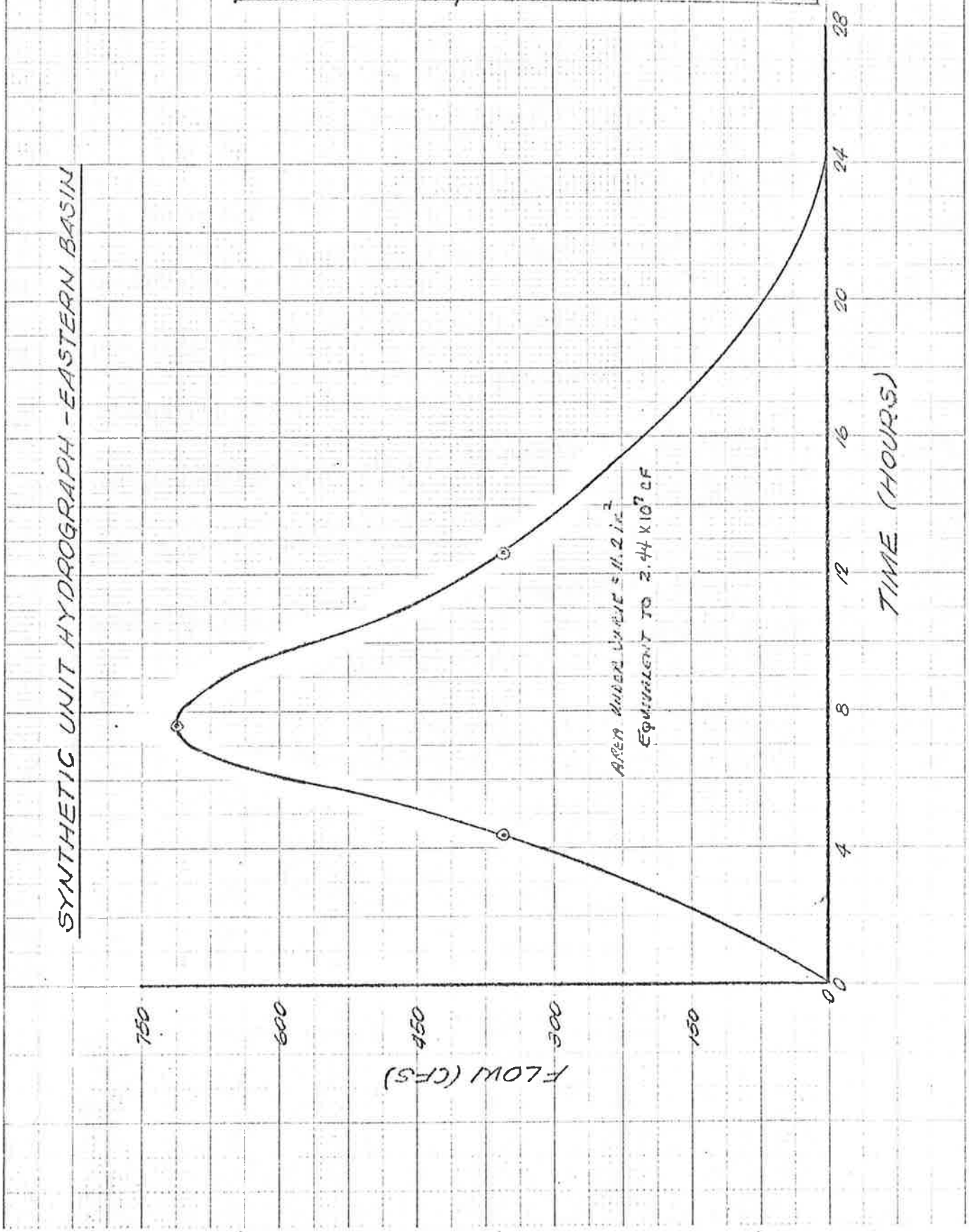
$1\ IN^2 = (150\ CFS)(4\ HR)(3600\ SEC/HR) = 2.16 \times 10^6\ FT^3$

THUS, AREA UNDER SYNTHETIC UNIT HYDROGRAPH SHOULD EQUAL:

$AREA = 2.4 \times 10^7\ FT^3 / 2.16 \times 10^6\ FT^3/IN^2 = 11.1\ in^2$

MEASURED AREA $= 11.2\ in^2 \Rightarrow$ OK.

SUBJECT Dam Safety Inspection - OH-474 Buckeye
BY [illegible] DATE 8/21/78 SHEET NO. 6 OF 9
CHKD. BY GRT DATE 8/24/78 PROJECT NO. 78-[illegible]-474



SUBJECT Dam Safety Inspection – Ohio 474
Buckeye Lake

BY GPT DATE 7-28-78, 8-23 PROJ. NO. 78-565-474

CHKD. BY RT DATE 7-28-78 8-23-78 SHEET NO. 7 OF 9

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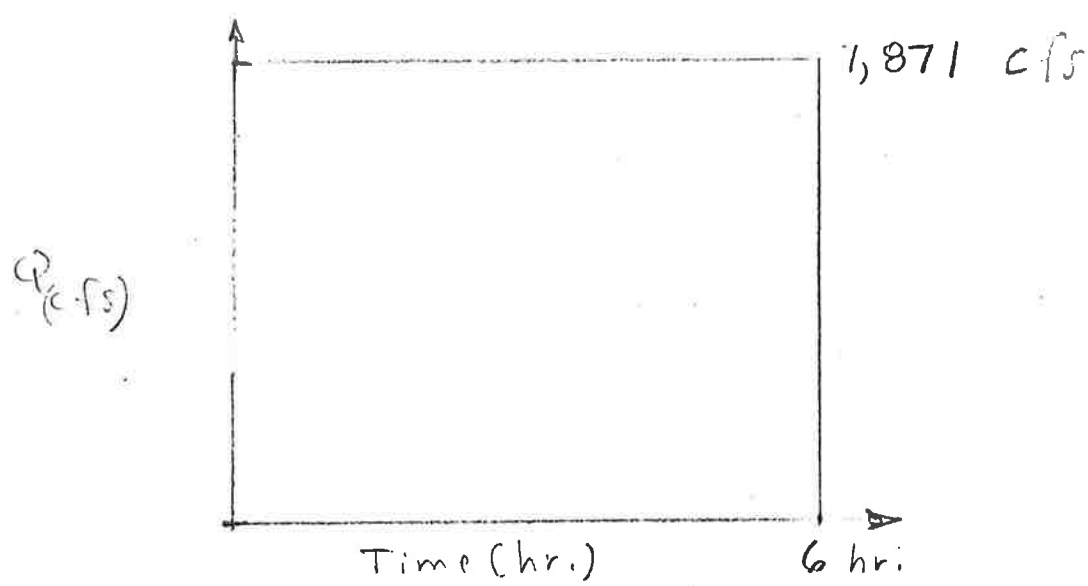
6-Hr Unit hydrograph – "Instantaneous" portion of drainage area:

Based on phone discussion w/ Mr. Salesky, assume portion of drainage area not included in "east basin" and "west basin" will experience instantaneous runoff. (Much of this area is lake surface or is close to lake.)

$$\text{Area} = 41.95 \text{ sq. mi.} - \underset{\text{east}}{10.38 \text{ sq. mi.}} - \underset{\text{west}}{14.17 \text{ sq. mi.}} = 17.4 \text{ sq. mi.}$$

$$Q = \frac{1'' \times D.A.}{6 \text{ hr.}} = \frac{(1/12) \text{ ft.} \times 17.4 \text{ mi.}^2 (5280 \text{ ft/mi})^2}{6 \text{ hr.} \times 3600 \text{ sec/hr.}} = \underline{\underline{1{,}871 \text{ cfs}}}$$

6-HR RAINFALLS USED IN SUBSEQUENT ANALYSIS



SUBJECT Dam Safety Inspection - OH - 414
Buckeye Lake

BY [illegible] DATE 8/28/78 PROJ. NO. 78-565-414

CHKD. BY GRT DATE 8/24/78 SHEET NO. 8 OF 9

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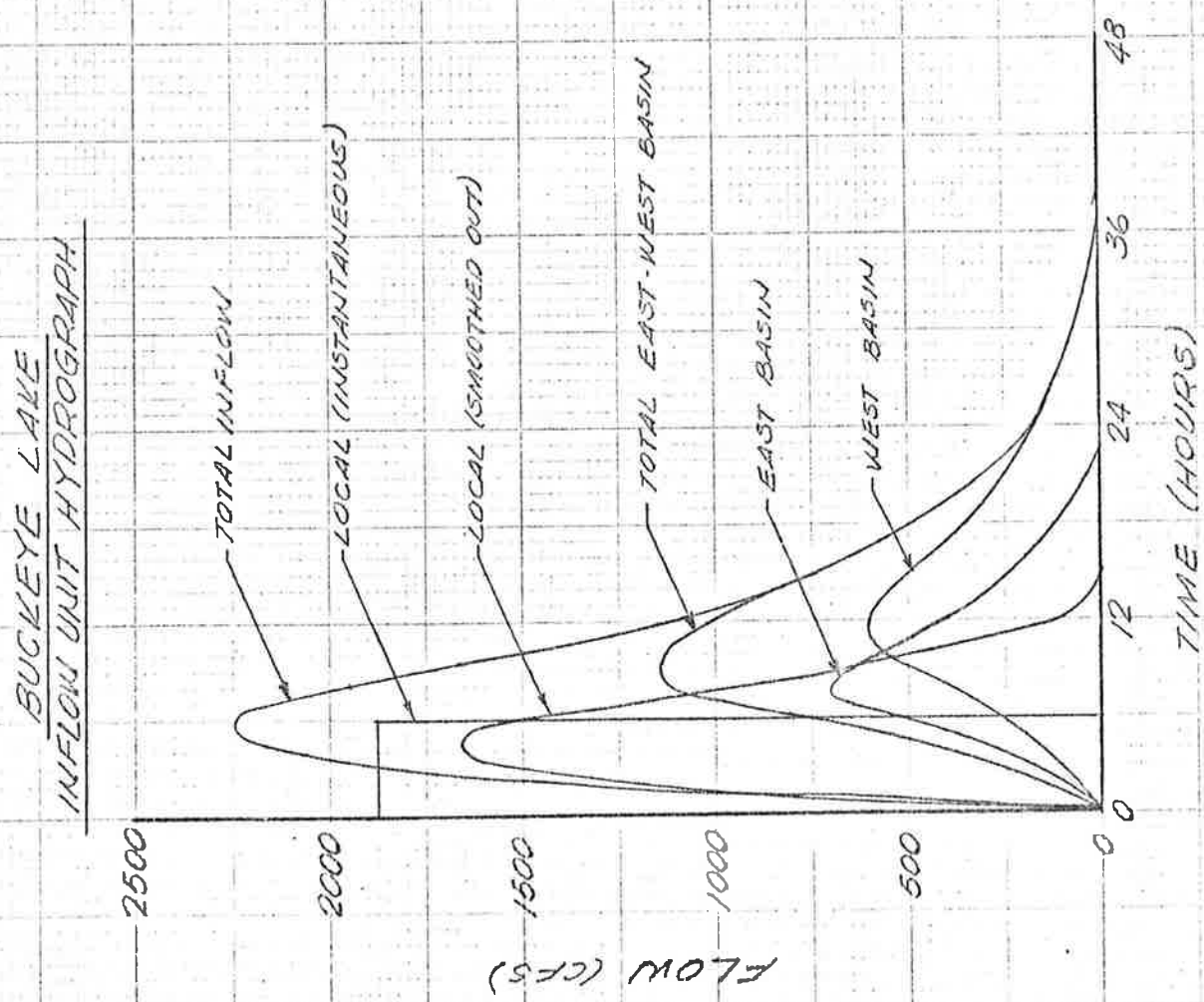
Combined Unit Hydrographs:

The individual unit hydrographs from the three sub-watersheds are graphically summed on page F20 to form the total inflow unit hydrograph for Buckeye Lake. As per a discussion with Mr. Smedley of the Corps of Engineers, the instantaneous hydrographs have been "smoothed out" in order to provide a more satisfactory representation of the prototype system.

NOTE: Use of instantaneous rainfall over the lake surface with rainfall from which antecedent moisture condition losses have been subtracted results in an inflow which is somewhat lower and less realistic than if losses were not deducted. Consequently, the final results regarding duration and depth of overtopping are somewhat unconservative; but the computed durations and depths are still so large that the overall conclusions regarding the danger to the embankment are not changed.

F20

SUBJECT DAM SAFETY INSPECTION - OH-474 BUCKEYE
BY [illegible] DATE 8/21/78 SHEET NO. 9 OF 9
CHKD. BY GRT DATE 8/24/78 PROJECT NO. [illegible]



F21

SUBJECT DAM SAFETY INSPECTION OHIO - 474
BUCKEYE LAKE

BY KHK, JDV DATE 7-27-78, 10/9 PROJ. NO. 78-565-474

CHKD. BY RT DATE 7-29-78 SHEET NO. 1 OF 3
GRT 7-30-78, 10/9
JEG 8-23-78

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CALCULATE CAPACITY OF SLUICE GATES

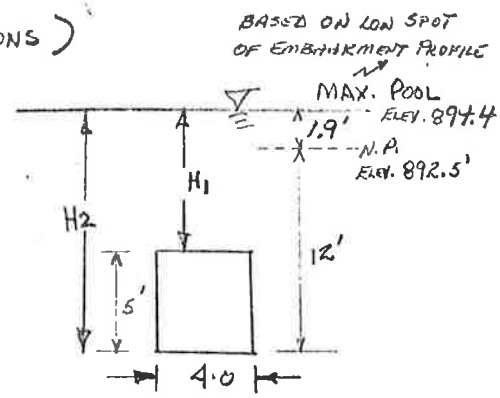
NUMBER OF GATES = 5

HEIGHT OF GATE = 5.0 FT. FIELD MEASURMENTS

WIDTH OF GATE = L = 4.0 FIELD MEASUREMENTS

NORMAL POOL = 892.5 (TOP OF FLASH BOARD)

FREE BOARD BEFORE OVERTOPPING = 2.5' (FIELD OBSERVATIONS)



$Q_T = 5 \times Q$

WHERE Q_T = TOTAL DISCHARGE

Q = DISCHARGE THROUGH ONE GATE

$$= \frac{2}{3} L \sqrt{2g} \left(H_2^{3/2} - H_1^{3/2} \right) \cdots \text{EQ (4-16)}^{*} \text{ REF 5}$$

SEE SKETCH
SHEET 2, APPENDIX D

$H_2 = 13.9$ FT
$H_1 = 8.9$ FT.

$$Q = \frac{2}{3} \times 4.0 \times \sqrt{2 \times 32.2} \left(13.9^{3/2} - 8.9^{3/2} \right)$$

* EQ (4-16) IGNORES FRICTIONAL LOSSES, FOR A RECTANGULAR ORIFICE UNDER LOW HEAD.

SUBJECT DAM SAFETY INSPECTION OHIO-474
BUCKEY LAKE

BY KHK, JPV DATE 7-27-78, 10/9 PROJ. NO. 78-565-474

CHKD. BY RT DATE 7-29-78 SHEET NO. 2 OF 3
GRT 7-30-78, 10/9
8-23-78

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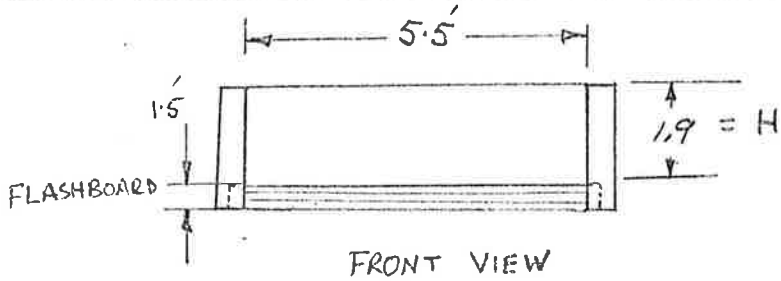
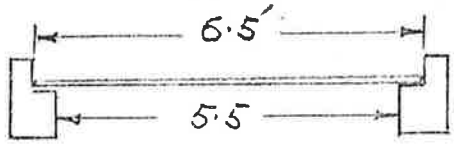
$Q = 541$ CFS

$Q_T = 5 \times 541$ CFS $= 2705$ CFS

CALCULATE CAPACITY OF UNGATED SPILLWAY (OVER FLASHBOARD)



FRONT VIEW



PLAN

B = 6.5

L = 5.5

NUMBER OF GATES = 10 (SEE SKETCH SHEET 6, APPENDIX D

FOR A HORIZONTAL SHARP-CRESTED WEIR WITH END CONTRACTIONS:

$$Q = C_e L_e H_e^{3/2} \quad \text{---- EQ 5-31 REF 5}$$

WHERE

C_e = COEFFICIENT CORRECTED FOR END CONTRACTION

L_e = LENGTH OF WEIR " " " "

H_e = HEAD OF WATER " " " "

$L/B = 5.5/6.5 = .85$ $H/P = 1.9/12' = 0.16$

(APPENDIX D, SH. 6)

USING FIGURE 5-3 REF 5

$k_L = .014$ AND $C_e = 3.25$

F23

SUBJECT DAM SAFETY INSPECTION OHIO 474
BUCKEYE LAKE

BY KHK, JDV DATE 7-27-78, 10/9 PROJ. NO. 78-565-474

CHKD. BY RT DATE 7-29-78 SHEET NO. 3 OF 3
G.RT 7-30-78 8/8 10/9

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USING $K_H = .003$ FROM USBR TESTS EQ (5-40)
PAGE 5-10

$L_e = 5.5 + .014 = 5.514$

$H_e = H + .003 = 1.9 + .003 = 1.903$ FT.

$C_e = 3.25$

$$Q_1 = 3.25 \times 5.514 \times (1.903)^{3/2} = 47.0 \text{ CFS.}$$

FOR TEN GATES

$= 47$ CFS $\times 10 = 470$ CFS

TOTAL Q_{MAX} BEFORE OVERTOPPING $= 2705 + 470$

$= 3175$ CFS

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SUBJECT DAM SAFETY INSPECTION OHIO 474
BUCKEYE LAKE

BY KHK DATE 7-27-78 PROJ. NO. 78-27-474

CHKD. BY RT DATE 7-29-78 SHEET NO. 1 OF 7
JRY 8/03/78

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DEVELOP POOL ELEVATION – DISCHAGE RELATIONSHIP.

FOR SLUICE GATES $Q = \frac{2}{3} L \sqrt{2g} \left(H_2^{3/2} - H_1^{3/2}\right)$

ELEVATION FEET	$\frac{2}{3} L \sqrt{2g}$ $\frac{2}{3} \times 4.0 \times \sqrt{64.4}$	H_2 FT	$H_2^{3/2}$	H_1 FT.	$H_1^{3/2}$	$H_2^{3/2} - H_1^{3/2}$	Q_1 CFS	Q_5 $Q_1 \times 5$
892.5*	21.4	12	41.57	7	18.52	23.05	493.3	2466.5
893.5		13	46.87	8	22.63	24.24	518.7	2593.5
894.5		14	52.38	9	27.0	25.38	543.1	2715.5
895.5		15	58.09	10	31.62	26.47	566.4	2832.0
896.0		15.5	61.02	10.5	34.02	27.00	577.8	2889.0
896.5		16	64.00	11	36.48	27.52	588.9	2944.5
897.5		17	70.09	12	41.57	28.52	610.3	3051.5

* NORMAL POOL LEVEL

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SUBJECT DAM SAFETY INSPECTION OHIO 474
BUCKEYE LAKE

BY KHK DATE 7-27-78 PROJ. NO. 78-565-474

CHKD. BY RT DATE 7-29-78 SHEET NO. 2 OF 7

GRT 7-30-78
JRY 8/23/78

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DISCHARGE THROUGH UNGATED SPILLWAY

$$Q = C_e L_e H_e^{3/2}$$

ELEVATION FEET	H/P	C_e	L_e	H_e (H+0.003	$H_e^{3/2}$	Q_1	Q_{10}
892.5	–	–	5.514	0	0	0	0
893.5	.083	3.20	"	1.003	1.005	17.7	177.
894.5	.17	3.22	"	2.003	2.835	50.3	503.
895.5	.25	3.25	"	3.003	5.204	93.3	933.
896.0	0.29	3.29	"	3.5003	6.549	118.8	1188.

WHEN THE WATER OVERTOPS THE BRIDGE DECK (ELEV. 896'), WATER IS STILL FLOWING THROUGH THE UNGATED SPILLWAY, BUT NOW, THE EQUATION FOR AN ORIFICE (EQ (4-16) PAGE 5) MUST BE APPLIED:

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

WHERE $H_1 = H_2 - 3.5'$

ELEV. FEET	$2/3\, L\sqrt{2g}$ $2/3\, 5.5\sqrt{64.4}$	H_2 FT	$H_2^{3/2}$	H_1 FT	$H_1^{3/2}$	$H_2^{3/2} - H_1^{3/2}$	Q_1 CFS	$Q_{10} = Q_1 \times 10$
896.5	29.42	4'	8.0	0.5'	.354	7.65	224.96	2250.
897.5	29.42	5'	11.18	1.5	1.84	9.34	274.78	2748.

F26

SUBJECT Dam Safety Inspection - OH-474
Buckeye Lake

BY G.R.T. DATE 8-23-78 10-5-78 PROJ. NO. 78-565-474

CHKD. BY [illegible] DATE 8/23/78 SHEET NO. 3 OF 7

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Discharge Over Embankment:

Ref. Existing Dike Profile (2 sheets) by Ohio D.N.R.

DIKE ELEVATION			EQUIVALENT LENGTH OF DIKE BETWEEN SPECIFIED MINIMUM AND MAXIMUM DIKE ELEVATIONS (FEET)							
MIN	MAX	AVG	Sta. 0 to 33*	Sta. 33 to 66*	Sta. 66 to 97*	Sta. 97 to 132*	Sta. 132 to 165*	Sta. 165 to 198*	Sta. 198 to 217	[illegible]
894.4	895.0	894.7	360	0	0	960	1,190	0	0	2,510
895.0	895.5	895.25	540	0	150	1,340	1,510	300	600	4,440
895.5	896.0	895.75	1,500	100	1,050	200	300	1300	900	5,350
896	896.5	896.25	400	700	600	400	100	300	300	2,800
896.5	897.5	897.0	400	1,800	700	300	100	600	200	4,100

* DRAWINGS EXTRAPOLATED ONE STATION TO SUPPLY MISSING DATA

TREAT AS A BROAD-CRESTED WEIR: $Q = C L H^{3/2}$

WHERE: C = COEFFICIENT OBTAINED FROM CURVES FOR A SQUARE EDGED BROAD-CRESTED WEIR, REF 26. AN AVERAGE BREADTH OF B = 23' IS USED (SHEETS 2-6, APPENDIX D).

L = TOTAL EQUIVALENT LENGTH (FROM ABOVE.

SUBJECT DAM SAFETY INSPECTION OH-474
BUCKEYE LAKE DAM

BY JDV DATE 10-4-78 PROJ. NO. 78-565-474

CHKD. BY KMM DATE 10-4-78 SHEET NO. 4 OF 7

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F27

POOL ELEVATION (FT)	CREST ELEV. OF DIKE — USE AVG. VALUE ON PAGE F26	H (FT)	H/B	C	CORRESPONDING TOTAL EQUIV. LENGTH OF DIKE (FT) (FROM P. F26)	FLOW OVER EMBANKMENT $Q = CLH^{3/2}$ (CFS)
895.0	894.7	0.3	0.013	2.77	2,510	1,142
895.5	894.7	0.8	0.035	2.77	2,510	4,975
	895.25	0.25	0.011	2.77	4,440	1,537
						6,512
896.0	894.7	1.3	0.057	2.78	2,510	10,343
	895.25	0.75	0.033	2.77	4,440	7,988
	895.75	0.25	0.011	2.77	5,350	1,852
						20,183
896.5	894.7	1.8	0.078	2.78	2,510	16,851
	895.25	1.25	0.054	2.78	4,440	17,250
	895.75	0.75	0.033	2.77	5,350	9,626
	896.25	0.25	0.011	2.77	2,800	770
						44,697
897.5	894.7	2.8	0.122	2.78	2,510	32,693
	895.25	2.25	0.098	2.78	4,440	41,658
	895.75	1.75	0.076	2.78	5,350	34,431
	896.25	1.25	0.054	2.78	2,800	10,378
	897.0	0.5	0.022	2.77	4,100	4,015
						123,675

SUBJECT Dam Safety Inspection - OH - 474
Buckeye Lake

BY [illegible] JDV DATE 8/23/78 10-5-78 PROJ. NO. 78-565-474

CHKD. BY GRT DATE 8/24/78 SHEET NO. 5 OF 7
KWW 10/5/78

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TOTAL DISCHARGE: (SEE PAGE F29 FOR PLOT OF ELEVATION VS. DISCHARGE)

ELEVATION		SLUICE GATES	UNGATED SPILLWAY	EMBANKMENT OVERTOPPING	TOTAL DISCHARGE
892.5	0	2466.5	0	0	2467.
893.5	1	2594.5	177.	0	2771
894.5	2	2715.5	503.	0	3219.
895.0	2.5	2775.0*	710.*	1,142	4,627
895.5	3	2832.0	733.	6,512	10,277
896.0	3.5	2889.0	1488.	20,183	24,260
896.5	4	2944.5	2250.	44,697	49,892
897.5	5	3051.5	2748.	123,675	129,475

* SEE PAGE F23

STORAGE VS. ELEVATION (SEE PAGE F30 FOR PLOT OF ELEVATION VS. STORAGE)

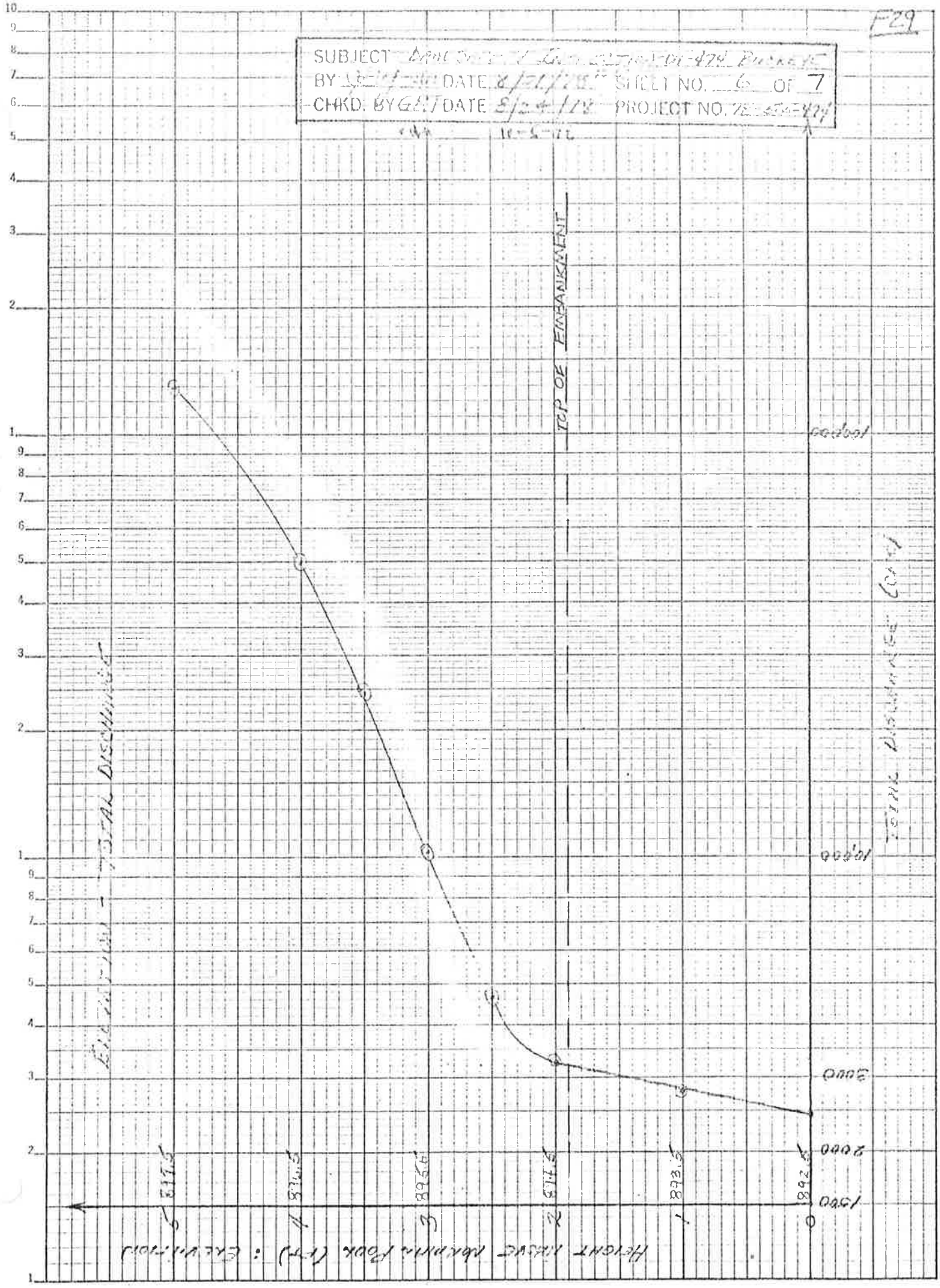
AREA AT NORMAL POOL = 2800 ACRES (ELEV. 892.5)
AREA AT ELEV 900 = 3697.9 ACRES

$\frac{\Delta AREA}{\Delta ELEV} = \frac{3697.9 - 2800}{900 - 892.5} = 119.4$ AC/FT

STORAGE AT NORMAL POOL = 11,200 ACRE FT

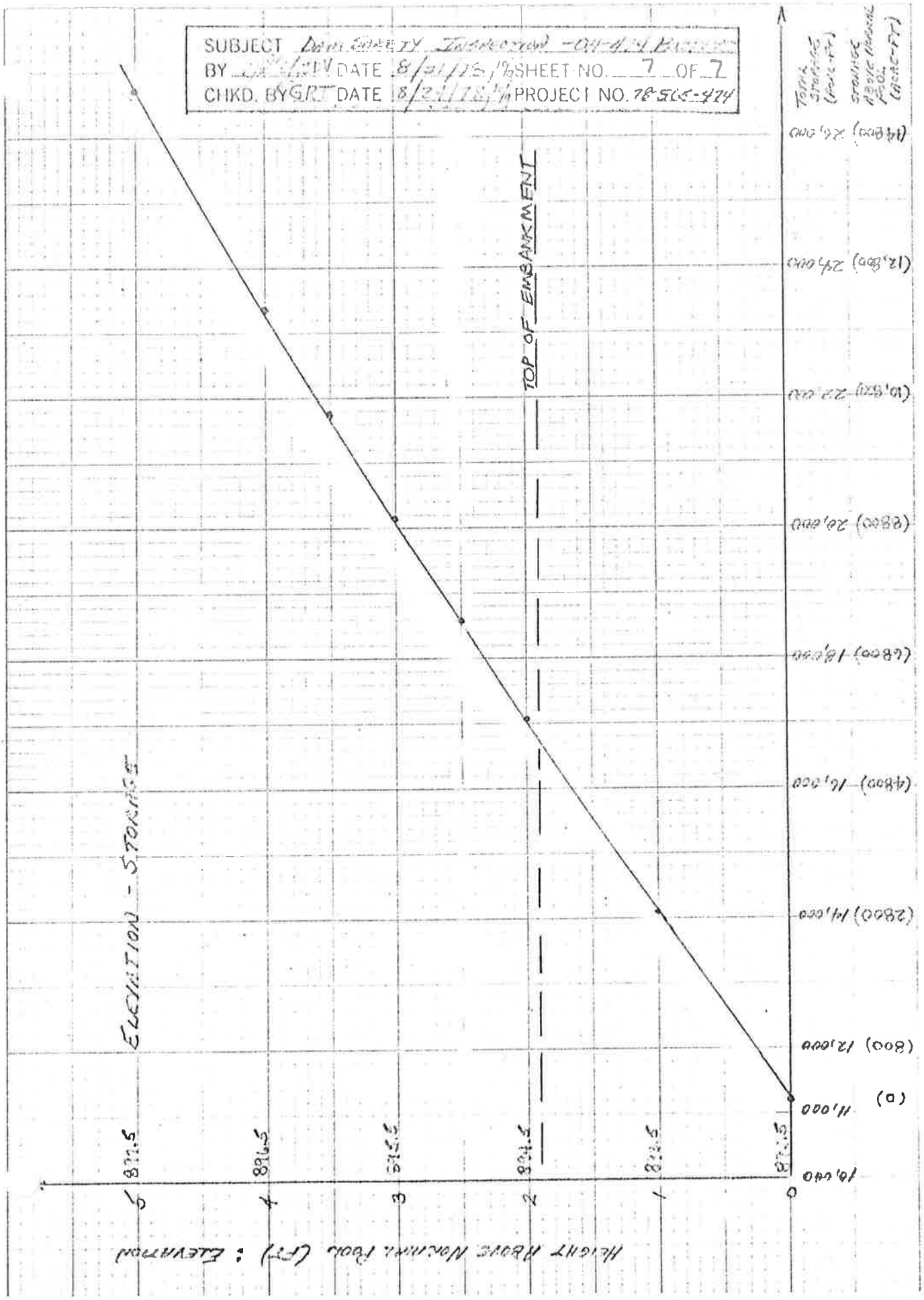
∴ STORAGE X FT ABOVE NORMAL POOL = $11,200 + \frac{1}{2}(2800 + 2800 + 119.4x)(x)$

X (FT)	1	2.	2.5	3.	3.5	4.	5.
STORAGE (AC-FT)	14,060	17,039	18,573.	20,137	21,731.	23,355	26,693.



K&E 3 CYCLES X 70 DIVISIONS KEUFFEL & ESSER CO. MADE IN U.S.A.

SUBJECT [illegible]
BY [illegible] DATE 8/21/78 SHEET NO. 7 OF 7
CHKD. BY GRT DATE 8/24/78 PROJECT NO. 78-565-474



SUBJECT DAM SAFETY INSPECTION OHIO-474
BUCKEYE LAKE DAM

BY KHK DATE 10-19-78 PROJ. NO. 78-565-474

CHKD. BY PMW DATE 10-23-78 SHEET NO. 7A OF 7

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F 30A

NOTE: DURING FLOOD ROUTING, IN AN EFFORT TO GAIN INSIGHT INTO HOW SERIOUSLY INADEQUATE THE EXISTING SPILLWAY IS, THE UNCONSERVATIVE ASSUMPTION WAS MADE THAT THE SPILLWAY GATES ARE OPENED AT TIME ZERO; i.e., AT THE START OF THE RAINFALL. THIS ASSUMPTION RESULTS IN THE LAKE INITIALLY BEING DRAWN DOWN DURING THE FIRST SEVERAL HOURS BEFORE APPRECIABLE RUNOFF BEGINS TO REFILL THE LAKE. THE ASSUMPTION IS SOMEWHAT UNREALISTIC AS IT ASSUMES: 1) THE ACCURATE PREDICTION OF THE START OF RAINFALL FOR THE SEVERE STORM; AND 2) THE IMMEDIATE DECISION TO OPEN THE GATES AND DRAIN THE LAKE DOWN TO INCREASE STORM RUNOFF STORAGE CAPACITY IN SPITE OF THE FACT THAT AN UNNECESSARY LOWERING OF THE WATER LEVEL RESULTS IN LOSS OF RECREATIONAL USE OF MUCH OF THE LAKE WITH THE ACCOMPANYING PRESSURE FROM THOSE AFFECTED AND A LARGE DISCHARGE OF WATER MAY WORSEN FLOODING CONDITIONS DOWNSTREAM. EVEN WITH THIS SOMEWHAT UNREALISTIC ASSUMPTION, WHICH RESULTS IN THE LAKE BEING ABLE TO STORE A CONSIDERABLE PORTION OF THE INITIAL STORM RUNOFF, THE COMPUTED DURATION AND DEPTH OF OVERTOPPING ARE STILL SO LARGE THAT THE OVERALL CONCLUSIONS REGARDING THE DANGER TO THE EMBANKMENT ARE NOT CHANGED. IN ADDITION, THIS APPROACH POINTS OUT THE FACT THAT THE EXISTING SPILLWAY IS SO SERIOUSLY INADEQUATE THAT OPENING OR NOT OPENING THE GATES PROBABLY HAS NO REAL SIGNIFICANCE IN CASE OF A LARGE INTENSE STORM, SUCH AS THE PMF AND ½ PMF, IN THAT IT IS LIKELY THAT THE EMBANKMENT WILL FAIL DUE TO THE SEVERE OVERTOPPING WITH OR WITHOUT THE GATES OPEN.

SUBJECT DAM SAFETY INSPECTION OHIO 474
BUCKEYE LAKE DAM

BY KHV DATE 10-19-78 PROJ. NO. 78-565-474

CHKD. BY PMW DATE 10-23-78 SHEET NO. 7B OF 7

F 30B

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Environmental Specialists

IT SHOULD BE NOTED THAT IF THE ANALYSIS HAD BEEN CARRIED OUT WITH THE ASSUMPTION THAT NO GATES WERE OPEN OR THAT THEY WERE OPENED MUCH LATER IN THE STORM, THE COMPUTED DURATIONS AND DEPTHS OF OVERTOPPING WOULD BE GREATER; HOWEVER, NO INFORMATION WOULD THAN BE AVAILABLE AS TO THE POSSIBLE EFFECT THAT AN EARLY OPENING OF THE GATES COULD HAVE.

SUBJECT Ohio Dam Safety Inspection-OH-474
Buckeye Lake

BY [illegible] JOV DATE 8/30/78 10-5-78 PROJ. NO. 78-565-474

CHKD. BY GRT DATE 8/29/78 10/5/78 SHEET NO. 1 OF 7

F31

GAI CONSULTANTS, INC
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ROUTING PMF STORM:

THE INPUT TO HEC-1 FOR A PMF STORM IS GIVEN ON PAGE F33. THE OUTPUT IS PRESENTED ON PAGES F34-F36, THE INFLOW/OUTFLOW PLOT IS GIVEN ON PAGE F37, AND THE WATER SURFACE ELEVATION/TIME PLOT ON PAGE F32.

MAXIMUM ELEVATION REACHED = 896.4'

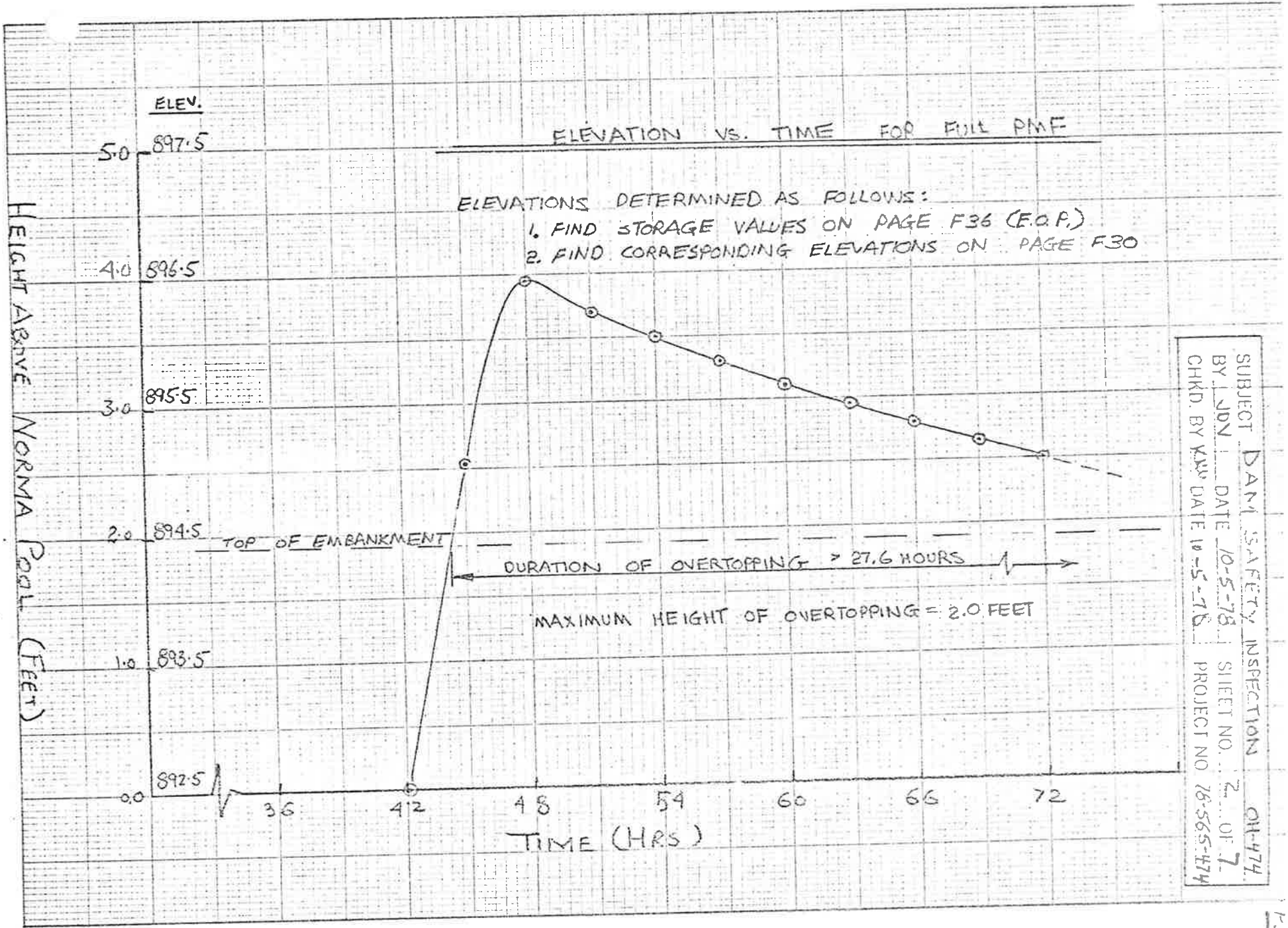
TOP OF EMBANKMENT = 894.4

∴ MAXIMUM HEIGHT OF OVERTOPPING = 2.0'

DURATION OF OVERTOPPING > 27.6 HRS.

NOTE: THIS ANALYSIS HAS NEGLECTED THE EFFECT OF THE MANY HOUSES BUILT ALONG THE DIKE. THE OVERALL EFFECT OF ANY HOUSES THAT WOULD REMAIN DURING A PMF STORM WOULD BE TO CONSTRICT THE FLOW ACROSS THE DIKE AND INCREASE THE WATER LEVEL. THE OVERTOPPING WOULD THEREFORE BE MORE SIGNIFICANT AND THE FINAL CONCLUSION WOULD NOT BE CHANGED.

∴ ROUT THE ½ PMF.


ELEV.
5.0 897.5
4.0 896.5
3.0 895.5
2.0 894.5
1.0 893.5
0.0 892.5
HEIGHT ABOVE NORMA POOL (FEET)
ELEVATION VS. TIME FOR FULL PMF
ELEVATIONS DETERMINED AS FOLLOWS:
1. FIND STORAGE VALUES ON PAGE F36 (E.O.P.)
2. FIND CORRESPONDING ELEVATIONS ON PAGE F30
TOP OF EMBANKMENT
DURATION OF OVERTOPPING > 27.6 HOURS
MAXIMUM HEIGHT OF OVERTOPPING = 2.0 FEET
36
42
48
54
60
66
72
TIME (HRS)
SUBJECT DAM SAFETY INSPECTION OH-474
BY JDV DATE 10-5-78 SHEET NO. 2 OF 7
CHKD. BY KW DATE 10-5-78 PROJECT NO 78-565-474

SUBJECT DAM SAFETY INSPECTION. OHIO-474
BY KHK DATE 10-5-78 PROJECT 78-565-474
CHKD BY JDV DATE 10-5-78 SHEET 3 OF 7

PMF-ROUTING INPUT.

```
A DAM SAFETY INSPECTION OHIO 474
A BUCKEYE LAKE 78-565-474
A 6-HOUR UNIT HYDROGRAPH FOR BUCKEYE LAKE
B      24        3        0                                0        2        0        0
1       3        0
K       0        1        0        0        0        0        1
A BUCKEYE LAKE PROBABLE MAXIMUM INFLOW
M       0       -1    41.95
O      24
1       0        0        0        0        0        0        0        0     .311     .311
1  1.4185   1.4185    9.716    9.716     .426     .426    .3945    .3945     .323     .323
1    .207     .207     .114     .114
T       0        0        0        0        0        0        0        0        0        0
U      13
1       0     1871     2250     1725     1075      725      480      300      180      125
1      75       35        0
X       0        0        1
K       1        2        0        0        0        0        1
1 BUCKEYE LAKE PMF
Y       0        0        0        1
1       1                                          11200.
2       0    11200    14060    17040    18570    20140    21730    23355    26695
3       0     2467     2771     3219     4627    10277    24260    49892   129475
K      99
A
A
A
A
A
```

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****************************
HEC-1 VERSION DATED JAN 1973
UPDATED A[illegible] 74
CHANGE N[illegible] 01
****************************
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PMF- ROUTING.

DAM SAFETY INSPECTION OHIO 474
BUCKEYE LAKE 78-565-474
6-HOUR UNIT HYDROGRAPH FOR BUCKEYE LAKE

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
24	3	0	0	0	0	0	2	0	0

JOPER	NWT
3	0

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

SUB-AREA RUNOFF COMPUTATION

BUCKEYE LAKE PROBABLE MAXIMUM INFLOW

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

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
0	-1	41.95	0.00	0.00	0.00	0.000	0	0	0

PRECIP DATA

NP	STORM	DAJ	DAK
24	0.00	0.00	0.00

PRECIP PATTERN

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.31	0.31
1.42	1.42	9.72	9.72	0.43	0.43	0.39	0.39	0.32	0.32
0.21	0.21	0.11	0.11						

LOSS DATA

STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00

GIVEN UNIT GRAPH, NUHGO= 13

0.	1871.	2250.	1725.	1075.	725.	480.	300.	180.	125.
75.	35.	0.							

UNIT GRAPH TOTALS 8841. CFS OR 0.98 INCHES OVER THE AREA

RECESSION DATA

STRTQ= 0.00 QRCSN= 0.00 RTIOR= 1.00

END-OF-PERIOD FLOW

TIME	RAIN	EXCS	COMP Q
1	0.00	0.00	0.
2	0.00	0.00	0.
3	0.00	0.00	0.
4	0.00	0.00	0.
5	0.00	0.00	0.
6	0.00	0.00	0.
7	0.00	0.00	0.
8	0.00	0.00	0.

SUBJECT DAM SAFETY INSPECTION
BY [illegible] DATE [illegible] SHEET NO. 4 OF 7
CHKD. BY JDV DATE [illegible] PROJECT NO. [illegible]

E34

9	0.31	0.31	0.
10	0.31	0.31	582.
11	1.42	1.42	1282.
12	1.42	1.42	3890.
13	9.72	9.72	6716.
14	9.72	9.72	24377.
15	0.43	0.43	44366.
16	0.43	0.43	42214.
17	0.39	0.39	30819.
18	0.39	0.39	21122.
19	0.32	0.32	15269.
20	0.32	0.32	10985.
21	0.21	0.21	7907.
22	0.21	0.21	5833.
23	0.11	0.11	4430.
24	0.11	0.11	3124.
SUM	25.82	25.82	222936.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	44386.	43300.	24635.	9289.	222936.
INCHES		9.60	21.85	24.72	24.72
AC-FT		21482.	48888.	55302.	55302.

SUBJECT DAM SAFETY INSPECTION
BY [illegible] DATE [illegible] SHEET NO. 5 OF 7
CHKD. BY [illegible] DATE [illegible] PROJECT NO. [illegible]

OVN

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

HYDROGRAPH ROUTING

BUCKEYE LAKE PMF

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

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME
0.0	0.000	0.00	1	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA
1	0	0	0.000	0.000	0.000	11200.

STORAGE=	0.	11200.	14060.	17040.	18570.	20140.	21730.	23355.	26695.	0.
OUTFLOW=	0.	2467.	2771.	3219.	4627.	10277.	24260.	49892.	129475.	0.

TIME	EOP STOR	AVG IN	EOP OUT
1	10605.	0.	2336.
2	10041.	0.	2212.
3	9507.	0.	2094.
4	9002.	0.	1983.
5	8523.	0.	1877.
6	8070.	0.	1778.
7	7641.	0.	1683.
8	7235.	0.	1594.
9	6850.	0.	1509.
10	6556.	291.	1444.
11	6433.	932.	1417.
12	6715.	2586.	1479.
13	7638.	5303.	1682.
14	10984.	15547.	2419.
15	18615.	34382.	4788.
16	23090.	43300.	45712.
17	22319.	36516.	33544.
18	21664.	25970.	23678.
19	21014.	18195.	17959.
20	20440.	13127.	12918.
21	19979.	9446.	9697.
22	19494.	6870.	7953.
23	19010.	5132.	6212.
24	18593.	3777.	4710.
SUM			192677.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	45712.	39628.	19709.	8028.	192677.
INCHES		8.79	17.48	21.36	21.36
AC-FT		19660.	39113.	47796.	47796.

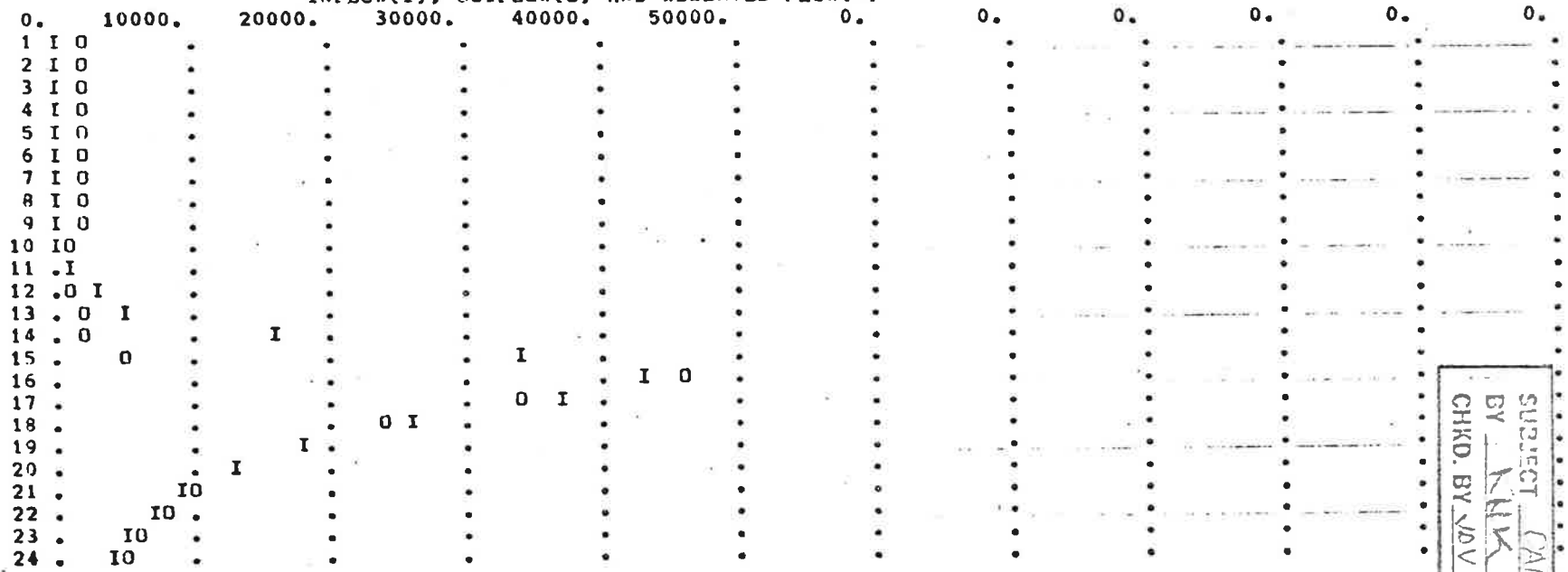
SUBJECT DAM SAFETY INSPECTION OH-474
BY KMC DATE 10-8-78 SHEET NO. 6 OF 7
CHKD. BY JDV DATE 10-5-78 PROJECT NO. 78-554474

F36

OVF

STATION 2

INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)



SUBJECT CAM SAFETY INSPECTION
BY KHK DATE 10-5-78 SHEET NO. 7 OF 7
CHKD. BY JDV DATE 10-5-78 PROJECT NO. 78-535-4M

F37

SUBJECT Dam Safety Inspection - OH - 474
Buckeye Lake

BY [illegible] DATE 8/20/78 10-5-78 PROJ. NO. 78-565-474

CHKD. BY GRT DATE 8/24/78 SHEET NO. 1 OF 8

F38

GAI CONSULTANTS, INC
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½ PMP Determination:

The Inflow Hydrograph for each of the sub-watersheds for the ½ PMP storm is presented on PAGE F39. As discussed on PAGE F10, the entire drainage area is used in the determination.

Routing the ½ PMF Storm:

The input to HEC-1 for a ½ PMF storm is given on PAGE F41. PAGES F42-F44 present the output. The inflow/outflow plot is given on PAGE F45, and the water surface elevation/time plot on PAGE F40.

Maximum elevation reached = 895.4'

Top of embankment = 894.4'

∴ Maximum height of overtopping = 1.0 FT.

Duration of overtopping > 22.5 hrs.

(See note near bottom of PAGE F31).

SUPPLEMENTAL HYDROLOGIC AND HYDRAULIC INFORMATION

FOR STATE OF OHIO DAM SAFETY INSPECTION

BUCKEYE LAKE HALF PMP

INPUT DATA

AREA = 41.950000

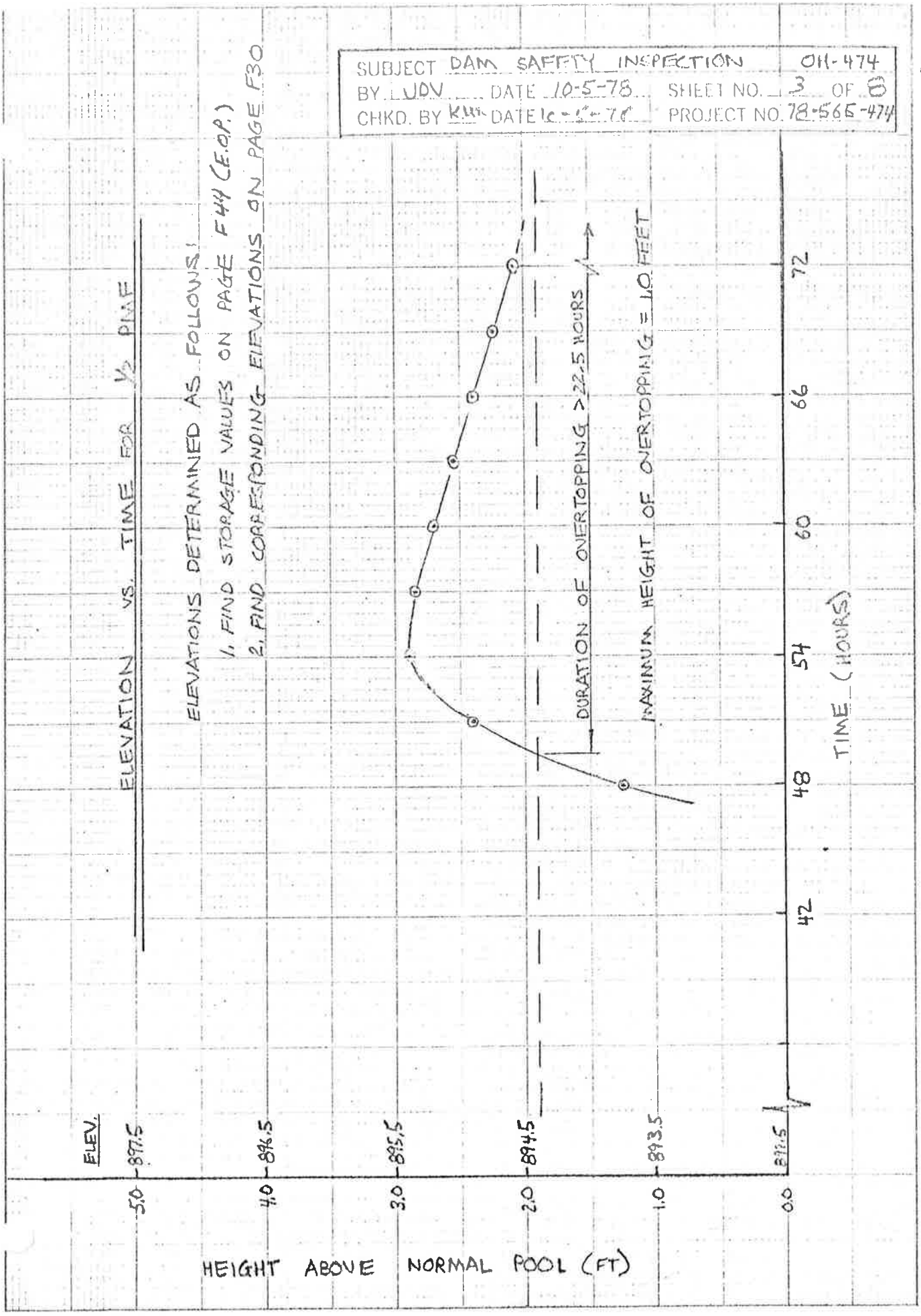
LATITUDE= 39.920000

RUNOFF BETWEEN	0 HOURS	AND	6 HOURS	=	0.000	INCHES
RUNOFF BETWEEN	6 HOURS	AND	12 HOURS	=	0.000	INCHES
RUNOFF BETWEEN	12 HOURS	AND	18 HOURS	=	0.000	INCHES
RUNOFF BETWEEN	18 HOURS	AND	24 HOURS	=	0.000	INCHES
RUNOFF BETWEEN	24 HOURS	AND	30 HOURS	=	0.000	INCHES
RUNOFF BETWEEN	30 HOURS	AND	36 HOURS	=	0.762	INCHES
RUNOFF BETWEEN	36 HOURS	AND	42 HOURS	=	9.583	INCHES
RUNOFF BETWEEN	42 HOURS	AND	48 HOURS	=	0.361	INCHES
RUNOFF BETWEEN	48 HOURS	AND	54 HOURS	=	0.254	INCHES
RUNOFF BETWEEN	54 HOURS	AND	60 HOURS	=	0.189	INCHES
RUNOFF BETWEEN	60 HOURS	AND	66 HOURS	=	0.188	INCHES
RUNOFF BETWEEN	66 HOURS	AND	72 HOURS	=	0.078	INCHES

TOTAL RUNOFF= 11.415

SUBJECT DAM SAFETY INSPECTION OH-474
BY JDV DATE 10-5-78 SHEET NO. 3 OF 8
CHKD. BY KMK DATE 10-5-78 PROJECT NO. 78-565-474

F40



SUBJECT DAM SAFETY INSPECTION OHIO -474
BY KHV DATE 10-5-78 PROJECT 78-565-474
CHKD BY JDV DATE 10-5-78 SHEET 4 OF 8

½ PMF – ROUTING INPUT.

```
A DAM SAFETY INSPECTION OHIO 474
A BUCKEYE LAKE 78-565-474
A 6-HOUR UNIT HYDROGRAPH FOR BUCKEYE LAKE
B      24        3        0                                0        2        0        0
1       3        0
K       0        1        0        0        0        0        1
A BUCKEYE LAKE  .5 PROBABLE MAXIMUM INFLOW
M       0       -1    41.95
O      24
1       0        0        0        0        0        0        0        0        0        0
1    .381     .381   4.7915   4.7915    .1805    .1805     .127     .127    .0945    .0945
1    .094     .094     .039     .039
T       0        0        0        0        0        0        0        0        0        0
U      13
1       0    .1871     2250     1725     1075      725      480      300      180      125
1      75       35        0
X       0        0        1
K       1        2        0        0        0        0        1
1 BUCKEYE LAKE  .5 PMF
Y       0        0        0        1
1       1                                          11200.
2       0    11200    14060    17040   .18570    20140    21730    23355    26695
3       0     2467     2771     3219     4627    10277    24260    49892   129475
K      99
A
A
A
A
A
```

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*****************************
HEC-1 VERSION DATED JAN 1973
UPDATED AUG 74
CHANGE NO   1
*****************************
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½ PMF - Routing

DAM SAFETY INSPECTION OHIO 474
BUCKEYE LAKE 78-565-474
6-HOUR UNIT HYDROGRAPH FOR BUCKEYE LAKE

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
24	3	0	0	0	0	0	2	0	0

JOPER	NWT
3	0

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

SUB-AREA RUNOFF COMPUTATION

BUCKEYE LAKE .5 PROBABLE MAXIMUM INFL

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

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
0	-1	41.95	0.00	0.00	0.00	0.000	0	0	0

PRECIP DATA

NP	STORM	DAJ	DAK
24	0.00	0.00	0.00

PRECIP PATTERN

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.38	0.38	4.79	4.79	0.18	0.18	0.13	0.13	0.09	0.09
0.09	0.09	0.04	0.04						

LOSS DATA

STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00

GIVEN UNIT GRAPH, NUHGQ= 13

0.	1871.	2250.	1725.	1075.	725.	480.	300.	180.	125.
75.	35.	0.							

UNIT GRAPH TOTALS 8841. CFS OR 0.98 INCHES OVER THE AREA

RECESSION DATA

STRTQ= 0.00 QRCSN= 0.00 RTIOR= 1.00

END-OF-PERIOD FLOW

TIME	RAIN	EXCS	COMP Q
1	0.00	0.00	0.
2	0.00	0.00	0.
3	0.00	0.00	0.
4	0.00	0.00	0.
5	0.00	0.00	0.
6	0.00	0.00	0.
7	0.00	0.00	0.
8	0.00	0.00	0.

SUBJECT DAM SAFETY INSPECTION OH-474
BY KHL DATE 10-5-78 SHEET NO. 5 OF 8
CHKD. BY JDV DATE 10-5-78 PROJECT NO. 78-565-474

F42

10	0.00	0.00	0.
11	0.38	0.38	0.
12	0.38	0.38	713.
13	4.79	4.79	1570.
14	4.79	4.79	10479.
15	0.18	0.18	20813.
16	0.18	0.18	20070.
17	0.13	0.13	14619.
18	0.13	0.13	9877.
19	0.09	0.09	6985.
20	0.09	0.09	4860.
21	0.09	0.09	3339.
22	0.09	0.09	2424.
23	0.04	0.04	1863.
24	0.04	0.04	1298.
SUM	11.40	11.40	98910.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	20813.	20441.	11380.	4121.	98910.
INCHES		4.53	10.09	10.97	10.97
AC-FT		10141.	22584.	24536.	24536.

SUBJECT DAM SAFETY INSPECTION 011-474
BY KUU DATE 10-5-78 SHEET NO. 6 OF 8
CHKD. BY VDV DATE 10-5-78 PROJECT NO. 78-565-474

F43

OVN

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

HYDROGRAPH ROUTING

BUCKEYE LAKE .5 PMF

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

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME
0.0	0.000	0.00	1	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA
1	0	0	0.000	0.000	0.000	11200.

STORAGE=	0.	11200.	14060.	17040.	18570.	20140.	21730.	23355.	26695.	0.
OUTFLOW=	0.	2467.	2771.	3219.	4627.	10277.	24260.	49892.	129475.	0.

TIME	EOP STOR	AVG IN	EOP OUT
1	10605.	0.	2336.
2	10041.	0.	2212.
3	9507.	0.	2094.
4	9002.	0.	1983.
5	8523.	0.	1877.
6	8070.	0.	1778.
7	7641.	0.	1683.
8	7235.	0.	1594.
9	6850.	0.	1509.
10	6486.	0.	1429.
11	6141.	0.	1353.
12	5901.	356.	1300.
13	5863.	1141.	1291.
14	7005.	6025.	1543.
15	10409.	15646.	2293.
16	14835.	20441.	2887.
17	18241.	17344.	4324.
18	19675.	12248.	8603.
19	19645.	8431.	8497.
20	19204.	5923.	6909.
21	18722.	4099.	5175.
22	18257.	2881.	4339.
23	17769.	2144.	3890.
24	17255.	1581.	3417.
SUM			74315.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	8603.	8550.	5644.	3096.	74315.
INCHES		1.90	5.01	8.24	8.24
AC-FT		4242.	11201.	18435.	18435.

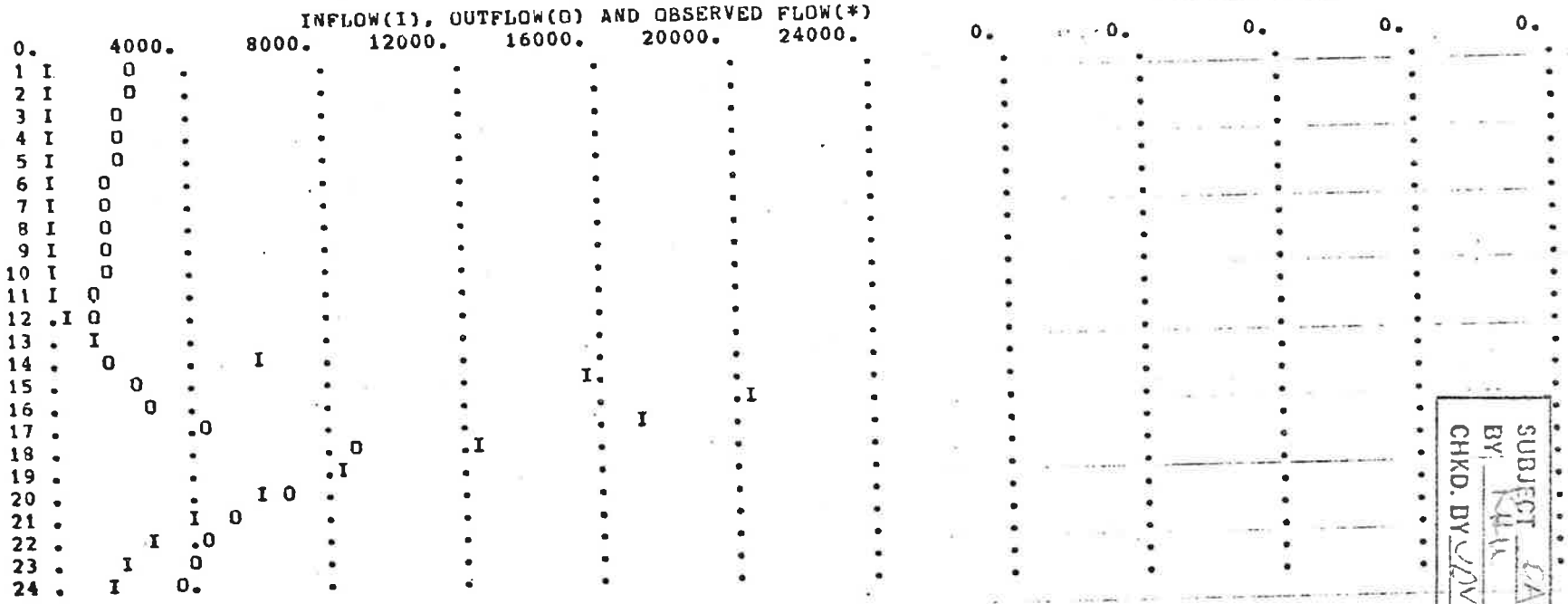
SUBJECT OHIO SAFETY INSPECTION CH-478
BY KMC DATE 10-5-78 SHEET NO. 7 OF 8
CHKD. BY WDV DATE 10-5-78 PROJECT NO. 78-565-478

E44

OVF

STATION 2

INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)



SUBJECT DAM SAFETY INSPECTION
BY RHU DATE 12-5-78 SHEET NO. 8 OF 8
CHKD. BY JDV DATE 10-5-78 PROJECT NO. 78-[illegible]

F45

OHIO DAM SAFETY INSPECTION
REFERENCES

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3. "Recommended Guidelines for Safety Inspection of Dams," prepared by Department of the Army, Office of the Chief of Engineers, Washington, D. C., (Appendix D).

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APPENDIX G

STRUCTURAL STABILITY DATA

Evaluation of Structural Stability

1. Visual Observations:

1.1 Embankment -

Based on visual observations, the embankment appears to be in fair condition from the standpoint of slope stability. In several places the stone masonry wall has been pushed out over the foundation and in one area is falling over. Also, retaining walls on the downstream slope are often tilted and pushed out. These phenomena are attributed to retaining wall problems versus large scale slope stability problems. However, seepage and associated piping is a major problem which potentially could breach the dam. The seepage problems are worsened by: 1) decaying roots from trees formerly present on the dam; 2) wave action undermining and eroding soil immediately behind the wall; 3) the presence of overly large tie-back holes in the sheetpile wall at the water level; and 4) undercutting of the downstream slope by residents.

The presence of holes caused by decaying tree roots is a particularly difficult problem to handle in that the trees (many are extremely large) have been present for such a long time that the roots have totally penetrated the embankment. This means that the usually sound recommendation of tree removal may cause more problems in the short run than simply leaving the trees alone and acting upon seepage problems as they occur. However, from the long range standpoint, it would be desirable to remove trees from the crest and downstream slope.

1.2 Appurtenant Structures -

Based on visual observations, the concrete in the spillway and outlet works structure is severely deteriorated. This deterioration is a product of very severe scaling (flaking and peeling away of the near surface portion of the concrete). Reinforcement is exposed and corroding. While the concrete needs to be repaired immediately, the deterioration is not believed to have had a serious impact on the overall structural integrity of the spillway structure; however, localized weak areas may exist.

2. Design and Construction Techniques:

2.1 Embankment -

According to a 1939 report by the U. S. Engineer Office (Corps of Engineers), Huntington, West Virginia, the dam is constructed primarily of clay and shale with a masonry and concrete upstream face (see Figures 2A through 4 in Appendix D). It is unlikely that the original embankment was compacted.

The original upstream wall is still present over much of the dam. Repair has been done by either rebuilding the masonry wall or driving steel sheet piling in front of the wall and then backfilling in the region between the old and new wall; or driving steel sheet piling behind the masonry wall. Anchor sheet piling has generally been driven behind the old concrete or masonry wall. The quality of the sheet piling installation was generally poor. Many of the welds had insufficient penetration, some of the sheeting is corroding badly, and overly large tie-back holes were left in the sheeting which allow water to enter behind the wall.

In addition, the residents were permitted to grow trees on the crest and slopes and to undercut the downstream slope. Some of the problems associated with allowing trees on the crest and undercutting were discussed above in Item 1.1 and in the main text.

2.2 Appurtenant Structures -

The spillway appears to have been adequately constructed. The usual effects of weather over time have caused the severe deterioration.

3. Past Performance -

Records indicate (see Item 2 in Appendix F) that the dam has never been overtopped during its existence. However, seepage, inadequate spillway capacity, and upstream shore protection wall problems have been recorded as early as in the 1939 report by the U. S. Engineer Office (Corps of Engineers), Huntington, West Virginia.

In May 1968, the National Guard had to sandbag portions of the crest to prevent overtopping. It is important to note that the park did not open the outlet works gates during the flood since this would have caused additional flooding downstream along the South Fork Licking River.

4. Seismic Stability -

The dam is located within Seismic Zone No. 1 and it is thought probable that the static stability is sufficient to enable it to withstand minor earthquake induced dynamic forces. However, no calculations, investigations, etc., were performed to confirm this conclusion.

APPENDIX H

INVENTORY DATA SHEETS

PART I – INVENTORY OF DAMS IN THE UNITED STATES
(PURSUANT TO PUBLIC LAW 92–367)

See reverse side for instructions.

[1] STATE: OH — IDENTITY NUMBER: 477

IDENTIFICATION

[2] DIVISION	[3] STATE	[4] COUNTY	[5] CONGR DIST	[6] STATE	[7] COUNTY	[8] CONGR DIST	[9] NAME	[10] LATITUDE (North) ° ′	[11] LONGITUDE (West) ° ′	[12] REPORT DATE DAY MO YR
ORD	OH	089	17				BUCKEYE LAKE DAM [13]	39 55.7 [14]	82 29	25 JUL 78

IDENTIFICATION (Continued)

POPULAR NAME	NAME OF IMPOUNDMENT
	BUCKEYE LAKE

LOCATION

[15] REGION	[16] BASIN	[17] RIVER OR STREAM	[18] NEAREST DOWNSTREAM CITY – TOWN – VILLAGE	[19] DIST. FROM DAM (mi)	[20] POPULATION
05	04	TR-SOUTH FORK LICKING RIVER.	BUCKEYE LAKE	0	2961

STATISTICS

[21] TYPE OF DAM	[22] YEAR COMPLETED	[23] PURPOSES	[24] STRUCTURAL HEIGHT (ft)	[25] HYDRAULIC HEIGHT (ft)	[26] IMPOUNDING CAPACITIES MAXIMUM (acre – ft)	[27] IMPOUNDING CAPACITIES NORMAL (acre – ft)	[27A] CORPS ENGR. DIST.	[27B] OWN.	[27C] FED. R.	[27D] PRV/FED	[27E] SCS A.	[27F] VERIFICATION DATE DA MO YR
RE	1825	R	13	15	18489	11200	ORH	N	N	N	N	25 JUL 78

[28]

REMARKS

26, 27 - ESTIMATED

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[1]

PART II – INVENTORY OF DAMS IN THE UNITED STATES

(PURSUANT TO PUBLIC LAW 92–367)

See reverse side for instructions.

STATE	IDENTITY NUMBER
ØH	474

STATISTICS	D S HAZ	CREST LENGTH (ft)	SPILLWAY TYPE	SPILLWAY WIDTH (ft)	SPILLWAY MAXIMUM DISCHARGE (cfs)	VOLUME OF DAM (CY)	POWER CAPACITY INSTALLED (MW)	POWER CAPACITY PROPOSED (MW)	NO.	NAVIGATION LOCKS LENGTH (ft)	NAVIGATION LOCKS WIDTH (ft)	NAVIGATION LOCKS LENGTH (ft)	NAVIGATION LOCKS WIDTH (ft)	NAVIGATION LOCKS LENGTH (ft)	NAVIGATION LOCKS WIDTH (ft)	NAVIGATION LOCKS LENGTH (ft)	NAVIGATION LOCKS WIDTH (ft)	BLANK	
	1	217 00	U	55	3175	375000													5

MISC DATA	OWNER	ENGINEERING BY	CONSTRUCTION BY	
	STATE ØF ØHIØ			6

MISC. DATA (Continued)	REGULATORY AGENCY DESIGN	CONSTRUCTION	OPERATION	MAINTENANCE	
	NØNE	NØNE	NØNE	ØDNR DIV ØF WATER	7

MISC. DATA (Continued)	INSPECTION BY	INSPECTION DATE DAY MO YR	AUTHORITY FOR INSPECTION	
	GAI CØNSULTANTS INC.	7 JUL 78	P.L. 92-367	8

REMARKS	REMARKS	
	34-ESTIMATED	9

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APPENDIX I

CORRESPONDENCE

GAI CONSULTANTS, INC.
Engineers • Geologists • Planners
Environmental Specialists
570 Beatty Rd. • Pittsburgh,
Monroeville, Pa. 15146
412-242-6530

June 8, 1978

Project 78-565-474

Mr. Ralph Vanzant
Chief, Division of Parks and Recreation
Ohio Department of Natural Resources
Foundation Square
Columbus, Ohio 43224

Phase I Inspection
National Dam Safety Program

Dear Mr. Vanzant:

GAI Consultants, Inc., is under contract with the U. S. Army Corps of Engineers (Pittsburgh District) to perform engineering evaluations of several dams throughout the state of Ohio. This work is being done in fulfillment of the National Dam Inspection Act, Public Law No. 92-367, a copy of which is attached.

Data supplied by Mr. Stuart Long of the Corps of Engineers and Mr. Charles Hahn, Administrator, Dam Permits and Inspections, for the Ohio Department of Natural Resources (ODNR) indicate that you are the owner of Buckeye Lake which is to be evaluated under our contract. Our evaluation will include an interview with your staff, the design engineer, and any persons who may have knowledge of the various items contained on the attached checklists. During this interview, we would like to review any files, plans, or records which you or your design engineer may have relative to these facilities.

Subsequent to our interview, we would like to perform a detailed inspection of each dam, its appurtenances and the impoundment area with our field team.

The results of our interview, field inspection, and subsequent engineering analysis will be presented in the form of a draft report to the Pittsburgh District, U. S. Army Corps of Engineers. Copies of the draft report will be sent by the District Engineer (U. S. Army Corps of Engineers)

to the ODNR and you for comments, which will become a part of the final report. Upon finalization, you will receive a copy of the report on your facility.

Your cooperation during our interview and field inspection will greatly expedite our work and will be appreciated. Our field team will be in your area the week of July 3 and we have tentatively assigned Friday and Saturday, July 7 and 8, as a prospective date for an interview and inspection of your facilities. We will call soon to confirm this suggested date and to answer any questions you may have. If you have any questions in the meantime, please call me or Mr. Thomas D. Donovan, collect.

Very truly yours,
GAI Consultants, Inc.

Percy M. Wimberly III / PGC

Percy M. Wimberly III, P.E.

PGC/dlp

Enclosures

ODNR

Ohio Department of Natural Resources

DIVISION OF PARKS & RECREATION

Buckeye Lake State Park
P.O. Box 488
Millersport, Ohio 43046

August 15, 1978

U.S. Army Engineer District
Corps of Engineers
Geotechnical Branch
Federal Bldg., 1000 Liberty Ave.
Pittsburgh, Pennsylvania 15222

ATTENTION: Stuart B. Long

Dear Mr. Long:

RE: OH474, State File #9723-004
Buckeye Lake Dam

I am in agreement with the observations described in the enclosed report.

I am looking forward to receiving a copy of the final report, in hopes that we will be able to take the necessary actions to correct these problems.

Sincerely,

Melvin R. Pillow

Melvin R. Pillow
Park Manager

MRP/ch
enc