US Army Corps
of Engineers
St. Paul District

OPERATION AND MAINTENANCE MANUAL

ENVIRONMENTAL MANAGEMENT PROGRAM (HREP)

PETERSON LAKE

WABASHA COUNTY, MINNESOTA

AUGUST 1997

PREFACE

The Peterson Lake Habitat Rehabilitation and Enhancement Project, constructed by the Corps of Engineers, was completed in September, 1996. In accordance with Section 906(e) of the Water Resources Development Act of 1986 and the policies set forth in the Fourth and Fifth Annual Addendums, the U.S. Fish and Wildlife Service has the responsibility for operation and maintenance. The Corps of Engineers has prepared this manual to assist in fulfilling the operation and maintenance tasks.

The manual and appendices contain the latest approved agreements, maps, drawings, tables, and references pertinent to operation and maintenance of this project. The project is designed to improve fish habitat in Peterson Lake, located immediately above the L/D 4 dike on the Minnesota side of the navigation channel. However, continued successful functioning of the project will depend upon the manner in which the project is maintained. Careful inspection and proper maintenance can help accomplish that goal.

The planning, design, and construction of the project was the result of an extensive cooperative effort on the part of the involved Federal and State agencies and the public. The continuation of this cooperation and coordination as part of the operation and maintenance of the project will be important to the success of the project and is strongly recommended.

DEPARTMENT OF THE ARMY
St. Paul District, Corps of Engineers
Army Corps of Engineers Centre, 190 Fifth Street East
St. Paul, Minnesota 55101-1638

UPPER MISSISSIPPI RIVER SYSTEM
ENVIRONMENTAL MANAGEMEMENT PROGRAM

PETERSON LAKE
POOL 4, UPPER MISSISSIPPI RIVER
WABASHA COUNTY, MINNESOTA

OPERATION AND MAINTENANCE MANUAL

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INTRODUCTION

This manual has been prepared to serve as a guide for the operation and maintenance of the Peterson Lake Habitat Rehabilitation and Enhancement Project in Wabasha County, Minnesota. Operation and maintenance instructions for the major features of the project are presented. These instructions are consistent with the general procedures found in the Peterson Lake Definite Project Report dated March 1994. This manual has been written for project and management personnel familiar with the project. It does not contain detailed information which is common knowledge to personnel or which is presented in other existing manuals or regulations.

The intent of the maintenance instructions is to present preventive maintenance information consisting of systematic inspections and subsequent corrective actions which should ensure long-term use of project features. A timely maintenance program prevents major damage to constructed features by early corrective action.

For ease in use, this manual is divided into two sections.

Part I. This section describes the project features and provides historical information on the project.

Part II. This section gives details on the operation and maintenance of the project.

PART I - PROJECT FEATURES AND CONSTRUCTION HISTORY

AUTHORIZATION AND LOCATION

The Peterson Lake project was authorized under the provisions of the 1985 Supplemental Appropriations Act (Public Law 99-88) and Section 1103 of the Water Resources Development Act of 1986 (Public Law 99- 662). The Peterson Lake project area is located in pool 4 of the Upper Mississippi River, approximately 6 miles below Wabasha, Minnesota, and across the river from Alma, Wisconsin. Peterson Lake lies immediately above the earthen dike at lock and dam 4 (L/D 4). The project lies within the Upper Mississippi River National Wildlife and Fish Refuge. Project drawings (appendix A) show the location of Peterson Lake and project features.

Because the Peterson Lake project is located on Federal lands managed as a National Wildlife Refuge, operation and maintenance are to be carried out in compliance with Section 906(e) of the 1986 Water Resources Development Act and policies set forth in the Fourth and Fifth Annual Addendums.

DESCRIPTION OF PROJECT

General

Prior to construction of the lock and dam system, what is now known as Peterson Lake was primarily a mixture of wooded areas, cropland, marsh, and small isolated backwater sloughs and lakes. Construction of the L/D 4 dike in the 1930's resulted in the inundation of this area, creating the water body known today as Peterson Lake.

The Peterson Lake Habitat Rehabilitation and Enhancement Project was designed to reduce sedimentation in the lake, stabilize barrier islands bordering the lake, and improve winter habitat conditions for fish in the upper portion of the lake. The project consists of full and partial side channel closures designed to reduce sediment inputs to the lake. In addition, rock was used to provide bank protection for portions of the lake's barrier island chain. Two fish channels were provided to improve fish access during the winter between deeper portions of the lake. The Definite Project Report/Environmental Assessment (SP-16), Peterson Lake Habitat Rehabilitation and Enhancement Project, March 1994, provides details on the overall project.

Design Considerations

Beginning at the upper end of the lake, the closures of openings 1 thru 4, 6, and 7 were designed to close off all flows and associated sediment inputs to the lake at normal river stages. The closure structures were constructed of rock primarily for stability and durability. Initially, closure structure 2 through 4 were constructed of sand. However, these structures were washed out by high water during construction, and were subsequently reconstructed using rock.

The partial closure structure in opening 5 was designed to permit some flow into the upper reaches of Peterson Lake at normal river stages for water quality purposes. The closure across opening 6 was designed as an extension of the opening 5 structure.

Rock was placed on the lower tip of Island VII to control erosion. The design used was that which minimized the need for construction access dredging.

The rock weirs across openings 8 and 9 were designed to reduce bed load sediment entering the lake through these openings, while at the same time allowing sufficient flow through these openings for water quality purposes.

The rock mound protection for Island VI and Island V was designed to protect these islands from further erosion. This design allowed the placing of the rock with little or no construction access dredging. A small break was left in this rock mound in an area where conditions are such that sediment transport through this opening may result in the formation of an island through the natural process of sediment accretion.

The rock mound protection for Island IV and Islands I-III was designed to protect these islands from further erosion. As noted earlier for Islands V and VI, this design allowed the placing of the rock with little or no construction access dredging.

Two fish channels were constructed in the lake to provide fish access during the winter between isolated deeper areas and the main body of the lake. The 40' width and 6' depth of the channels were considered more than adequate for fish passage. These dimensions were based on minimum constructability dimensions for marine equipment. In addition, the fish channels were excavated to a depth such that no maintenance dredging is expected during the 50-year project life.

Dredged material from the fish channels and from construction access dredging was placed on Grand Encampment Island located at river mile 756 (right bank). The purpose was to provide topsoil to promote revegetation of old channel maintenance dredged material (sand) that had been placed on this island. The site was planted with a mixture of forbs and grasses to promote the growth of native prairie vegetation.

CONSTRUCTION HISTORY

A contract was awarded to L&S Industrial and Marine, Inc. of Hugo, Minnesota, in June, 1995. Construction began in August, 1995, and was initially completed in November, 1995, save for grading and seeding of the dredged material placement site. The grading and seeding of the placement site was completed in June, 1996.

During spring high water of 1996, sand closures constructed at side channel openings 2 through 4 washed out. These structures were reconstructed of rock, with this work being completed in September, 1996.

PART II - OPERATION AND MAINTENANCE

GENERAL RESPONSIBILITIES AND PROCEDURES

Approved Responsibilities

Operation and maintenance responsibilities for the Peterson Lake habitat project were originally outlined in the Definite Project Report. The acceptance of these responsibilities was formally recognized by an agreement signed by the U.S. Fish and Wildlife Service (USFWS) and the St. Paul District, Corps of Engineers. This agreement, dated October 3, 1994, is contained in appendix B. The capability of the USFWS to carry out the maintenance responsibilities described below will be contingent upon the passage of sufficient appropriations by Congress. Annual operation and maintenance costs estimated during the preparation of the Definte Project Report were $3,125.

District Manager

Typically, the USFWS operation and maintenance responsibility for habitat projects is given to the district manager in charge of that portion of the appropriate National Wildlife Refuge. For the Peterson Lake project, the current address for the district manager is District Manager, U.S. Fish and Wildlife Service, 51 East 4th Street, Winona, Minnesota 55987. Hereafter, for the purposes of this manual, when describing responsibilities, etc., the term "District Manager" will be used.

Improvements or Alterations

It is understood that improvements and alterations to any portion of the habitat project that would affect the ability of that element to function as intended to meet the project's habitat goals and objectives would be coordinated with other involved agencies.

Procedure for Reviewing Operation and Maintenance Responsibilities

The District Engineer or his representative will be kept informed on operation and maintenance activities for the Peterson Lake habitat project through a periodic inspection of the project by the Corps and through analysis of an annual inspection checklist submitted by the USFWS. The Corps will inspect the project at least every third year and at other times as may be required. The Corps will contact the District Manager so that a mutually convenient date can be set up for a joint inspection, if needed. The findings of these inspections will be transmitted to the USFWS and could include recommendations for any remedial work considered necessary to maintain the habitat project in a satisfactory operating condition. Any agreed upon remedial work should be completed as soon as possible by the USFWS as provided in the Memorandum of Agreement between the USFWS and the Corps.

Annual Report

A checklist report covering inspection, operation, and maintenance of the habitat project shall be submitted each year to the District Engineer. The USFWS may send the Peterson Lake report in conjunction with reports on other habitat projects for which it has responsibility. If so desired, these reports can be sent to the Corps with the annual Cooperative Agreement Report which is done every April by the USFWS. A sample copy of the checklist can be found in appendix C. Besides completion of the inspection checklist, each individual report should briefly summarize the condition of the entire system, including any maintenance work done during the past 1-year period.

OPERATION

There are no operational requirements associated with the Peterson Lake project features.

MAINTENANCE

General Inspection and Maintenance

The established points and times at which the required inspections should be made were developed through coordination between the Corps of Engineers and the USFWS during the preparation of plans and specifications for this project. After the habitat project has been in operation for 5 years, the Corps and the USFWS will review these inspection activities for adequacy. The frequency and nature of the inspections may be modified by mutual written agreement.

Inspection

The inspection of the closure structure, weir, and bank protection features of the project should be made by the District Manager at a minimum frequency of once a year. Inspections should also be made after any flood whose elevation exceeds 670.0 feet msl at the lock 4 headwater gage.

The frequency for inspection will be subject to review by the USFWS and Corps and could change upon mutual agreement of both parties. The timing of the annual inspection can be made at the discretion of the District Manager.

Maintenance

Maintenance of the project features will be accomplished on an as needed basis such that their structural integrity is maintained and they continue to function in the manner for which they were designed.

Displaced or missing rock from the closure structures and weirs should be replaced as soon as possible to prevent further damage to the structures and to maintain their structural integrity. In addition, the crest elevations of these features need to be maintained to insure that they function as designed.

No maintenance of the fish channels is anticipated as they were constructed wider and deeper than considered necessary for winter fish passage and to accomodate construction. Should surveys reveal that sedimentation in these channels has reached the point where winter fish passage is threatened or cut off, re-excavation will be considered "project rehabilitation" and the procedures outlined in the section of this manual entitled "Project Rehabilitation or Abandonment" will be followed.

Repair Materials

Appendix D contains those portions of the construction specification describing the rock used in the original construction. Rock used for repair should meet these specifications.

INSPECTIONS, TESTS, AND OPERATIONS FOLLOWING MAJOR STORMS OR FLOODS

General

As stated in the Memorandum of Agreement between the USFWS and the Corps, the Corps will be responsible for any mutually agreed upon repair and rehabilitation of the Peterson Lake project that exceeds the annual maintenance requirements and that may be needed as a result of a specific storm or flood. The project will be inspected as previously described, following flood events producing a water surface elevation greater than 670.0 feet msl at the lock 4 headwater gage.

Project Rehabilitation or Abandonment

Should inspection of the project area following a major flood or natural disaster disclose substantial damage to the entire project that appears to exceed the annual operation and maintenance as specified in this manual and the Definite Project Report, the Corps and USFWS should meet and discuss the appropriate course of action in light of original project design. The inspections by the District Manager and the joint inspections with the Corps will be the basis for determining maintenance responsibility by the U.S. Fish and Wildlife Service versus potential rehabilitation by the Corps of Engineers. Repair of damage attributable to lack of maintenance would be considered a U.S. Fish and Wildlife Service responsibility.

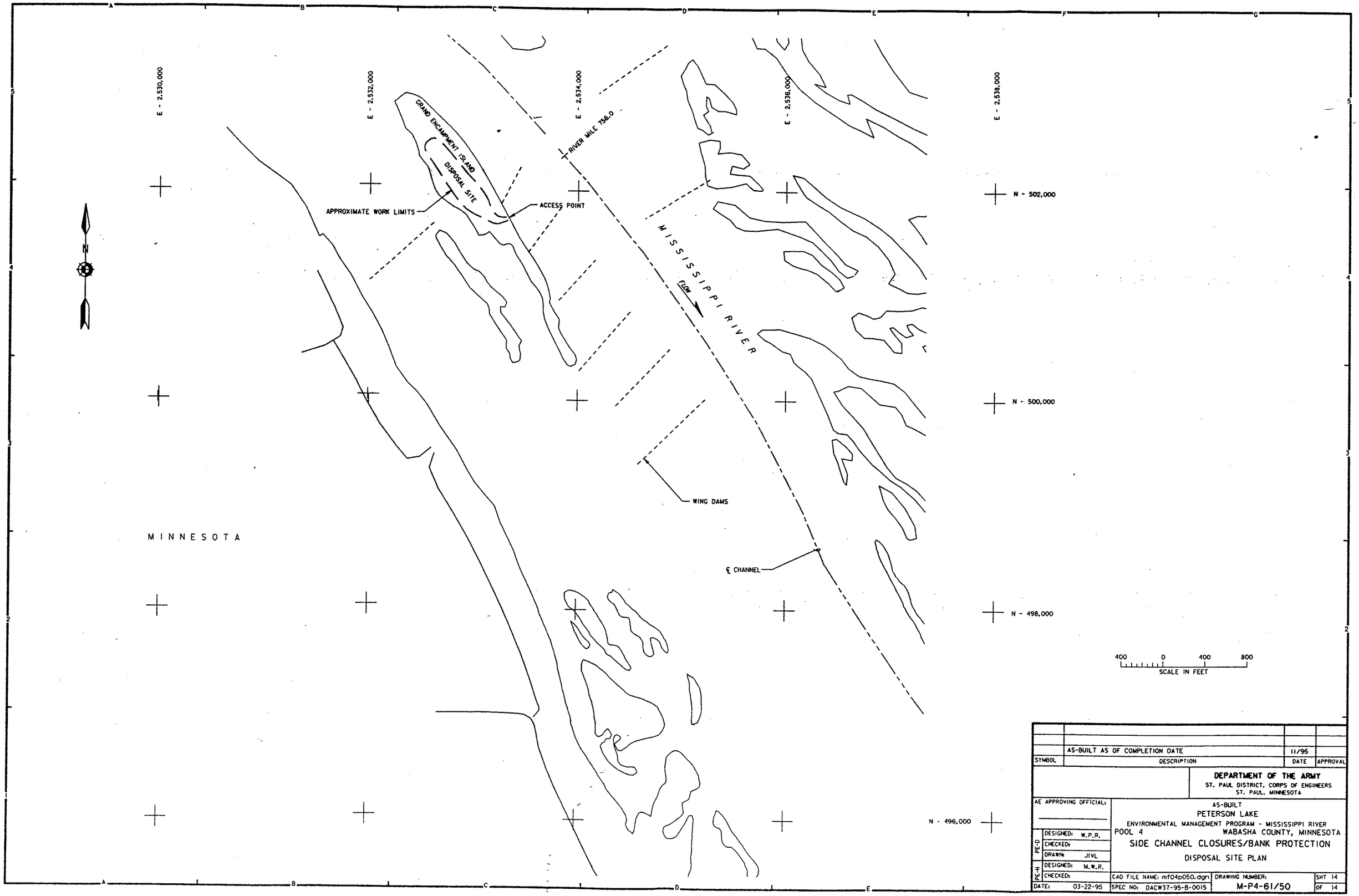
The options of rehabilitation or abandonment of the project may be considered at this time. Any decision would be carried forth only upon written mutual agreement of the USFWS and the Corps. Included within such agreement would be a description of the agreed upon course of action and funding responsibilities, if any. The Minnesota Department of Natural Resources will be consulted prior to coming to any final determination on a course of action.

Project Monitoring and Evaluation

Performance monitoring of the Peterson Lake project will be conducted by the Corps of Engineers to help determine the extent to which the design meets the habitat improvement objectives. Information from this monitoring will also be used, if required, when ascertaining whether rehabilitation or abandonment of portions of this project would be the wisest choice.

APPENDIX A

PROJECT DRAWINGS



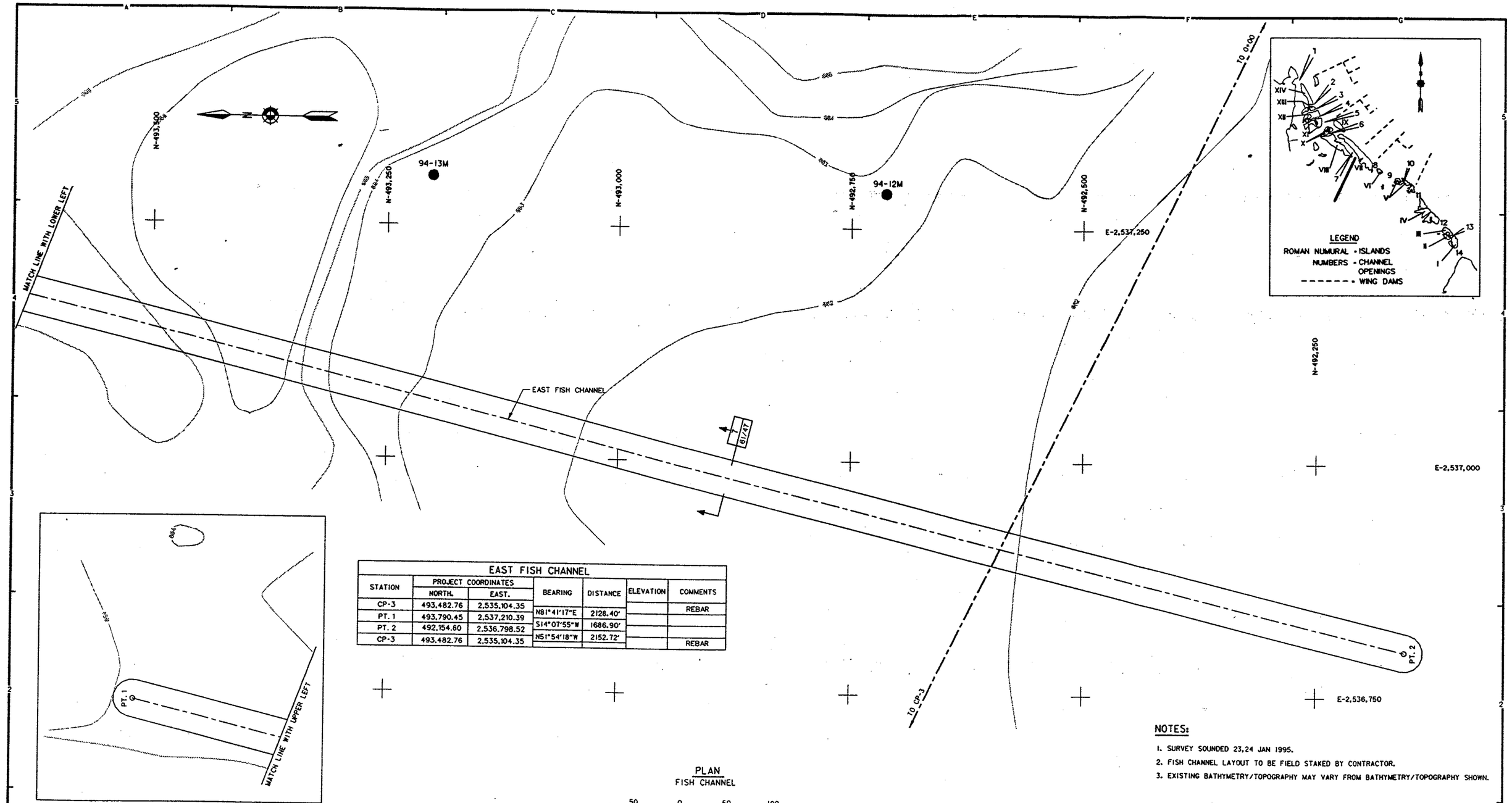
SYMBOL	DESCRIPTION	DATE	APPROVAL
	AS-BUILT AS OF COMPLETION DATE	11/95	

DEPARTMENT OF THE ARMY
ST. PAUL DISTRICT, CORPS OF ENGINEERS
ST. PAUL, MINNESOTA

AE APPROVING OFFICIAL:

AS-BUILT
PETERSON LAKE
ENVIRONMENTAL MANAGEMENT PROGRAM - MISSISSIPPI RIVER
POOL 4 WABASHA COUNTY, MINNESOTA
SIDE CHANNEL CLOSURES/BANK PROTECTION
DISPOSAL SITE PLAN

PE-D	DESIGNED: W.P.R.	
	CHECKED:	
	DRAWN: JIVL	
PE-H	DESIGNED: M.W.R.	
	CHECKED:	
DATE: 03-22-95	CAD FILE NAME: mf04p050.dgn	DRAWING NUMBER: M-P4-61/50
	SPEC NO: DACW37-95-B-0015	SHT 14 OF 14



EAST FISH CHANNEL						
STATION	PROJECT COORDINATES		BEARING	DISTANCE	ELEVATION	COMMENTS
	NORTH.	EAST.				
CP-3	493,482.76	2,535,104.35				REBAR
			N81°41'17"E	2128.40'		
PT. 1	493,790.45	2,537,210.39				
			S14°07'55"W	1686.90'		
PT. 2	492,154.60	2,536,798.52				
			N51°54'18"W	2152.72'		
CP-3	493,482.76	2,535,104.35				REBAR

PLAN
FISH CHANNEL

50 0 50 100
SCALE IN FEET

NOTES:

1. SURVEY SOUNDED 23,24 JAN 1995.
2. FISH CHANNEL LAYOUT TO BE FIELD STAKED BY CONTRACTOR.
3. EXISTING BATHYMETRY/TOPOGRAPHY MAY VARY FROM BATHYMETRY/TOPOGRAPHY SHOWN.

GEN ENG
HYD
HYDR
GEOTECH
STR ENG
MEA

SYMBOL	DESCRIPTION	DATE	APPROVAL
	AS-BUILT AS OF COMPLETION DATE	11/95	

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ST. PAUL, MINNESOTA

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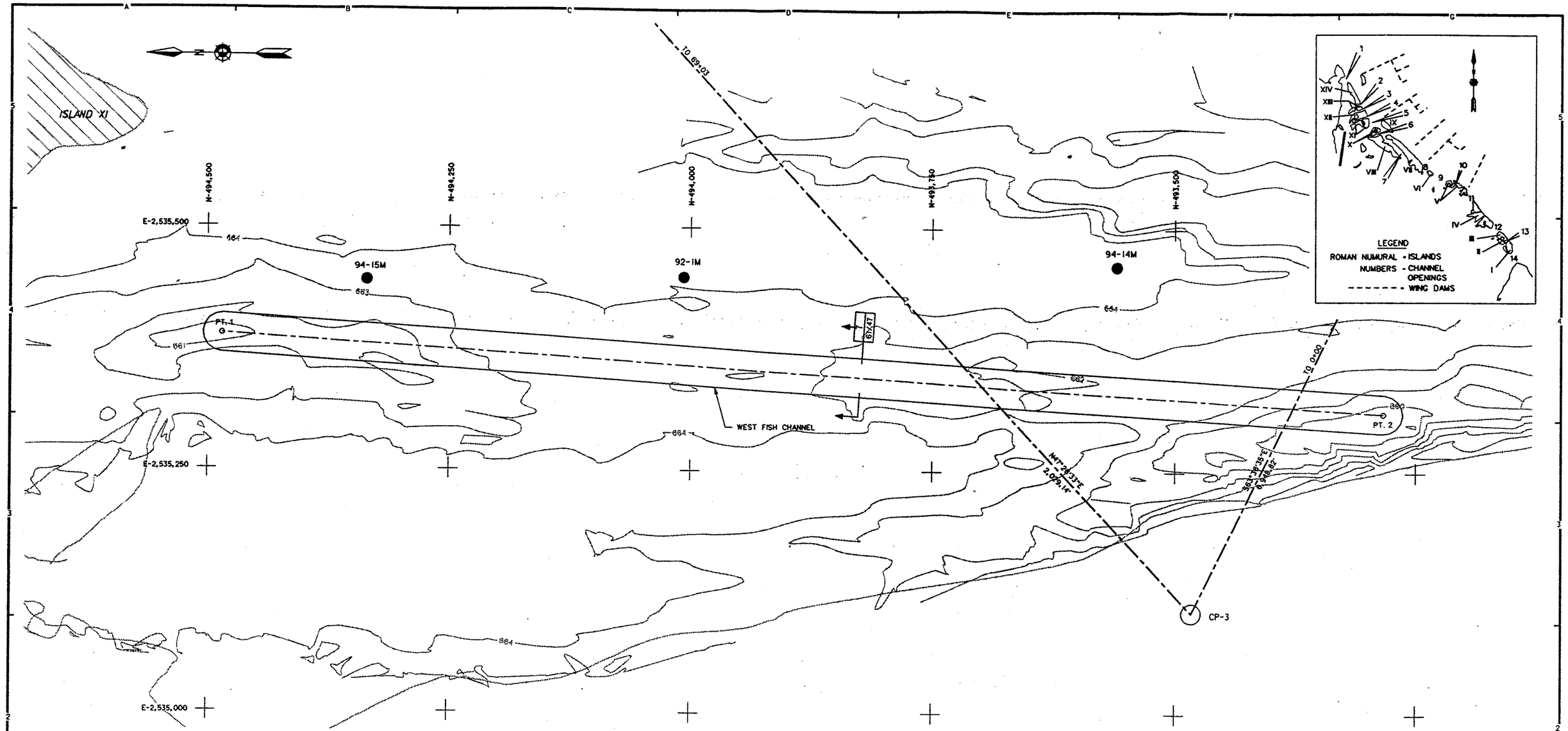
PETERSON LAKE
ENVIRONMENTAL MANAGEMENT PROGRAM - MISSISSIPPI RIVER
POOL 4 WABASHA COUNTY, MINNESOTA
SIDE CHANNEL CLOSURES/BANK PROTECTION
SITE PLAN - EAST FISH CHANNEL

PE-D: DESIGNED: W.P.R.; CHECKED:; DRAWN: JIVL
PE-H: DESIGNED: M.W.R.; CHECKED:
DATE: 03-22-95
CAD FILE NAME: m104p049.dgn
SPEC NO: DACW37-95-B-0015
DRAWING NUMBER: M-P4-61/49
SHT 13 OF 14



GEN ENG

HYD

HYDR

GEOTECH

STR ENG

MEA

PLAN
FISH CHANNEL

50 0 50 100
SCALE IN FEET

WEST FISH CHANNEL						
STATION	PROJECT COORDINATES		BEARING	DISTANCE	ELEVATION	COMMENTS
	NORTH.	EAST.				
CP-3	493,482.76	2,535,104.35				REBAR
			N15°52'33"E	1041.51'		
PT. 1	494,484.54	2,535,389.26				
			S03°42'54"W	1204.45'		
PT. 2	493,282.62	2,535,311.22				
			N64°48'36"W	235.77'		
CP-3	493,482.76	2,535,104.35				REBAR

NOTES:

1. SURVEY SOUNDED NOV. 9 1994.
2. FISH CHANNEL LAYOUT TO BE FIELD STAKED BY CONTRACTOR..
3. EXISTING BATHYMETRY/TOPOGRAPHY MAY VARY FROM BATHYMETRY/TOPOGRAPHY SHOWN.

SYMBOL	DESCRIPTION	DATE	APPROVAL
	AS-BUILT AS OF COMPLETION DATE	11/95	

DEPARTMENT OF THE ARMY
ST. PAUL DISTRICT, CORPS OF ENGINEERS
ST. PAUL, MINNESOTA

AE APPROVING OFFICIAL:

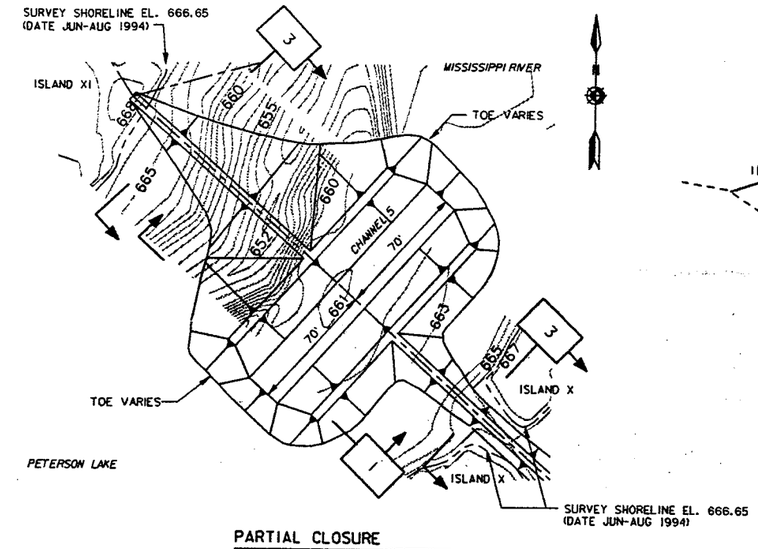
AS-BUILT
PETERSON LAKE
ENVIRONMENTAL MANAGEMENT PROGRAM - MISSISSIPPI RIVER
POOL 4 WABASHA COUNTY, MINNESOTA

SIDE CHANNEL CLOSURES/BANK PROTECTION

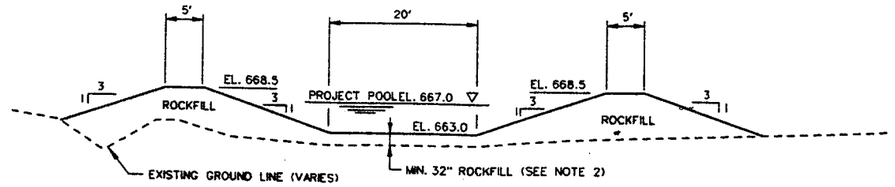
SITE PLAN - WEST FISH CHANNEL

PE-D: DESIGNED: W.P.R.; CHECKED:; DRAWN: JIVL
PE-H: DESIGNED: M.W.R.; CHECKED:
DATE: 03-22-95

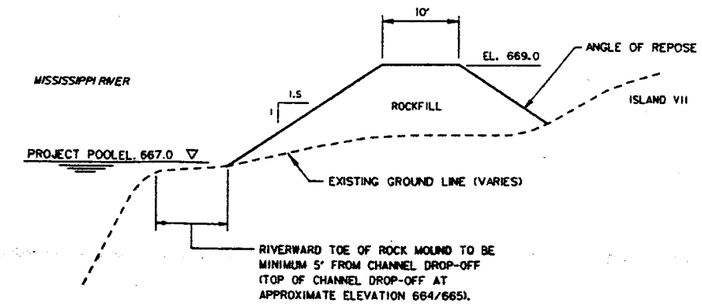
CAD FILE NAME: mf04p048.dgn
SPEC NO: DACW37-95-B-0015
DRAWING NUMBER: M-P4-61/48
SHT 12 OF 14



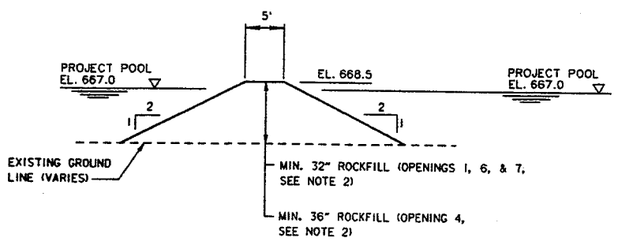
PARTIAL CLOSURE
PLAN SEE DWG. 61/44 FOR LOCATION
40 0 40 80
SCALE IN FEET



SECTION 1
THROUGH NOTCH
NO SCALE



TYPICAL SECTION 2
ROCK MOUND (ISLAND VII) 61/43
NO SCALE



TYPICAL SECTION 3
ROCK CLOSURE (OPENINGS 1,2,3,4,6 & 7) 61/44,45,46
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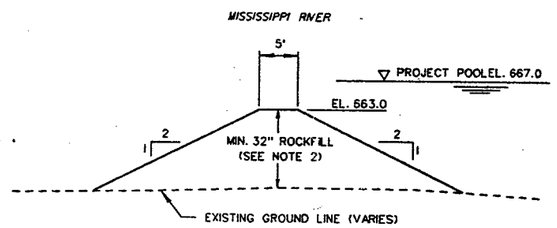
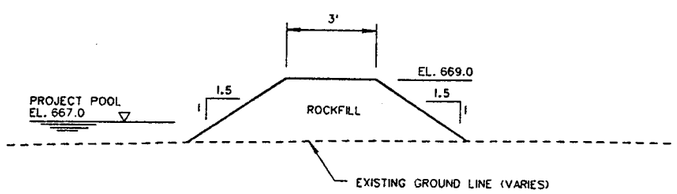


TYPICAL SECTION 4
ROCK WEIR (OPENING 8,9) 61/43
NO SCALE



TYPICAL SECTION 6
ROCK MOUND 61/40,41,42,43,45
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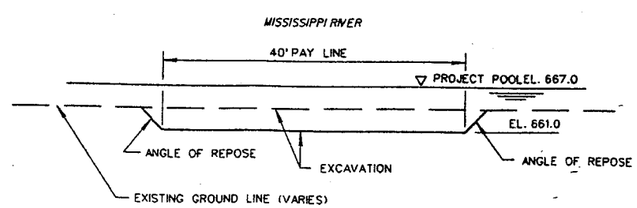


TYPICAL SECTION 7
FISH CHANNELS 61/48,49

NOTE:

1. ELEVATIONS REFER TO MEAN SEA LEVEL (N.G.V.D. 1912 ADJ.).
2. DREDGING MAY BE REQUIRED TO OBTAIN MINIMUM ROCKFILL THICKNESS OF 32".

SYMBOL	DESCRIPTION	DATE	APPROVAL
	AS-BUILT AS OF COMPLETION DATE	8/96	

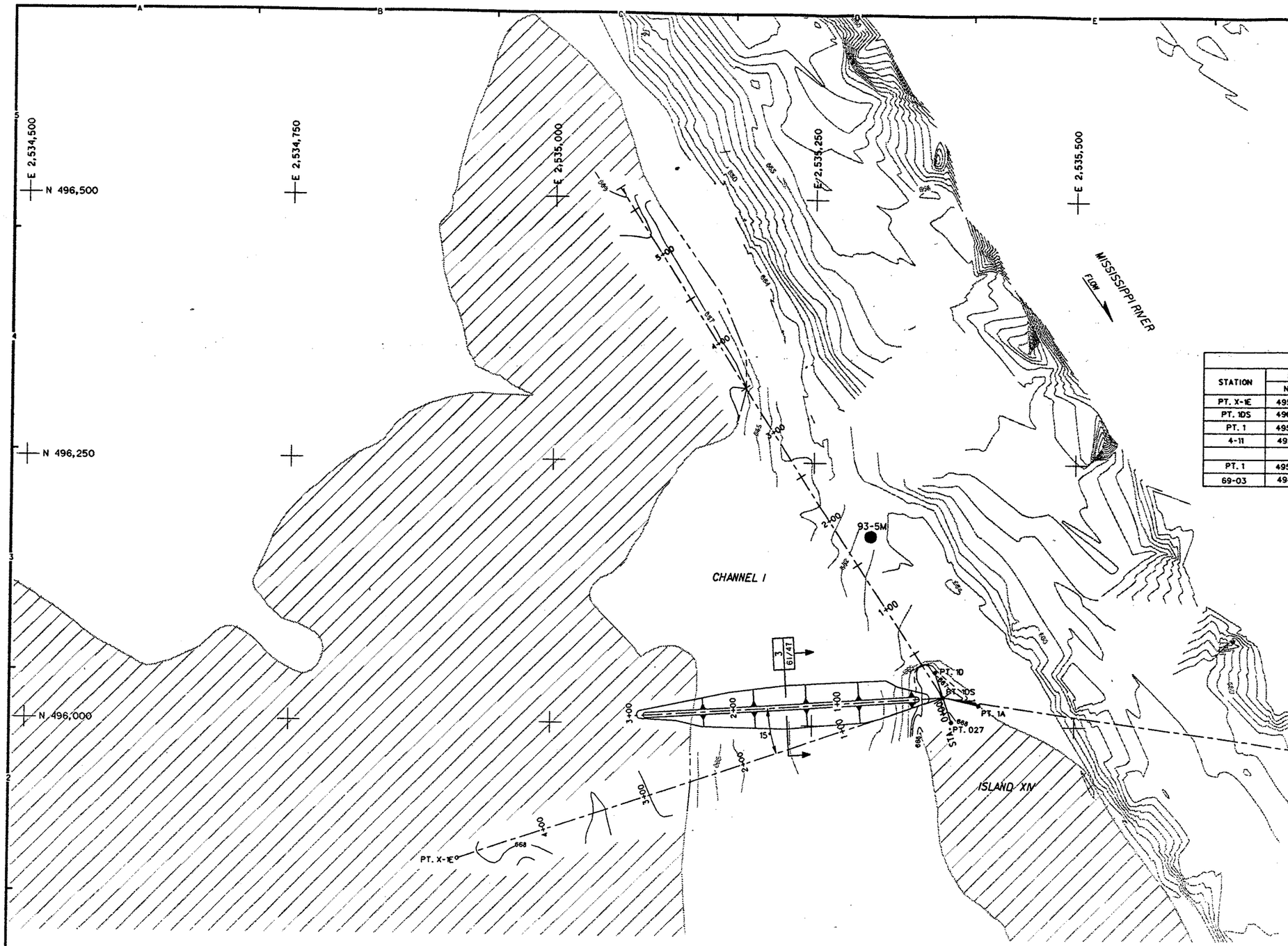
DEPARTMENT OF THE ARMY
ST. PAUL DISTRICT, CORPS OF ENGINEERS
ST. PAUL, MINNESOTA

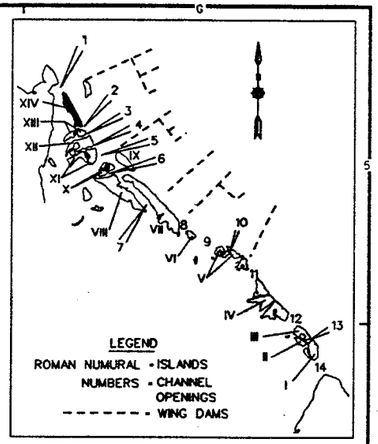
AE APPROVING OFFICIAL:

AS-BUILT
PETERSON LAKE
ENVIRONMENTAL MANAGEMENT PROGRAM - MISSISSIPPI RIVER
POOL 4 WABASHA COUNTY, MINNESOTA
SIDE CHANNEL CLOSURES/BANK PROTECTION
TYPICAL SECTIONS - BANK PROTECTION
CLOSURE STRUCTURES, WEIRS & FISH CHANNELS

PE-D: DESIGNED: W.P.R. / CHECKED: / DRAWN: JIVL/SKM/FJB
PE-H: DESIGNED: M.W.R. / CHECKED:
DATE: 06-06-96
CAD FILE NAME: MF04P047.DGN
SPEC NO: DACW37-95-B-0015
DRAWING NUMBER: M-P4-61/47
SHT 11 OF 14

GEN ENG
HYD
HYDR
GEOTECH
STR ENG
MEA





BASELINE SITE I						
STATION	PROJECT COORDINATES		BEARING	DISTANCE	ELEVATION	COMMENTS
	NORTH.	EAST.				
PT. X-1E	495,870.06	2,534,914.22				
			N71°06'42"E	486.00		
PT. 10S	496,027.39	2,535,374.05				1/2" I. P.
			N81°58'17"W	444.96		
PT. 1	495,965.24	2,535,814.65				1/2" I. P. ISLAND
			S83°49'16"E	3,531.56		
4-11	495,585.13	2,539,325.70				3" I.P. NAV. MON.
PT. 1	495,965.24	2,535,814.65				1/2" I. P. ISLAND
			N35°14'35"E	1,359.25		
69-03	494,855.13	2,536,599.01				FENCE POST

NOTES:

1. BANK PROTECTION LAYOUT SHALL BE FIELD STAKED BY CONTRACTOR.
2. WORK LIMITS 10' BEYOND LANDWARD TOE OF ROCK MOUNDS.
3. EXISTING BATHYMETRY/TOPOGRAPHY MAY VARY FROM BATHYMETRY/TOPOGRAPHY SHOWN.

REFERENCE:

1. SURVEY BOOK M4-T18 (JUNE, JULY, AUG.-94 BK. #1, #2, & #3).

GEN ENG
HYD
HYDR
GEOTECH
STR ENG
MEA

PLAN
CLOSURE STRUCTURE

50 0 50 100
SCALE IN FEET

SYMBOL	DESCRIPTION	DATE	APPROVAL
	AS-BUILT AS OF COMPLETION DATE	11/95	

DEPARTMENT OF THE ARMY
ST. PAUL DISTRICT, CORPS OF ENGINEERS
ST. PAUL, MINNESOTA

AE APPROVING OFFICIAL:

AS-BUILT
PETERSON LAKE
ENVIRONMENTAL MANAGEMENT PROGRAM - MISSISSIPPI RIVER
POOL 4 WABASHA COUNTY, MINNESOTA
SIDE CHANNEL CLOSURES/BANK PROTECTION
SITE PLAN
CHANNEL I CLOSURE STRUCTURE

PE-D: DESIGNED: W.P.R.; CHECKED:; DRAWN: JIVL/FJB
PE-H: DESIGNED: M.W.R.; CHECKED:

CAD FILE NAME: mf04p046.dgn
DATE: 03-22-95
SPEC NO: DACW37-95-B-0015
DRAWING NUMBER: M-P4-61/46
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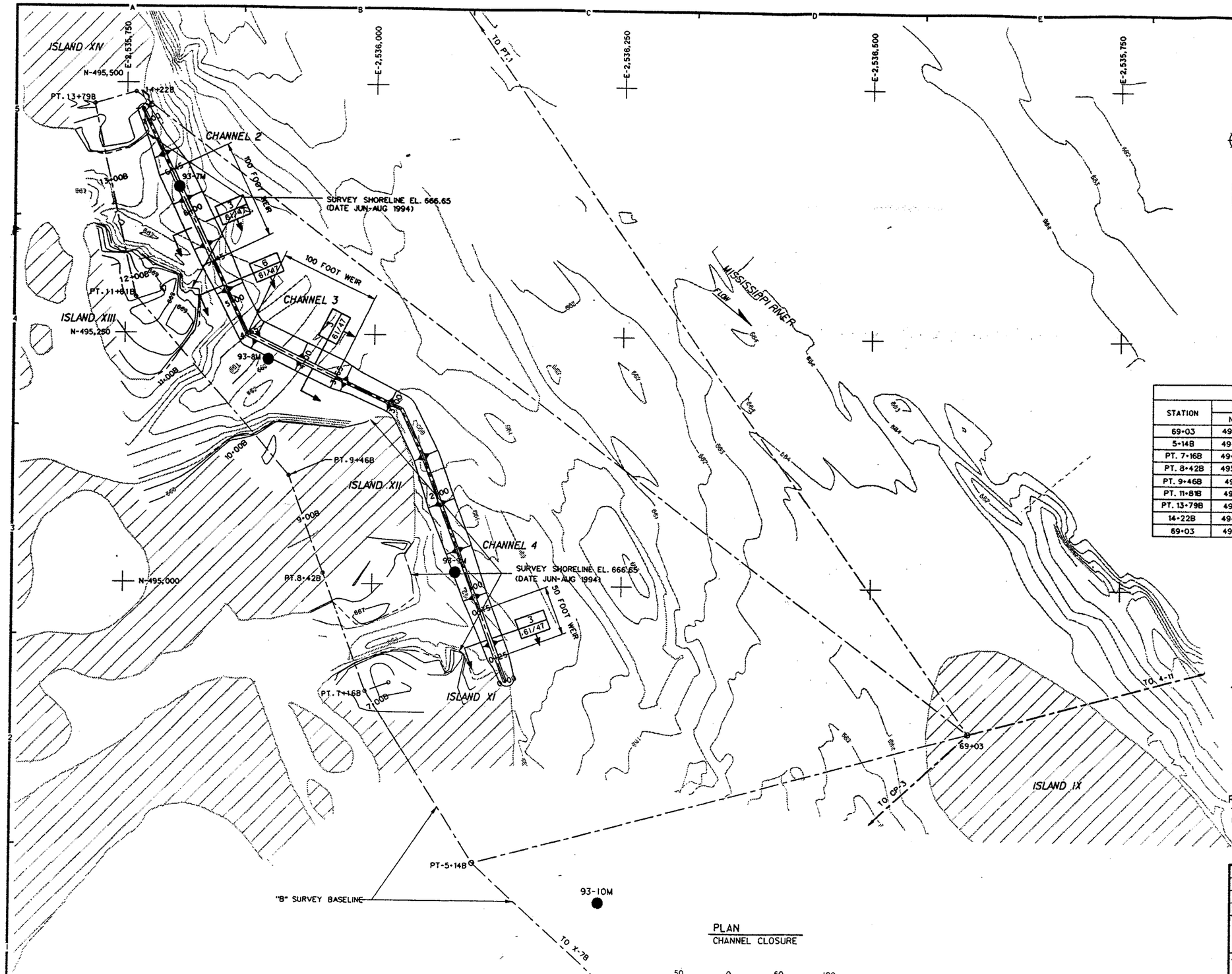
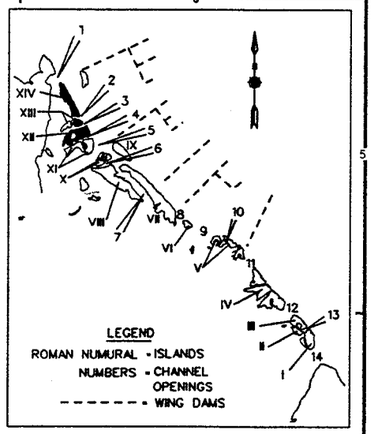




BASELINE SITES 2,3 AND 4						
STATION	PROJECT COORDINATES		BEARING	DISTANCE	ELEVATION	COMMENTS
	NORTH.	EAST.				
69+03	494,855.13	2,536,599.01				
			S74°56'01"W	513.78		
5+14B	494,721.58	2,536,102.89			668.64	
			N32°22'39"W	202.43		
PT. 7+16B	494892.539	2,535994.49			668.81	
			N20°11'27"W	125.57		
PT. 8+42B	495,010.392	2,535,951.15			667.54	
			N20°00'10"W	104.04		
PT. 9+46B	495,108.16	2,535,915.56			668.47	
			N41°09'12"W	236.20		
PT. 11+81B	495,286.01	2,535,760.12			669.43	
			N12°33'53"W	197.85		
PT. 13+79B	495,479.12	2,535,717.08			669.09	
			S02°24'03"E	989.23		
14+22B	494,490.76	2,535,758.52				
			N66°33'44"E	916.07		
69+03	494,855.13	2,536,599.01				

NOTES:

1. BANK PROTECTION LAYOUT SHALL BE FIELD STAKED BY CONTRACTOR.
2. WORK LIMITS 10' BEYOND LANDWARD TOE OF ROCK MOUNDS.
3. BATHYMETRIC SURVEY DATE 8 NOV 1994.
4. EXISTING BATHYMETRY/TOPOGRAPHY MAY VARY FROM BATHYMETRY/TOPOGRAPHY SHOWN.
5. ROCK MOUNDS AND WEIRS SHOWN WERE CONSTRUCTED AS PART OF A MODIFICATION TO REPAIR SAND CLOSURES BUILT DURING THE ORIGINAL CONTRACT. AS-BUILT SURVEYS DID NOT TIE THE MOUNDS AND WEIRS INTO HORIZONTAL CONTROL POINTS; THEREFORE, THE LOCATIONS SHOWN ARE APPROXIMATE.

REFERENCES:

1. SURVEY BOOK M4-T18 (JUNE, JULY, AUG.-94 BK.#1, #2, & #3).

PLAN
CHANNEL CLOSURE

50 0 50 100
SCALE IN FEET

GEN ENG
HYD
HYDR
GEOTECH
STR ENG
MEA

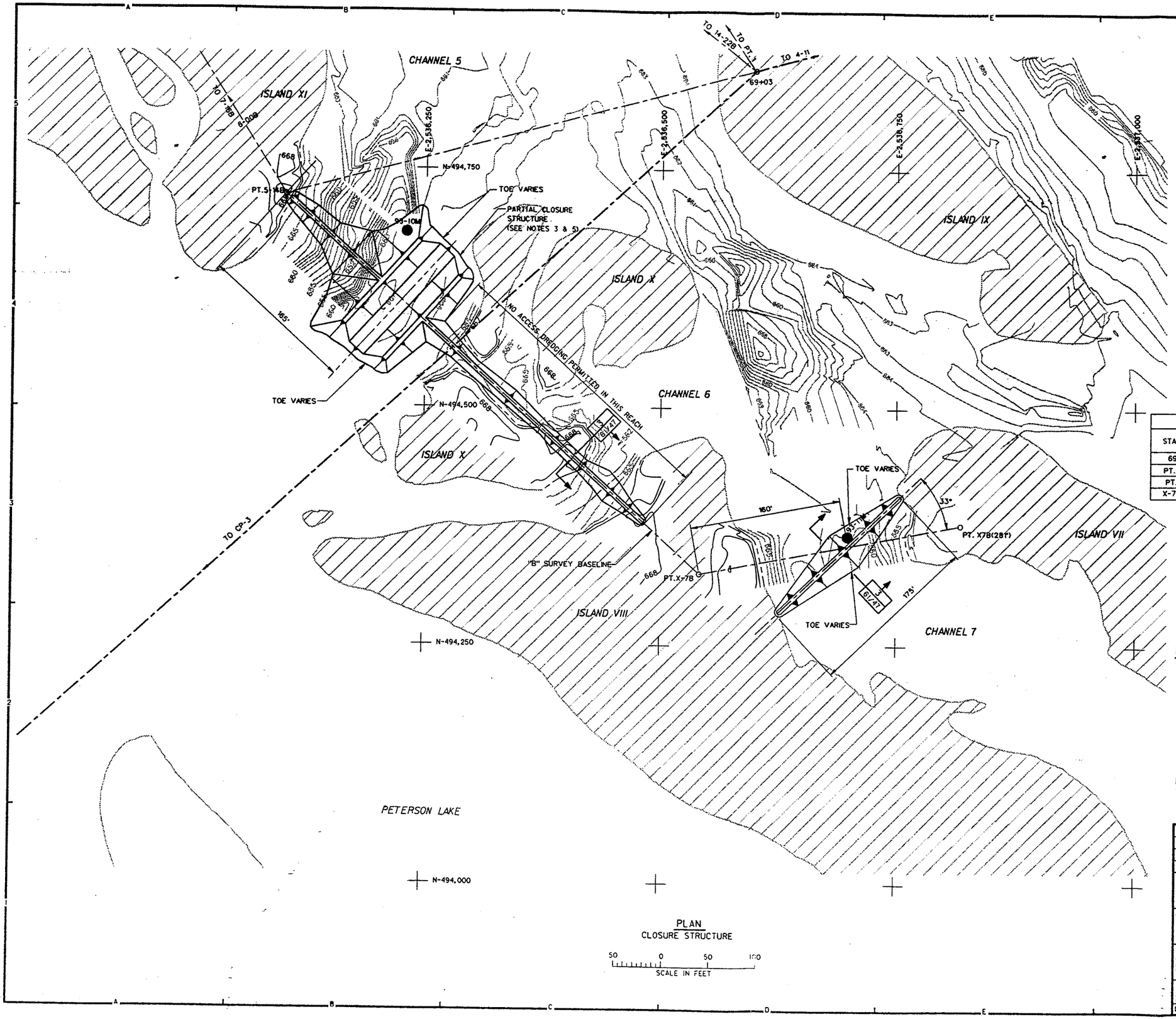
SYMBOL	DESCRIPTION	DATE	APPROVAL
	AS-BUILT AS OF COMPLETION DATE	8/96	

DEPARTMENT OF THE ARMY
ST. PAUL DISTRICT, CORPS OF ENGINEERS
ST. PAUL, MINNESOTA

AE APPROVING OFFICIAL:

AS-BUILT
PETERSON LAKE
ENVIRONMENTAL MANAGEMENT PROGRAM - MISSISSIPPI RIVER
POOL 4 WABASHA COUNTY, MINNESOTA
SIDE CHANNEL CLOSURES/BANK PROTECTION
SITE PLAN
CHANNELS 2, 3, AND 4 CLOSURE

PE-D: DESIGNED: W.P.R.; CHECKED:; DRAWN: JIVL/FJB
PE-H: DESIGNED: M.W.R.; CHECKED:
DATE: 03-22-95
CAD FILE NAME: MF04P045.DGN
SPEC NO: DACW37-95-B-0015
DRAWING NUMBER: M-P4-61/45
SHT 9 OF 14



BASELINE CLOSURES 5-7						
STATION	PROJECT COORDINATES		BEARING	DISTANCE	ELEVATION	COMMENTS
	NORTH.	EAST.				
69+03	494,855.13	2,536,599.01				I. P.
PT.5+14B	494,721.58	2,536,102.89	S74°56'01"W	513.78'	668.64	1/2" I. P.
PT.X-7B	494,325.43	2,536,542.31	S47°57'52"E	591.63'	668.66	1/2" I. P.
X-7B(281')	494,377.68	2,536,818.41	N72°17'02"E	281.00'	668.89	ON BANK

NOTES:

1. BANK PROTECTION LAYOUT SHALL BE FIELD STAKED BY CONTRACTOR.
2. WORK LIMITS 10' BEYOND LANDWARD TOE OF ROCK MOUNDS.
3. SEE DRAWING NO. 61/47 FOR PARTIAL CLOSURE STRUCTURE DETAILS.
4. BATHYMETRIC SURVEY DATE 8 NOV 1994.
5. ACCESS SHALL BE THRU CHANNEL 5.
6. EXISTING BATHYMETRY/TOPOGRAPHY MAY VARY FROM BATHYMETRY/TOPOGRAPHY SHOWN.
7. ALIGNMENT OF STRUCTURES SHOWN IS APPROXIMATE.

REFERENCES:

1. SURVEY BOOK M4-T18 (JUNE, JULY, AUG.-94 BK.#1, #2, & #3).

PLAN
CLOSURE STRUCTURE

50 0 50 100
SCALE IN FEET

GEN ENG
HYD
HYDR
GEOTECH
STR ENG
MEA

SYMBOL	DESCRIPTION	DATE	APPROVAL
	AS-BUILT AS OF COMPLETION DATE	11/95	

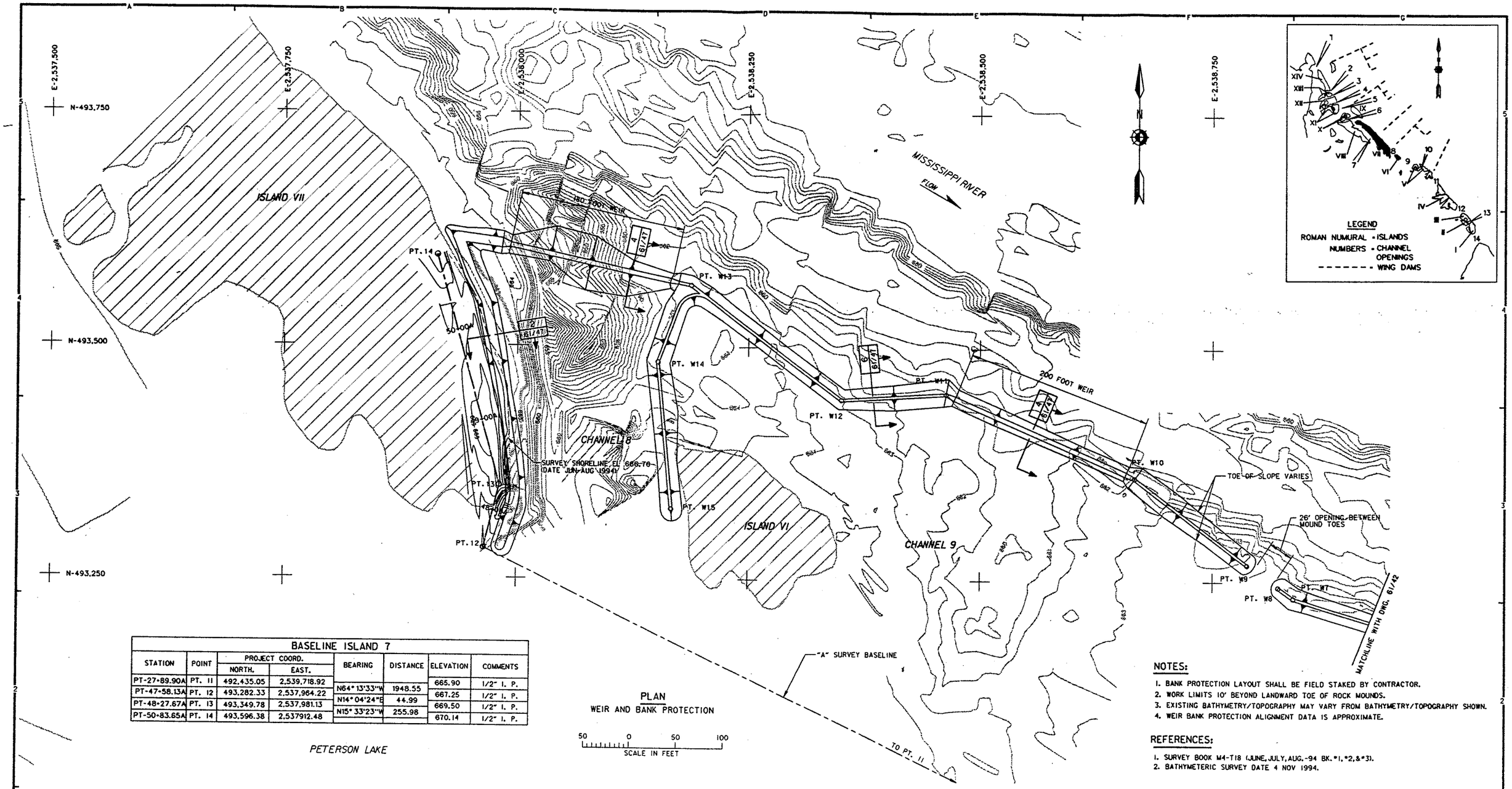
DEPARTMENT OF THE ARMY
ST. PAUL DISTRICT, CORPS OF ENGINEERS
ST. PAUL, MINNESOTA

AE APPROVING OFFICIAL:

AS-BUILT
PETERSON LAKE
ENVIRONMENTAL MANAGEMENT PROGRAM - MISSISSIPPI RIVER
POOL 4 WABASHA COUNTY, MINNESOTA
SIDE CHANNEL CLOSURES/BANK PROTECTION
SITE PLAN - CHANNEL 5 PARTIAL CLOSURE STRUCTURE AND CHANNELS 6 AND 7 CLOSURE STRUCTURES

PE-D: DESIGNED: W.P.R.; CHECKED:; DRAWN: JIVL/FJB
PE-H: DESIGNED: M.W.R.; CHECKED:
DATE: 03-22-95

CAD FILE NAME: mf04b044.dgn
SPEC NO: DACW37-95-B-0015
DRAWING NUMBER: M-P4-61/44
SHT 8 OF 14



PLAN
WEIR AND BANK PROTECTION

50 0 50 100
SCALE IN FEET

BASELINE ISLAND 7							
STATION	POINT	PROJECT COORD. NORTH.	PROJECT COORD. EAST.	BEARING	DISTANCE	ELEVATION	COMMENTS
PT-27+89.90A	PT. 11	492,435.05	2,539,718.92			665.90	1/2" I. P.
				N64°13'33"W	1948.55		
PT-47+58.13A	PT. 12	493,282.33	2,537,964.22			667.25	1/2" I. P.
				N14°04'24"E	44.99		
PT-48+27.67A	PT. 13	493,349.78	2,537,981.13			669.50	1/2" I. P.
				N15°33'23"W	255.98		
PT-50+83.65A	PT. 14	493,596.38	2,537912.48			670.14	1/2" I. P.

WEIR BANK PROTECTION						
POINT NO.	PROJECT COORD. NORTH.	PROJECT COORD. EAST.	BEARING	DISTANCE	ELEVATION	COMMENTS
PT. W6	493,171.53	2,539,030.29			669.0'	
			N72°26'11"W	202.74'		
PT. W7	493,232.71	2,538,837.00			669.0'	
			N53°51'13"W	19.80'		
PT. W8	493,244.39	2,538,821.01			669.0'	
			N54°38'36"W	41.20'		
PT. W9	493,268.23	2,538,787.41			669.0'	
			N52°45'02"W	153.37'		
PT. W10	493,361.06	2,538,665.33			669.0'	
			N66°08'39"W	221.20'		
PT. W11	493,450.52	2,538,463.03			669.0'	
			S86°29'15"W	113.44'		
PT. W12	493,443.57	2,538,349.80			669.0'	
			N52°51'53"W	202.47'		
PT. W13	493,565.80	2,538,188.39			669.0'	
			S22°09'54"W	89.50'		
PT. W14	493,483.51	2,538,153.18			669.0'	
			S05°23'44"E	158.56'		
PT. W15	493,325.65	2,538,168.09			669.0'	

NOTES:
1. BANK PROTECTION LAYOUT SHALL BE FIELD STAKED BY CONTRACTOR.
2. WORK LIMITS 10' BEYOND LANDWARD TOE OF ROCK MOUNDS.
3. EXISTING BATHYMETRY/TOPOGRAPHY MAY VARY FROM BATHYMETRY/TOPOGRAPHY SHOWN.
4. WEIR BANK PROTECTION ALIGNMENT DATA IS APPROXIMATE.

REFERENCES:
1. SURVEY BOOK M4-T18 (JUNE, JULY, AUG.-94 BK.#1,#2,&#3).
2. BATHYMETERIC SURVEY DATE 4 NOV 1994.

SYMBOL	DESCRIPTION	DATE	APPROVAL
	AS-BUILT AS OF COMPLETION DATE	11/95	

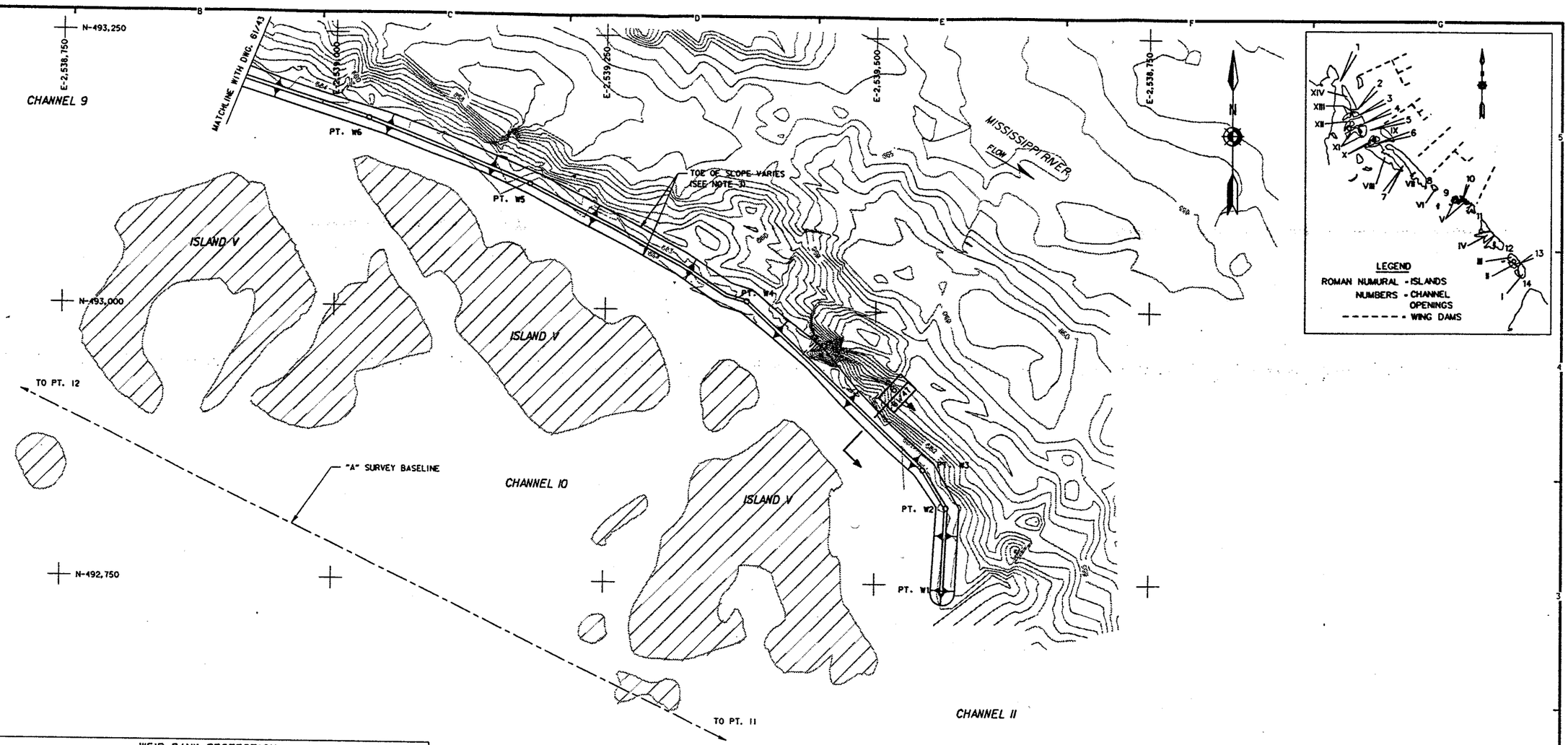
DEPARTMENT OF THE ARMY
ST. PAUL DISTRICT, CORPS OF ENGINEERS
ST. PAUL, MINNESOTA

AE APPROVING OFFICIAL:

AS-BUILT
PETERSON LAKE
ENVIRONMENTAL MANAGEMENT PROGRAM - MISSISSIPPI RIVER
POOL 4 WABASHA COUNTY, MINNESOTA
SIDE CHANNEL CLOSURES/BANK PROTECTION
SITE PLAN - CH.9 WEIR, ISLAND VI BANK PROTECTION
CH.8 WEIR, AND ISLAND VII BANK PROTECTION

PE-D: DESIGNED: W.P.R.; CHECKED:; DRAWN: JIVL/FJB
PE-H: DESIGNED: M.W.R.; CHECKED:
DATE: 03-22-95
CAD FILE NAME: mf04p043.dgn
SPEC NO: DACW37-95-B-0015
DRAWING NUMBER: M-P4-61/43
SHT 7 OF 14

GEN ENG
HYD
HYDR
GEOTECH
STR ENG
MEA



WEIR BANK PROTECTION						
POINT NO.	PROJECT COORD. NORTH.	PROJECT COORD. EAST.	BEARING	DISTANCE	ELEVATION	COMMENTS
PT. W1	492,742.47	2,539,562.81			669.0'	
			N02°31'16"E	78.21'		
PT. W2	492,820.60	2,539,566.25			669.0'	
			N31°57'40"W	41.10'		
PT. W3	492,855.46	2,539,544.50			669.0'	
			N47°49'43"W	224.92'		
PT. W4	493,008.39	2,539,379.57			669.0'	
			N62°51'56"W	225.25'		
PT. W5	493,113.68	2,539,180.44			669.0'	
			N68°55'45"W	160.91'		
PT. W6	493,171.53	2,539,030.29			669.0'	
			N72°26'11"W	202.74'		
PT. W7	493,232.71	2,538,837.00			669.0'	

NOTES:

1. BANK PROTECTION LAYOUT SHALL BE FIELD STAKED BY CONTRACTOR.
2. WORK LIMITS 10' BEYOND LANDWARD TOE OF ROCK MOUNDS.
3. RIVERWARD TOE OF ROCK MOUND TO FOLLOW 663.0 CONTOUR.
4. EXISTING BATHYMETRY/TOPOGRAPHY MAY VARY FROM BATHYMETRY/TOPOGRAPHY SHOWN.
5. WEIR BANK PROTECTION ALIGNMENT DATA IS APPROXIMATE.

REFERENCES:

1. SURVEY BOOK M4-T18 (JUNE, JULY, AUG.-94 BK.#1, #2, & #3).
2. BATHYMETERIC SURVEY DATE 4 NOV 94.

PLAN
BANK PROTECTION

50 0 50 100
SCALE IN FEET

GEN ENG
HYD
HYDR
GEOTECH
STR ENG
MEA

SYMBOL	DESCRIPTION	DATE	APPROVAL
	AS-BUILT AS OF COMPLETION DATE	11/95	

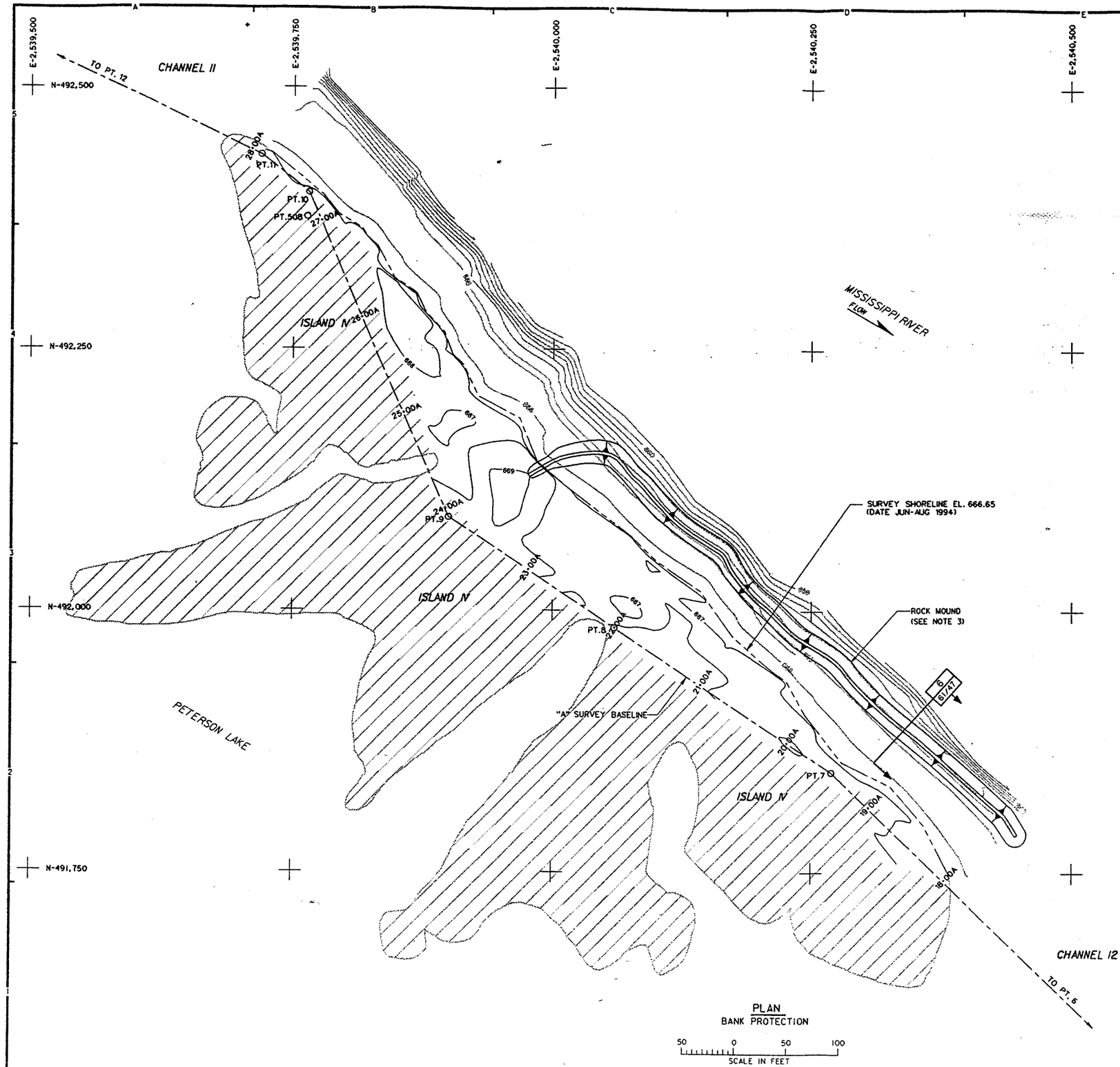
DEPARTMENT OF THE ARMY
ST. PAUL DISTRICT, CORPS OF ENGINEERS
ST. PAUL, MINNESOTA

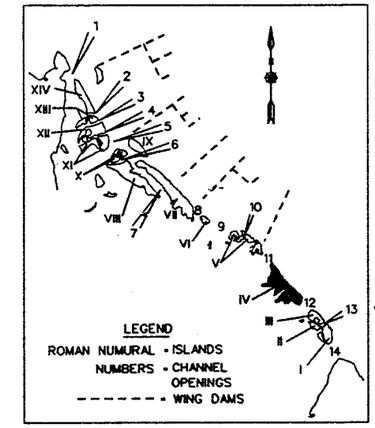
AE APPROVING OFFICIAL:

PE-D DESIGNED: W.P.R.
CHECKED:
DRAWN: JIVL/FJB
PE-H DESIGNED: M.W.R.
CHECKED:
DATE: 03-22-95

AS-BUILT
PETERSON LAKE
ENVIRONMENTAL MANAGEMENT PROGRAM - MISSISSIPPI RIVER
POOL 4 WABASHA COUNTY, MINNESOTA
SIDE CHANNEL CLOSURES/BANK PROTECTION
SITE PLAN
ISLAND V BANK PROTECTION

CAD FILE NAME: mf04p042.dgn
SPEC NO: DACW37-95-B-0015
DRAWING NUMBER: M-P4-61/42
SHT 6 OF 14





PLAN
BANK PROTECTION

50 0 50 100
SCALE IN FEET

BASELINE ISLAND 4							
STATION	POINT	PROJECT COORDINATES		BEARING	DISTANCE	ELEVATION	COMMENTS
		NORTH.	EAST.				
14+56.70A	PT. 6	491,504.24	2,540,624.07			667.60	1/2" I. P.
				N46°03'11"W	492.08		
19+48.78A	PT. 7	491,845.74	2,540,269.78			667.31	1/2" I. P.
				N56°46'18"W	251.21		
21+99.99A	PT. 8	491,983.40	2,540,059.64			668.18	1/2" I. P.
				N56°27'16"W	191.21		
23+91.20A	PT. 9	492,089.06	2,539,900.28				1/2" I. P.
				N23°35'05"W	338.39		
27+29.59A	PT. 10	492,399.18	2,539,764.89				1/2" I. P.
				N52°02'07"W	58.31		
27+89.90A	PT. 11	492,435.05	2,539,718.92			667.90	1/2" I. P.

NOTES:

1. BANK PROTECTION LAYOUT SHALL BE FIELD STAKED BY CONTRACTOR.
2. WORK LIMITS 10' BEYOND LANDWARD TOE OF ROCK MOUNDS.
3. RIVERWARD TOE OF ROCK MOUND TO FOLLOW 663.0 CONTOUR.
4. EXISTING BATHYMETRY/TOPOGRAPHY MAY VARY FROM BATHYMETRY/TOPOGRAPHY SHOWN.

REFERENCE:

1. SURVEY BOOK M4-T18 (JUNE, JULY, AUG.-94 BK.#1, #2, & #3).

GEN ENG
HYD
HYDR
GEOTECH
STR ENG
MEA

SYMBOL	DESCRIPTION	DATE	APPROVAL
	AS-BUILT AS OF COMPLETION DATE	11/95	

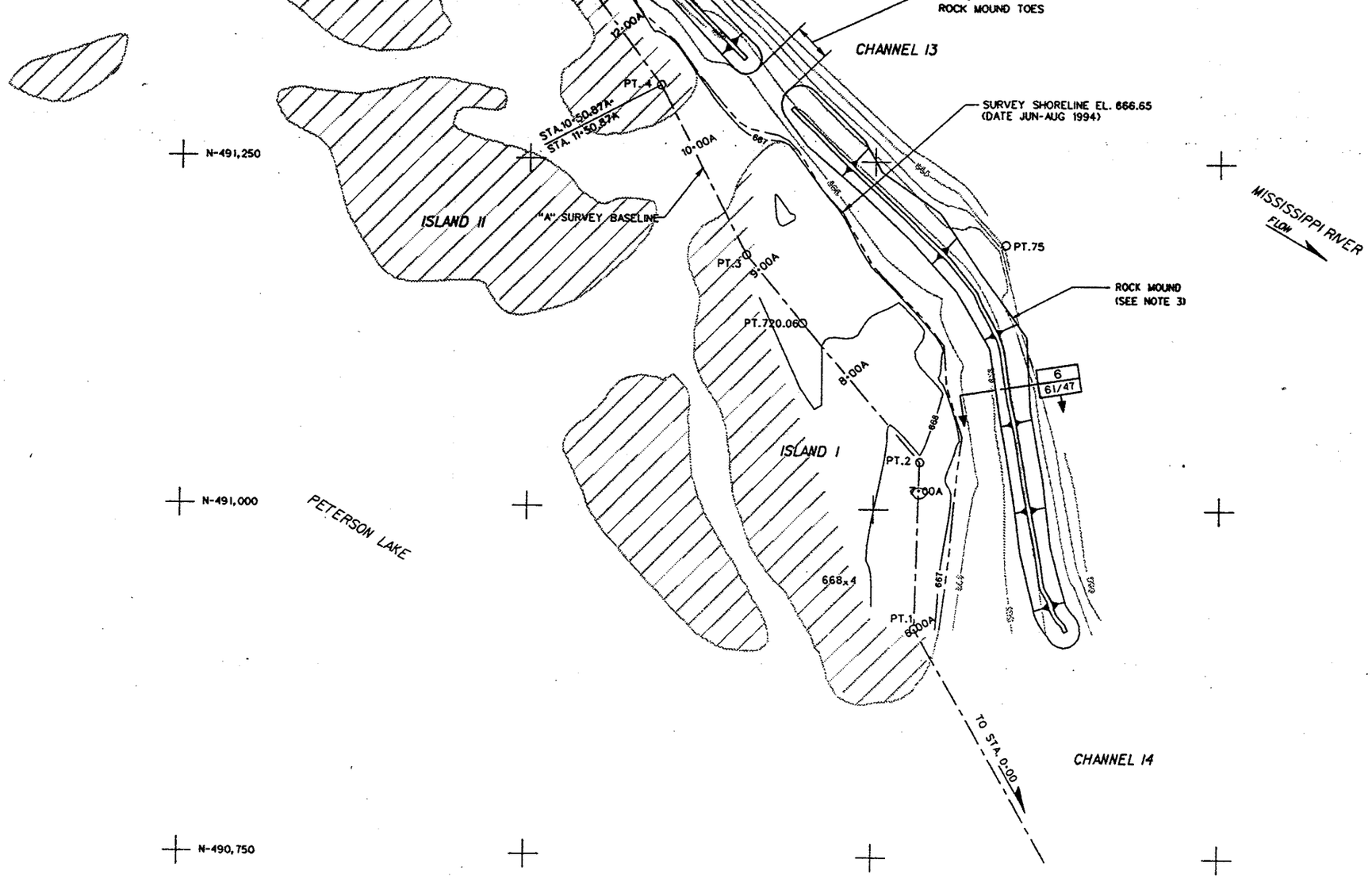
DEPARTMENT OF THE ARMY
ST. PAUL DISTRICT, CORPS OF ENGINEERS
ST. PAUL, MINNESOTA

AE APPROVING OFFICIAL:

AS-BUILT
PETERSON LAKE
ENVIRONMENTAL MANAGEMENT PROGRAM - MISSISSIPPI RIVER
POOL 4 WABASHA COUNTY, MINNESOTA
SIDE CHANNEL CLOSURES/BANK PROTECTION
SITE PLAN
ISLAND IV BANK PROTECTION

PE-D: DESIGNED: W.P.R.; CHECKED:; DRAWN: JIVL/FJB
PE-H: DESIGNED: M.W.R.; CHECKED:

CAD FILE NAME: mf04p041.dgn
DRAWING NUMBER: M-P4-61/41
SHT 5 OF 14
DATE: 03-22-95
SPEC NO: DACW37-95-B-0015



PLAN
BANK PROTECTION

50 0 50 100
SCALE IN FEET

BASELINE - ISLAND I				
STATION	POINT	PROJECT COORDINATES		E
		NORTH.	EAST.	
0+00	0+00	490,394.11	2,541,329.01	
6+00.48A	PT.1	490,914.45	2,541,029.87	N 2
7+20.00A	PT.2	491,034.18	2,541,033.06	N
9+14A	PT.3	491,182.11	2,540,907.64	N 4
11+50.87A	PT.4	491,303.52	2,540,844.44	N 2
13+32.24A	PT.5	491,448.35	2,540,735.28	N 3
14+56.70A	PT.6	491,504.24	2,540,624.07	N 6

NOTES:

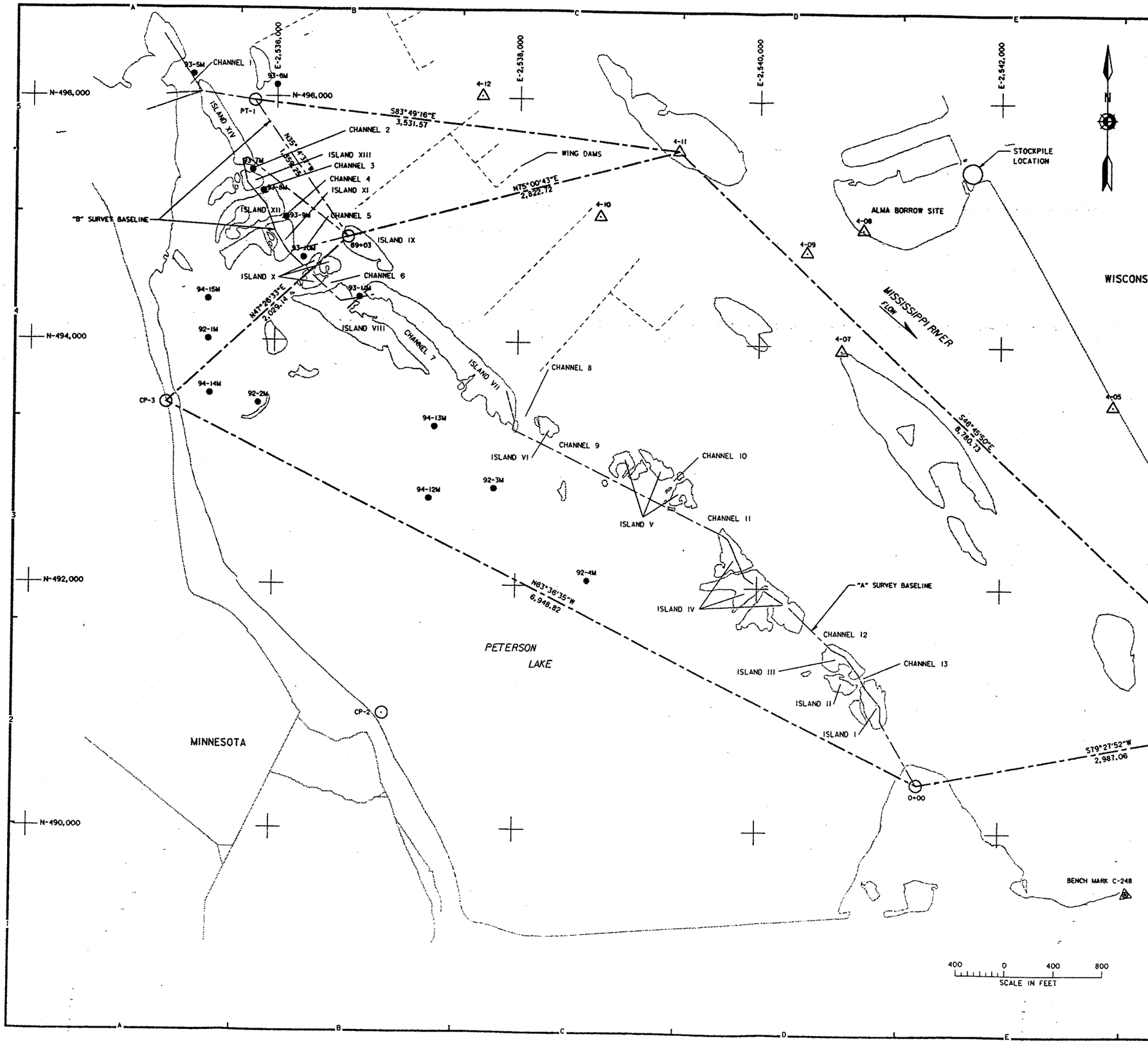
1. BANK PROTECTION LAYO
2. WORK LIMITS 10' BEYON
3. RIVERWARD TOE OF ROC
4. EXISITNG BATHYMETRY/

REFERENCE:

1. SURVEY BOOK M4-T18 (J

GEN ENG
HYD
HYDR
GEOTECH
STR ENG
MEA

	AS-BUILT AS OF
SYMBOL	
AE APPROVING OFFICIAL:	
PE-D DESIGNED: W.P.R.	PO
PE-D CHECKED:	
PE-D DRAWN: JIVL/FJB	
PE-H DESIGNED: M.W.R.	
PE-H CHECKED:	CAD
DATE: 03-22-95	SPE



PROJECT - HORIZONTAL & VERTICAL CONTROL POINTS						
STATION	*PROJECT COORDINATES NORTH.	*PROJECT COORDINATES EAST.	BEARING	DISTANCE	ELEVATION	COMMENTS
4-02	490,940.28	2,544,265.71				L/D NO.4
0+00	490,394.11	2,541,329.01	S79°27'52"W	2,987.06		FENCE POST
CP*3	493,482.76	2,535,104.353	N63°36'35"W	6,948.82		REBAR
69+03	494,855.13	2,536,599.01	N47°26'33"E	2,029.14		FENCE POST
4-11	495,585.13	2,539,325.70	N75°00'43"E	2,822.72		3" I.P. NAV.MON.
4-02	495,585.48	2,539,325.19	S46°45'50"E	6,780.73		1/2" I. P.
4-11	495,585.13	2,539,325.70				3" I.P. NAV.MON.
69+03	494,855.13	2,536,599.01	S75°00'43"W	2,822.72		FENCE POST
PT. 1	495,965.24	2,535,814.65	N35°14'37"W	1,359.25		1/2" I. P.
4-11	495,585.13	2,539,325.70	S83°49'16"E	3,531.57		3" I.P. NAV.MON.

*COORDINATES BASED ON MINNESOTA STATE PLANE GRID SYSTEM, SOUTH ZONE

NOTES:

1. UNLESS INDICATED OTHERWISE, VERTICAL CONTROL FOR CONTRACT DRAWINGS REFERS TO MEAN SEA LEVEL (MSL), N.G.V.D. 1912 ADJ.
2. TO CONVERT BENCH MARK C-248 FROM N.G.V.D. 1929 ADJ. TO N.G.V.D. 1912 ADJ. ADD 0.486 FEET.
3. BENCH MARK C-248 AT EL. 676.488 (N.G.V.D. 1929 ADJ.) IS SET IN TOP OF THE SOUTHWEST CONCRETE WALL AND FOUNDATION FOR THE PIERS WHICH SUPPORT THE SERVICE BRIDGE FOR THE LOCK AND DAM AND 1.8 FEET NORTHWEST OF THE NORTHWEST FACE OF THE MOST SOUTHWESTERLY CONCRETE PIER.
4. ISLANDS & SHORELINES SHOWN ARE FROM AERIAL PHOTO DATED NOV. 6 1991.

REFERENCES:

DWG. NO.

SURVEY BOOK M4-T18 (JUNE, JULY, AUG.-94 BK.#1, #2, & #3).
BORING LOGS 92-1M THRU 92-4M ____ 10/10
BORING LOGS 93-5M THRU 93-9M ____ 10/11
BORING LOGS 93-10M, 93-11M AND 94-12M THRU 94-15M ____ 10/12

● ALMA

SYMBOL	DESCRIPTION	DATE	APPROVAL
	AS-BUILT AS OF COMPLETION DATE	11/95	

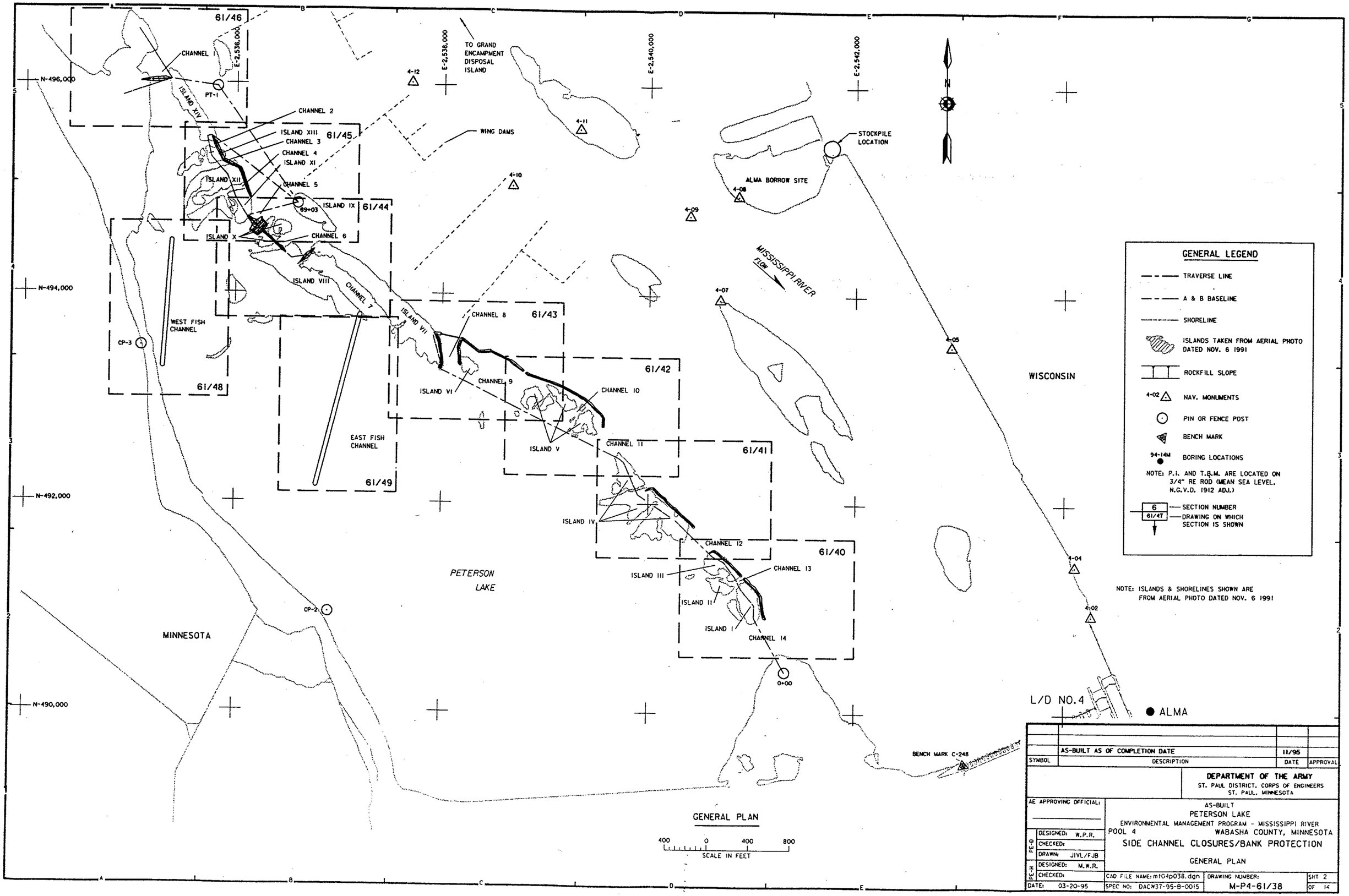
DEPARTMENT OF THE ARMY
ST. PAUL DISTRICT, CORPS OF ENGINEERS
ST. PAUL, MINNESOTA

AE APPROVING OFFICIAL:

PE-D: DESIGNED: W.P.R. / CHECKED: / DRAWN: JIVL/FJB
PE-H: DESIGNED: M.W.R. / CHECKED:

AS-BUILT
PETERSON LAKE
ENVIRONMENTAL MANAGEMENT PROGRAM - MISSISSIPPI RIVER
POOL 4 WABASHA COUNTY, MINNESOTA
SIDE CHANNEL CLOSURES/BANK PROTECTION
HORIZONTAL CONTROL DATA AND BORING LOCATIONS

CAD FILE NAME: m104p039.dgn
DATE: 03-24-95
SPEC NO: DACW37-95-B-0015
DRAWING NUMBER: M-P4-61/39
SHT 3 OF 14


61/46
61/45
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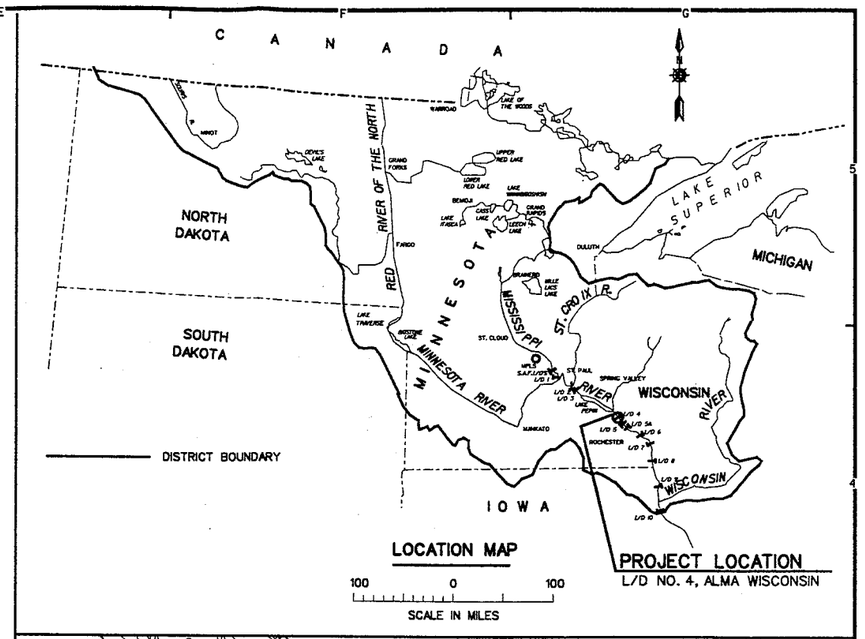
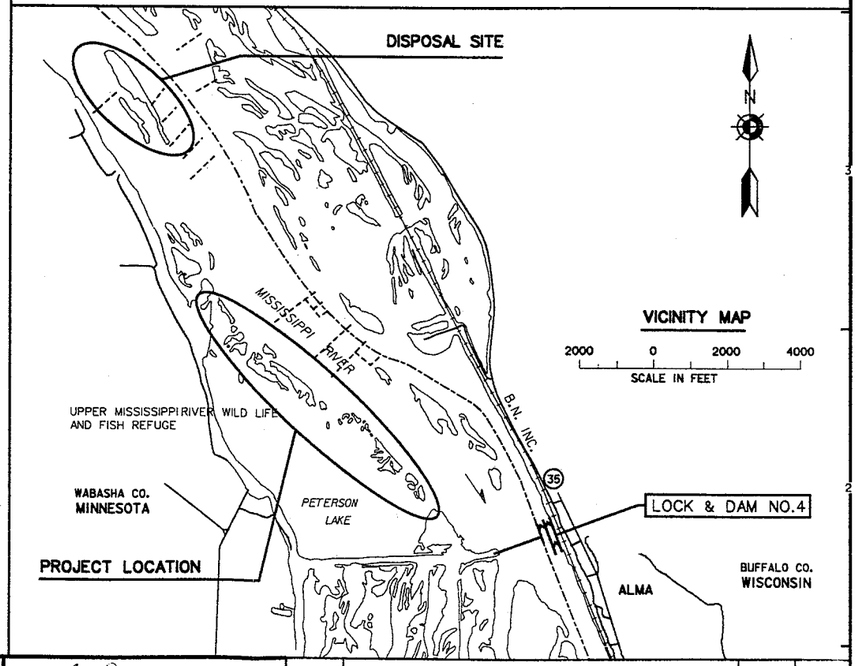
CHANNEL 1
CHANNEL 2
CHANNEL 3
CHANNEL 4
CHANNEL 5
CHANNEL 6
CHANNEL 7
CHANNEL 8
CHANNEL 9
CHANNEL 10
CHANNEL 11
CHANNEL 12
CHANNEL 13
CHANNEL 14
ISLAND XIV
ISLAND XIII
ISLAND XII
ISLAND XI
ISLAND X
ISLAND IX
ISLAND VIII
ISLAND VII
ISLAND VI
ISLAND V
ISLAND IV
ISLAND III
ISLAND II
ISLAND I
PT-1
69+03
0+00
CP-3
CP-2
WEST FISH CHANNEL
EAST FISH CHANNEL
N-496,000
N-494,000
N-492,000
N-490,000
E-2,536,000
E-2,538,000
E-2,540,000
E-2,542,000
TO GRAND ENCAMPMENT DISPOSAL ISLAND
WING DAMS
STOCKPILE LOCATION
ALMA BORROW SITE
MISSISSIPPI RIVER FLOW
PETERSON LAKE
MINNESOTA
WISCONSIN
L/D NO.4
ALMA
BENCH MARK C-248
4-12
4-11
4-10
4-09
4-08
4-07
4-05
4-04
4-02
GENERAL LEGEND
TRAVERSE LINE
A & B BASELINE
SHORELINE
ISLANDS TAKEN FROM AERIAL PHOTO DATED NOV. 6 1991
ROCKFILL SLOPE
4-02 NAV. MONUMENTS
PIN OR FENCE POST
BENCH MARK
94-14M BORING LOCATIONS
NOTE: P.I. AND T.B.M. ARE LOCATED ON 3/4" RE ROD (MEAN SEA LEVEL. N.G.V.D. 1912 ADJ.)
6 SECTION NUMBER
61/47 DRAWING ON WHICH SECTION IS SHOWN
NOTE: ISLANDS & SHORELINES SHOWN ARE FROM AERIAL PHOTO DATED NOV. 6 1991
GEN ENG
HYD
HYDR
GEOTECH
STR ENG
MEA
GENERAL PLAN
400 0 400 800
SCALE IN FEET
AS-BUILT AS OF COMPLETION DATE 11/95
SYMBOL DESCRIPTION DATE APPROVAL
DEPARTMENT OF THE ARMY
ST. PAUL DISTRICT, CORPS OF ENGINEERS
ST. PAUL, MINNESOTA
AE APPROVING OFFICIAL:
AS-BUILT
PETERSON LAKE
ENVIRONMENTAL MANAGEMENT PROGRAM - MISSISSIPPI RIVER
POOL 4 WABASHA COUNTY, MINNESOTA
SIDE CHANNEL CLOSURES/BANK PROTECTION
GENERAL PLAN
PE-D DESIGNED: W.P.R.
CHECKED:
DRAWN: JIVL/FJB
PE-H DESIGNED: M.W.R.
CHECKED:
DATE: 03-20-95
CAD FILE NAME: m104p038.dgn
SPEC NO: DACW37-95-B-0015
DRAWING NUMBER: M-P4-61/38
SHT 2 OF 14

PLANS & SPECIFICATIONS

ENVIRONMENTAL MANAGEMENT PROGRAM

PETERSON LAKE LOCK & DAM NO. 4





GEN ENG
HYD
HYDR
GEOTECH
STR ENG
MEA

CONTRACT DRAWING INDEX

DRAWING NO.	SHT.	DESCRIPTION	CAD FILE
M-P4-10/9	1	LOCATION, VICINITY MAP, AND DRAWING INDEX	mf04c109.dgn
M-P4-61/38	2	GENERAL PLAN	mf04p038.dgn
M-P4-61/39	3	HORIZONTAL CONTROL DATA	mf04p039.dgn
M-P4-61/40	4	SITE PLAN - ISLANDS I, II AND III BANK PROTECTION	mf04p040.dgn
M-P4-61/41	5	SITE PLAN - ISLAND IV BANK PROTECTION	mf04p041.dgn
M-P4-61/42	6	SITE PLAN - ISLAND V BANK PROTECTION	mf04p042.dgn
M-P4-61/43	7	SITE PLAN - CHANNEL 9 WEIR, ISLAND VI BANK PROTECTION, CHANNEL 8 WEIR, AND ISLAND VII BANK PROTECTION.	mf04p043.dgn
M-P4-61/44	8	SITE PLAN - CHANNEL 5 PARTIAL CLOSURE STRUCTURE AND CHANNELS 6 AND 7 CLOSURE STRUCTURES.	mf04p044.dgn
M-P4-61/45	9	SITE PLAN - CHANNELS 2, 3, AND 4 CLOSURE STRUCTURES	mf04p045.dgn
M-P4-61/46	10	SITE PLAN - CHANNEL 1 CLOSURE STRUCTURE	mf04p046.dgn
M-P4-61/47	11	SECTIONS - BANK PROTECTION CLOSURE STRUCTURES, WEIRS & FISH CHANNELS	mf04p047.dgn
M-P4-61/48	12	SITE PLAN - WEST FISH CHANNEL	mf04p048.dgn
M-P4-61/49	13	SITE PLAN - EAST FISH CHANNEL	mf04p049.dgn
M-P4-61/50	14	DISPOSAL SITE	mf04p050.dgn

REFERENCE DRAWINGS

DRAWING NO.	DESCRIPTION	CAD FILE
M-P4-10/10	BORING LOGS 92-1M THRU 92-4M	PETERSO1.DGN
M-P4-10/11	BORING LOGS 93-5M THRU 93-9M	PETERSO2.DGN
M-P4-10/12	BORING LOGS 93-10M, 93-11M, AND 94-12M THRU 94-15M	PETERSO3.DGN
M-L4-14/34	ELEVATION DURATION CURVES POOL JAN-JUN (1971-1993)	D1_DAM4P.DGN
M-L4-14/35	ELEVATION DURATION CURVES POOL JUL-DEC (1971-1993)	D2_DAM4P.DGN
M-L4-14/36	HYDROGRAPHS POOL JAN-DEC (1984-1988)	H1_DAM4P.DGN
M-L4-14/37	HYDROGRAPHS POOL JAN-DEC (1989-1993)	H1_DAM4P.DGN
M-P4-61/51	BEEF SLOUGH SOUNDINGS	
M-P4-61/52	BEEF SLOUGH SOUNDINGS	

SIGNATURES AFFIXED BELOW INDICATE OFFICIAL RECOMMENDATION AND APPROVAL OF ALL DRAWINGS IN THIS SET, AS INDEXED ON THIS SHEET.
* (AS REQUIRED BY ENGINEER CIRCULAR NO. 1110-1-76)

APPROVAL RECOMMENDED BY:

- Allen F. Klein, P.E. for — CHIEF PE-D BRANCH
- Helmut E. Johnson, PE — CHIEF PE-H BRANCH
- Robert L. Post, P.E. — CHIEF ENGINEERING AND PLANNING DIVISION

APPROVED BY: — DISTRICT COMMANDER

TECHNICAL MANAGER
Allen F. Klein — CHIEF COST ENGINEERING & SPECIFICATIONS SECTION
James D. Moore — CHIEF GENERAL ENGINEERING SECTION
N/A — CHIEF STRUCTURAL ENGINEERING SECTION
N/A — CHIEF MECH/ELEC/ARCH SECTION
Samuel W. Maung — CHIEF GEOTECHNICAL AND GEOLOGY SECTION
Patrick Fahey — CHIEF HYDRAULICS SECTION
N/A — CHIEF HYDROLOGY SECTION

SYMBOL	DESCRIPTION	DATE	APPROVAL
	AS - BUILT AS OF COMPLETION DATE	11/95	

DEPARTMENT OF THE ARMY
ST. PAUL DISTRICT, CORPS OF ENGINEERS
ST. PAUL, MINNESOTA

AE APPROVING OFFICIAL:

AS - BUILT
PETERSON LAKE
ENVIRONMENTAL MANAGEMENT PROGRAM - MISSISSIPPI RIVER
POOL 4 WABASHA COUNTY, MINNESOTA
SIDE CHANNEL CLOSURES/BANK PROTECTION
LOCATION, VICINITY MAP AND DRAWING INDEX

PE-D: DESIGNED: W.P.R. / CHECKED: / DRAWN: JIVL/FJB
PE-H: DESIGNED: M.W.R. / CHECKED: JSH

CAD FILE NAME: MF04C109.DGN | DRAWING NUMBER: M-P4-10/9 | SHT 1 OF 14
DATE: APRIL 1995 | SPEC NO: DACW37-95-B-0015

APPENDIX B

MEMORANDUM OF AGREEMENT

FWS# 14-48-0003-94-1091

MEMORANDUM OF AGREEMENT
BETWEEN
THE UNITED STATES FISH AND WILDLIFE SERVICE
AND
THE DEPARTMENT OF THE ARMY
FOR
ENHANCING FISH AND WILDLIFE RESOURCES
OF THE
UPPER MISSISSIPPI RIVER SYSTEM
AT
PETERSON LAKE
WABASHA COUNTY, MINNESOTA

I. PURPOSE

The purpose of this memorandum of agreement (MOA) is to establish the relationships, arrangements, and general procedures under which the U.S. Fish and Wildlife Service (USFWS) and the Department of the Army (DOA) will operate in constructing, operating, maintaining, repairing, and rehabilitating the Peterson Lake separable element of the Upper Mississippi River System - Environmental Management Program (UMRS-EMP).

II. BACKGROUND

Section 1103 of the Water Resources Development Act of 1986, Public Law 99-662, authorizes construction of measures for the purpose of enhancing fish and wildlife resources in the Upper Mississippi River System. The project area is managed by the USFWS and is on land managed as a national wildlife refuge. Under conditions of Section 906(e) of the Water Resources Development Act of 1986, Public Law 99-662, 100% of the construction costs of those fish and wildlife features for the Peterson Lake project are the responsibility of DOA, and pursuant to Section 107(b) of the Water Resources Development Act of 1992,

Public Law 102-580, 100% of the costs of operation and maintenance for the Peterson Lake project are the responsibility of USFWS.

III. GENERAL SCOPE

The project to be accomplished pursuant to this MOA shall consist of rehabilitating and improving the fish and wildlife habitat at Peterson Lake. This would involve the construction of bank stabilization on six islands, two rock side channel closures, four sand side channel closures, two rock weirs, and one rock partial side channel closure. Two fish access channels would be excavated within the lake. The project would stabilize existing islands at Peterson Lake and reduce flows into the upper portion of the lake for the benefit of fish and wildlife.

IV. RESPONSIBILITIES

A. DOA is responsible for:

1. Construction. Construction of the project consists of placement of approximately 3,500 feet of rock bank protection, construction of nine side channel structures of rock and/or sand, and excavation of two fish access channels.

2. Major Rehabilitation. The Federal share of any mutually agreed upon rehabilitation of the project that exceeds the annual operation and maintenance requirements identified in the definite project report and that is needed as a result of specific storm or flood events.

3. Construction Management. Subject to and using funds appropriated by the Congress of the United States, and in accordance with Section 906(e) of the Water Resources Development Act of 1986, Public Law 99-662, DOA will construct the Peterson Lake project as described in the Definite Project Report/ Environmental Assessment, Peterson Lake Habitat Rehabilitation

and Enhancement Project, dated March 1994, applying those procedures usually followed or applied in Federal projects, pursuant to Federal laws, regulations, and policies. The USFWS will be afforded the opportunity to review and comment on all modifications and change orders prior to the issuance to the contractor of a Notice to Proceed. If DOA encounters potential delays related to construction of the project, DOA will promptly notify USFWS of such delays.

4. Maintenance of Records. The DOA will keep books, records, documents, and other evidence pertaining to costs and expenses incurred in connection with construction of the project to the extent and in such detail as will properly reflect total costs. The DOA shall maintain such books, records, documents, and other evidence for a minimum of three years after completion of construction of the project and resolution of all relevant claims arising therefrom, and shall make available at its offices, at reasonable times, such books, records, documents, and other evidence for inspection and audit by authorized representatives of the USFWS.

B. USFWS is responsible for operation, maintenance, and repair: Upon completion of construction, as determined by the District Engineer, St. Paul, the USFWS shall accept the project and shall operate, maintain, and repair the project as defined in the Definite Project Report/Environmental Assessment entitled "Peterson Lake Habitat Rehabilitation and Enhancement Project," dated March 1994, in accordance with Section 107(b) of the Water Resources Development Act of 1992, Public Law 102-580.

V. MODIFICATION AND TERMINATION

This MOA may be modified or terminated at any time by mutual agreement of the parties. Any such modification or termination must be in writing. Unless otherwise modified or terminated, this MOA shall remain in effect for a period of no more than 50 years after initiation of construction of the project.

VI. REPRESENTATIVES

The following individuals or their designated representatives shall have authority to act under this MOA for their respective parties.

USFWS: Assistant Regional Director
U.S. Fish and Wildlife Service
Bishop Henry Whipple Federal Building
1 Federal Drive
Fort Snelling, Minnesota 55111-4056

DOA: District Engineer
U.S. Army Corps of Engineers, St. Paul District
Army Corps of Engineers Centre
190 Fifth Street East
St. Paul, Minnesota 55101-1638

VII. EFFECTIVE DATE OF MOA

This MOA shall become effective when signed by the appropriate representatives of both parties.

THE DEPARTMENT OF THE ARMY

BY: _____
(signature)

JAMES T. SCOTT
Colonel, Corps of Engineers
St. Paul District

DATE: 3 Oct 94

THE U.S. FISH AND WILDLIFE SERVICE

BY: Susan Haseltine
(signature)

Susan D. Haseltine
Assistant Regional Director
Refuges and Wildlife
U.S. Fish and Wildlife Service

DATE: SEP 14 1994

APPENDIX C

CHECKLIST FORM COVERING INSPECTIONS

SUBJECT: Annual Inspection Report, Peterson Lake Habitat Rehabilitation and Enhancement Project
Pool 4, Upper Mississippi River, for the period _____ to _____.

TO: St. Paul District, Corps of Engineers
ATTN: CO-TS
190 Fifth Street East
St. Paul, Minnesota 55101-1638

Indicate deficiencies by noting location and condition. Indicate repairs made under the remarks section.

Item	Date of Inspection	Identified Deficiencies		Remarks
		Location (use stationing)	Condition (describe deficiency)	
Closures #1-4				
Closures #5-7				
Island VII Bank Prot.				
Weirs #8-9				
Islands #V-VI Rock Mound				
Island #I-IV Rock Mounds				

APPENDIX D

CONSTRUCTION SPECIFICATION SECTIONS FOR REPAIR MATERIAL

SECTION 02250 - ROCKFILL BANK PROTECTION CONSTRUCTION

1. GENERAL

1.1 SCOPE. This section covers rockfill used for closures and bank protection.

1.2 RELATED WORK OF OTHER SECTIONS. The following items of related work are covered under other sections:

1.2.1 Disposal of driftwood, snags, wood debris and brush: SECTION: GENERAL.

1.3 APPLICABLE PUBLICATIONS. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

U. S. Army Corps of Engineers, Engineer Manual (EM).

EM 1110-2-1906 Laboratory Soils Testing (Nov 70) change 1 (May 80) and change 2 (Aug 86).

1.4 SUBMITTALS. The following shall be submitted in accordance with SECTION: SUBMITTAL PROCEDURES.

1.4.1 Gradation and testing procedures as specified in PARAGRAPH: TESTS FOR GRADATION AND SHAPE.

1.4.2 Material sources as specified in PARAGRAPH: SOURCES AND EVALUATION.

1.4.3 Test results as specified in PARAGRAPH: TESTS FOR GRADATION AND SHAPE.

1.4.4 Schedule of rockfill placement operations, including the sequence of closure construction and bank protection.

1.4.5 The Contractor shall submit for approval a plan which describes the Contractor's proposed method(s) and equipment to be used for survey control, source(s), processing, handling, transporting, and placing of the rockfill.

1.4.6 Survey results as specified in PARAGRAPH: SURVEYS.

1.5 MEASUREMENT AND PAYMENT

1.5.1 Measurement. Rockfill shall be weighed on accurate, approved scales furnished or made available by the Contractor. Before being approved for use, the scales shall have been tested by the Department of Weights and Measures or by a reliable scale servicing company so as to operate within a degree of error not greater than one percent and be sensitive to a change in load of 1/5 of one percent, both percentages being based on the total required weight of material normally weighed as a unit on the scale. Scales shall be spot checked for accuracy and sensitivity at least once each week as the work progresses. When materials are weighed in hauling vehicles, gross weights shall be checked and the vehicle tare weight determined as often as the Contracting Officer directs. The Contractor shall furnish such weights, accessories, and assistance as the

Contracting Officer may require for making weighing equipment tests.

1.5.1.1 Weighing operations shall be performed offsite, as approved, in the presence of a representative of the Contracting Officer. The Contracting Officer reserves the right to waive his/her presence during weighing operations. Each load shall be accompanied by duplicate copies of delivery tickets certified by the weighmaster. As a minimum, each ticket shall contain the following information.

(1) Date and time.
(2) Vehicle number.
(3) Gross weight.
(4) Vehicle tare weight.
(5) Net weight.
(6) Material weighed.
(7) Signature of weighmaster.

Delivery tickets shall be collected by the Contractor and one copy thereof furnished to the Contracting Officer at the close of each day's operations.

1.5.1.2 A plan indicating the location and proposed schedule of weighing operations shall be submitted for approval at least 15 days prior to delivery of stone to the site.

1.5.2 Payment shall be by the ton (2000 pounds avoirdupois) of material acceptably placed within the tolerances specified, and shall constitute full payment for supplying the material and for all work associated with placement as specified and as shown in the areas indicated on the drawings.

1.5.2.1 Deductions. All stone permitted by the Contracting Officer to remain outside the tolerances specified and limits shown will be deducted from the quantity to be paid for. Volume of excess stone will be computed using the average-end-area of excess above the tolerance line specified and limits shown. The excess volume will be deducted from the payment quantity at a rate of 1.35 tons per cubic yard at the unit price per ton.

1.6 BIDDING SCHEDULE ITEMS applicable to the work of this section are as follows:

Item	Unit
Rockfill	TN

2. PRODUCTS

2.1 MATERIALS.

2.1.1 Rockfill shall be a durable quarried stone of suitable quality to ensure permanence in the Upper Mississippi River environment. Stone shall be free from cracks, seams and other defects that would unduly increase its deterioration from natural causes.

2.1.1.1 Specific gravity. Stone shall have a specific gravity of not less than 2.55 and not more than 2.75.

2.1.1.2 Shape. Neither the breadth not thickness of any individual stone shall be less than one-third its length.

2.1.1.3 Gradation. Rockfill shall be reasonably well graded within the limits shown on the riprap gradation curve attached at the end of this section. The stone shall be reasonably well graded within these specified limits to permit construction of relatively dense and impervious rockfill blankets. Inclusion of objectionable quantities of dirt, sand, clay, rock fines or other deleterious materials will not be allowed.

2.1.1.4 Processing. The Contractor shall submit for approval a method of processing rockfill at the quarry that will preclude the inclusion of objectionable amounts of fine material or organic matter. All rockfill shall be processed in accordance with the method approved.

2.2 SOURCES AND EVALUATION. Stone materials shall be produced from the sources listed in CONTRACT CLAUSE: MATERIAL SOURCES. If the Contractor proposes to furnish materials from a source not listed, the Government geologist will make such investigations and evaluations as necessary to determine whether or not materials meeting the requirements of this project can be produced from the proposed source. The Contractor shall be responsible for making his own investigations for sources of suitable materials and for making his own arrangements with the owners of the quarries or land for procuring the required quantities of suitable materials. Sources from which the Contractor proposes to obtain the materials shall be selected and submitted for approval at least 60 days in advance of the time when the material will be required in the work.

2.3 TESTS FOR ACCEPTABILITY.

2.3.1 Quality tests and service records will be used to determine the acceptability of stone materials. In the event suitable test reports and satisfactory service records are not available, as in the case of newly operated sources, the materials will be tested to determine acceptability. Tests to which the materials may be subjected include petrographic analysis, specific gravity, soundness, abrasion, absorption, freezing and thawing, and other tests considered necessary to demonstrate acceptability. Tests will be made by, or under the supervision of, the Government and at the Government's expense.

2.3.2 Samples. If directed, suitable samples of materials shall be submitted for approval prior to delivery of materials to the work site. Unless otherwise directed, samples shall be obtained by the Contractor, in the presence of the Contracting Officer, and delivered at the Contractor's expense to a point designated by the Contracting Officer, at least 30 days in advance of the date that the stone protection is expected to begin. The materials must be approved by the Contracting Officer before commencing placement.

2.4 TESTS FOR GRADATION AND SHAPE.

2.4.1 Rockfill. Tests shall be performed by and at the expense of the

Contractor. Testing shall be under the direction of the Contracting Officer, unless waived. Gradation test results shall be submitted on ENG Form 4055 and on the Gradation Analysis Worksheet provided at the end of this section. One sample for each type of material shall be taken from stockpiled materials and the remaining samples shall be taken from loads prior to dumping or from in-place material, when and where directed. Prior to placing materials, the Contractor shall submit for approval proposed testing and procedures. The Contractor shall state, in writing, methods of processing and handling samples and shall notify the Contracting Officer immediately when production methods are changed. A minimum of 5 weight classes shall be used in the gradation testing. The Contractor shall select weight classes to yield approximately 75, 50 and 30 percent finer by weight gradation points. The Contractor shall weigh that portion smaller than 4 inches in each sample of rockfill and indicate that weight in the total weight of the gradation test sample. Determination of the gradation of rockfill material smaller than 4 inches is not required.

2.4.2 Testing results shall be submitted to the Contracting Officer immediately after testing completion. The minimum sample size for tests shall be as follows:

Material	Minimum Sample Size
Rockfill	6 tons.

2.4.3 Frequency. The minimum gradation tests shall be performed as follows. The Contractor shall take as many additional tests under the Contractor's quality control program as is needed to ensure that the gradation is being met. Tests performed on materials that do not meet requirements will not be counted as part of the minimum required.

Material	Minimum Number of Tests
Rockfill	1 test prior to placement, and 1 test per 2,000 tons or fraction thereof.

2.4.4 Corrective Action. If materials fail to meet gradation or shape requirements, the Contractor shall adjust his operations and verify with necessary tests that acceptable materials are being produced, or he shall propose another source and verify, with necessary tests, that acceptable material can be produced from that source. Payment will not be made for material which fails to meet requirements. Material already in place that fails to meet requirements will be removed by the Contractor at no additional cost to the Government.

3. EXECUTION

3.1 GENERAL.

3.1.1 Tolerances. Where tolerances are shown or specified, plus shall be above lines and grades, and minus shall be below lines and grades.

3.2 SURVEYS. Areas where rockfill is to be placed, as indicated on the

drawings, shall be surveyed by the Contractor prior to commencing rockfill placement and after rockfill placment is completed to determine the placement tolerances of rockfill. Quantity survey cross sections shall be performed at intervals of 50 feet and at locations of all significant breaks in configurations of original and final surfaces. Surveys for progress payments shall be done by the Contractor as specified in CONTRACT CLAUSE: QUANTITY SURVEYS. The Contractor shall also plot each cross section from the survey notes at a scale of 1" = 10' and provide a copy of the survey notes and cross sections to the Contracting Officer within 10 days after completion of the survey.

3.3 LAYOUT.

3.3.1 The Contractor shall layout its work from the Government established bench marks in accordance with CONTRACT CLAUSE: LAYOUT OF WORK. The alignment for the construction of the bank protection areas shall follow the alignments as indicated on the drawings as much as is practicable to fit into the existing terrain while limiting to a minimum any encroachment into the navigation channel or environmentally sensitive backwater areas. The Contractor shall have in place, at least 7 calendar days prior to commencing construction operations, sufficient stakes to enable the Contracting Officer to verify the proposed bank protection alignments, mark trees left to be standing, and define areal limits. These stakes shall define bank protection alignments, access channel excavation/dredging limits, spoil placement limits, staging area limits, rights-of-way or other areal limits as directed, such that the Contracting Officer can easily determine, without additional surveys, if alignment and/or limit adjustments need to be made. The Contracting Officer may waive these requirements for certain areas. No work shall take place without prior approval of all the alignments and limits by the Contracting Officer.

3.4 LINES, GRADES, SECTIONS, AND ALIGNMENT.

3.4.1 Lines, grades and sections. The bank protection areas shall be constructed to the lines, grades, elevations, and cross sections indicated. The Government reserves the right to increase or decrease the widths, slopes, or otherwise modify the section shown, as necessary to produce a safe structure and to modify the internal zoning as necessary. Any bank protection construction not within the tolerances specified and/or shown shall be re-established at no additional cost to the Government.

3.4.2 Alignment. The Government reserves the right to make changes in the alignment of the bank protection areas as may be found necessary before completion of the work. If it becomes necessary, through no fault of the Contractor, to abandon any line or location on which work has been done, payment for materials placed will be made as specified in PARAGRAPH: MEASUREMENT. No alignment changes or abandonment of work shall take place without prior written notice from the Contracting Officer.

3.5 FOUNDATION PREPARATION. Foundation areas shall be cleared of woody vegetation materials that could prevent proper placement of rockfill. Removal of driftwood, snags, wood debris and brush within the limits of bank protection construction shall be considered part of the bank protection construction process and shall be disposed of in accordance with SECTION: GENERAL. Plant root

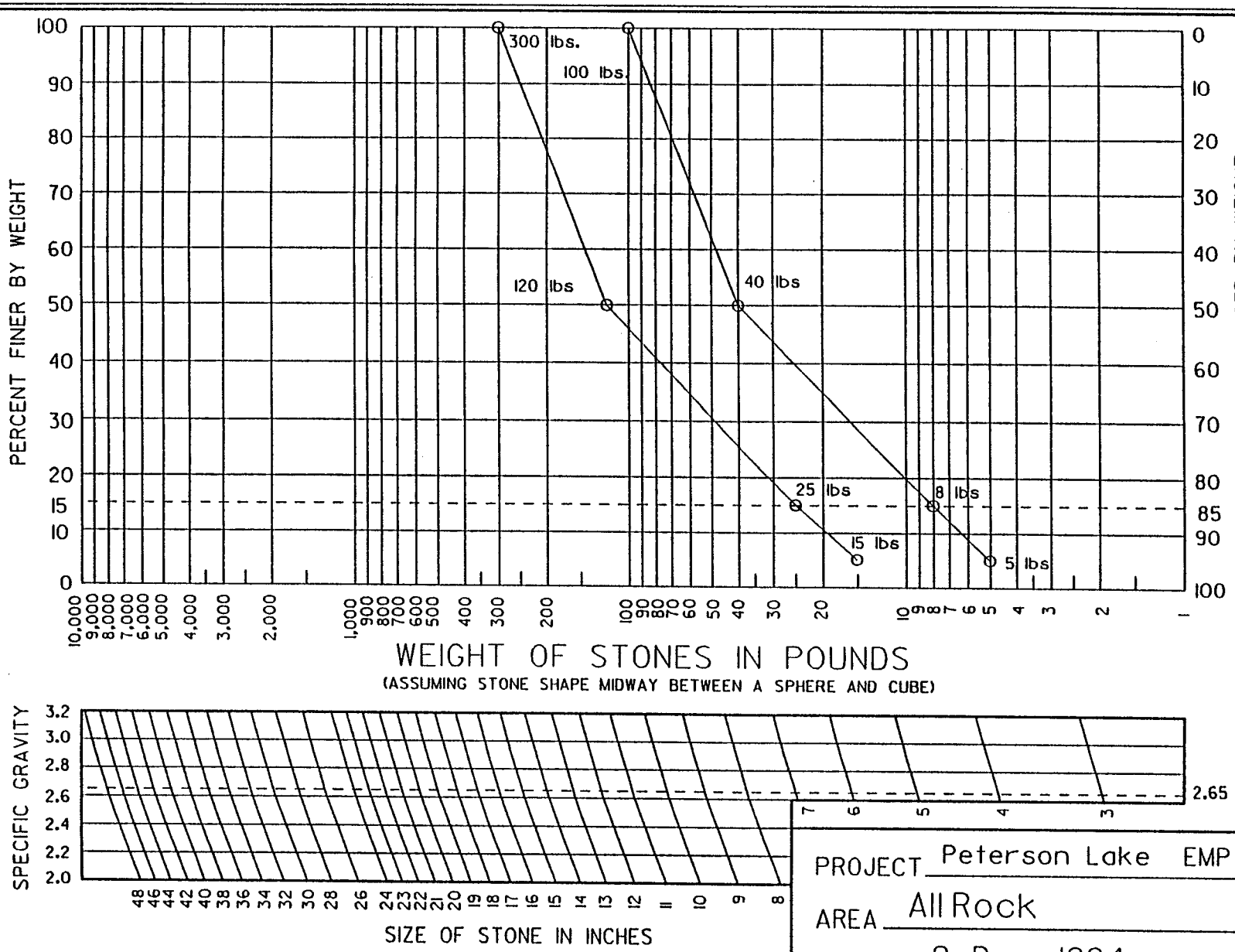
systems may be left in place and intact. Plant trunks and stems that construction work can be built around and remain standing vertically through the completed fill may be left in place in order to assist in the natural revegetation of the completed fill. Immediately prior to placing rockfill, the foundation area will be inspected by the Contracting Officer and no material shall be placed thereon until that area has been approved.

3.6 PLACEMENT AND TOLERANCES.

3.6.1 Rockfill shall be constructed to the lines and grades shown or established within a tolerance of 6 inches above and 3 inches below the prescribed grade, except either extreme shall not be continuous over an area greater than 200 square feet. Rockfill shall be placed to the full surface course thickness in one operation and in such a manner as to avoid displacing the underlying material. Placing rockfill in layers shall not be permitted. All rockfill shall be placed in such a manner as to produce a mass of unsegregated stone with maximum interlocking and stone to stone contact and a minimum of voids. The finished mass shall be free from pockets of small stones, clusters or larger stones and excessive voids. Placing rockfill by dumping into chutes or by similar methods likely to cause segregation shall not be permitted. The Contractor shall maintain the rockfill protection until accepted, and displaced material must be replaced by the Contractor at no additional cost to the Government.

3.6.2 Rockfill to be placed under water shall meet gradation requirements in the bucket or container used for placing, and shall be placed in a systematic manner so as to ensure a continuous uniform layer of well-graded stone of the required thickness. Stone to be placed under water shall not be cast across the surface of the water.

* * * * *



SPECIFIC GRAVITY OF STONE= 2.65

PROJECT Peterson Lake EMP

AREA All Rock

DATE 2 Dec. 1994

RIPRAP GRADATION CURVES

02250-7

95-B-0015