



US Army Corps
of Engineers
St. Paul District

OPERATION AND MAINTENANCE MANUAL

ENVIRONMENTAL MANAGEMENT PROGRAM (HREP)

EAST CHANNEL

**WINONA COUNTY, MINNESOTA
AND LA CROSSE COUNTY, WISCONSIN**

OCTOBER 1997

PREFACE

The East Channel Habitat Rehabilitation and Enhancement Project, constructed by the Corps of Engineers, was completed in June, 1997. 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 the U.S. Fish and Wildlife Service in fulfilling this responsibility.

The manual and appendices contain the latest information pertinent to operation and maintenance of this project. The project as designed and constructed will restore and maintain protected off-channel fish habitat and protect two islands from erosion, all located in upper pool 8 of the Upper Mississippi River. 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 MANAGEMENT PROGRAM

EAST CHANNEL
POOL 8, UPPER MISSISSIPPI RIVER
WINONA COUNTY, MINNESOTA, AND LA CROSSE COUNTY, WISCONSIN

OPERATION AND MAINTENANCE MANUAL

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- C CHECKLIST FORM COVERING INSPECTIONS
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INTRODUCTION

This manual has been prepared to serve as a guide for the operation and maintenance of the East Channel Habitat Rehabilitation and Enhancement Project in Winona County, Minnesota, and La Crosse County, Wisconsin. Operation and maintenance instructions for the project are presented. These instructions are consistent with the general procedures found in the East Channel Definite Project Report dated September 1995. 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 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 East Channel 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 East Channel project area is located in pool 8 of the Upper Mississippi River, approximately 1.5 miles below Lock and Dam 7 near La Crosse, Wisconsin. The project lies within the Upper Mississippi River National Wildlife and Fish Refuge and consists of three separate features, I-90 Bay, Lower Island 98, and Minnesota Island. Project drawings (appendix A) show the location of these features.

Because the East Channel 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

The East Channel Habitat Rehabilitation and Enhancement Project was designed to maintain the I-90 Bay as a protected off-channel habitat for a variety of fish species, but most specifically walleye and sauger. In addition, the project was designed to stabilize the heads of Lower Island 98 and Minnesota Island to preserve the wildlife habitat provided by these islands. The Definite Project Report/Environmental Assessment (SP-19), East Channel Habitat Rehabilitation and Enhancement Project, September 1995, provides details on the overall project.

Design Considerations

I-90 Bay

The peninsula forming the I-90 Bay was eroding since its formation in the 1960's as part of the construction of the Interstate 90 crossing of the Mississippi River. Portions of the eroded peninsula were restored using a rock dike as this design was more cost effective than restoring the peninsula using earthen materials protected by riprap.

A rock berm design was used for the bank protection on the remaining peninsula because shaping for a standard riprap layer would have been impractical and would have required substantial disturbance of the limited habitat still remaining.

The upstream end section and the two tie-back dikes are designed to control erosion of the shoreline behind the rock berm.

Lower Island 98

A rock berm design was used to avoid the bank shaping that would be required with a riprap layer. A remnant wing dam located at the main channel end of the rock berm was elevated to deflect currents away from the head of the island.

The rock berm was terminated on its east end where substantial increases in water depths would have made it prohibitively expensive to continue the bank protection.

Minnesota Island

A rock berm design was used to avoid the bank shaping that would be required with a riprap layer. The rock berm was terminated on its east end where substantial increases in water depths would have made it prohibitively expensive to continue the bank protection. A remnant closing dam at the east end of the rock berm was elevated to deflect currents away from the head of the island that could not be protected by the rock berm.

CONSTRUCTION HISTORY

A contract was awarded to J.F. Brennan Co., Inc. of La Crosse, Wisconsin, in September 1996. Construction began in October 1996, and all rock work was completed in November 1996. The willow plantings at the I-90 Bay site took place in June 1997.

PART II - OPERATION AND MAINTENANCE

GENERAL RESPONSIBILITIES AND PROCEDURES

Approved Responsibilities

Operation and maintenance responsibilities for the East Channel 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 January 23, 1996, 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 Definite Project Report were \$5,100.

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 East Channel project, the current address for the district manager is District Manager, U.S. Fish and Wildlife Service, 555 Lester Avenue, Onalaska, Wisconsin 54650. 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.

Inspections

The District Engineer or his representative will be kept informed on operation and maintenance activities for the East Channel habitat project through a periodic inspection of the project by the Corps and through analysis of an annual inspection checklist submitted by the USFWS. A representative of the Corps will coordinate the periodic inspection in advance with the USFWS. The first inspection will occur within 3 years after project completion. Subsequent inspections will occur at 3 to 5 year intervals. After the first 10 years of project operation, the Corps and the USFWS will jointly review the inspection plans and make any appropriate revisions.

The findings of the periodic 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.

An inspection of the project should be made by the District Manager at a minimum frequency of once a year. The frequency of 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. No special inspections are required after high water events.

Annual Report

An annual report covering inspection of the habitat project shall be submitted to the District Engineer by April 30 of the ensuing year. The USFWS may send the East Channel report in conjunction with reports on other habitat projects for which it has responsibility. If so desired, the report 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 for use in reporting can be found in appendix C. Besides completion of the inspection checklist, the report should briefly summarize the condition of the project, including any maintenance work done during the past 1-year period.

OPERATION

There are no operational requirements associated with the East Channel project features.

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.

Trees and other woody vegetation should not be allowed to grow in the rock features. Dislodgement of woody vegetation by ice action or other natural forces may result in rock dislodgement or displacement.

Displaced or missing rock should be replaced as soon as possible to prevent further damage to the structures. 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

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 East Channel project that exceeds the annual maintenance requirements and that may be needed as a result of a specific storm or flood.

Because of its location, the potential exists for the I-90 Bay dike to be substantially damaged by commercial barge tows. Should this dike receive substantial damage from a commercial tow, the repair and rehabilitation of this structure will be treated in the same manner as if the damage was caused by a storm or flood.

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 and Wisconsin Departments of Natural Resources will be consulted prior to coming to any final determination on a course of action.

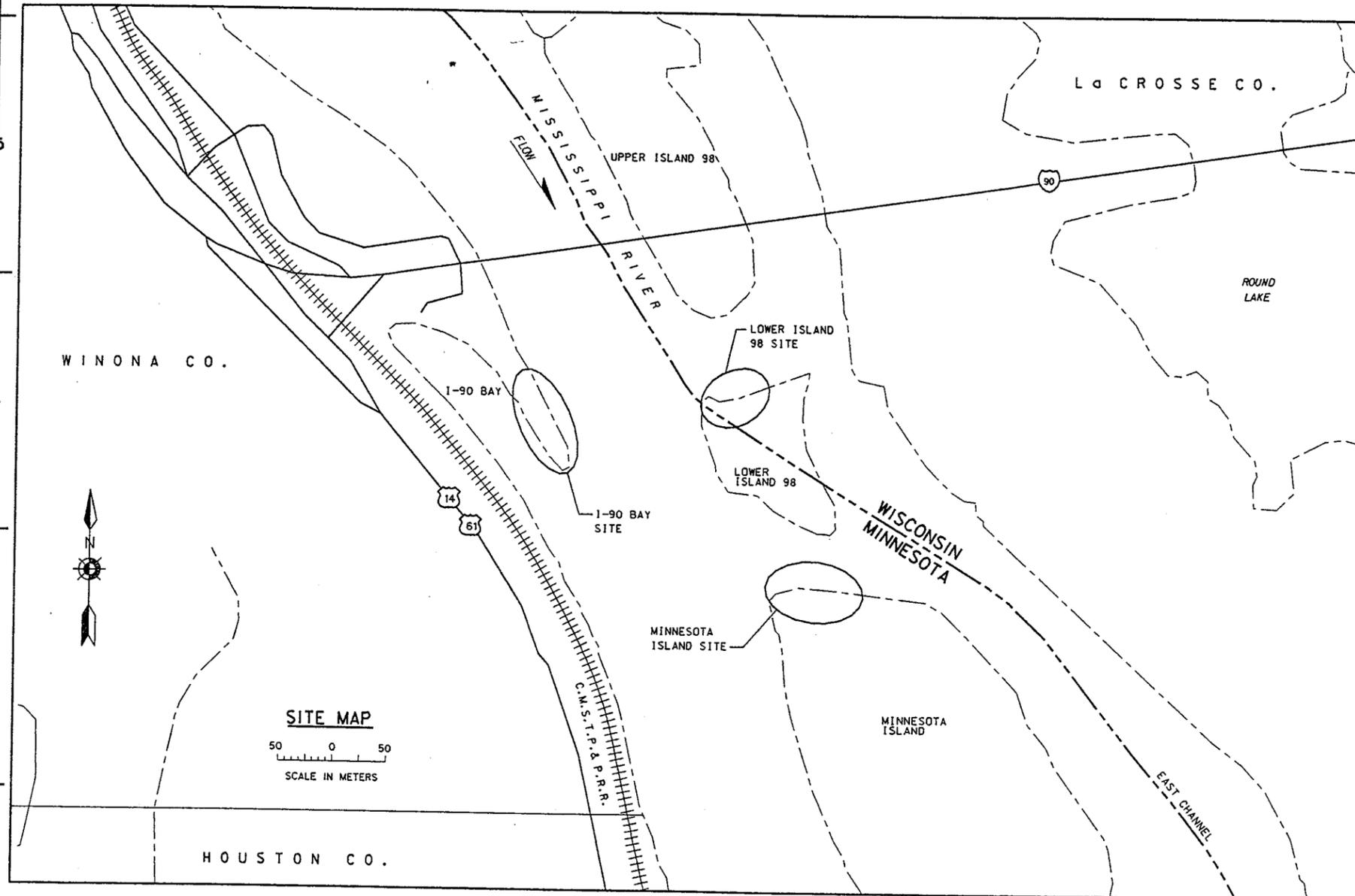
PROJECT MONITORING AND EVALUATION

Performance monitoring of the East Channel 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.

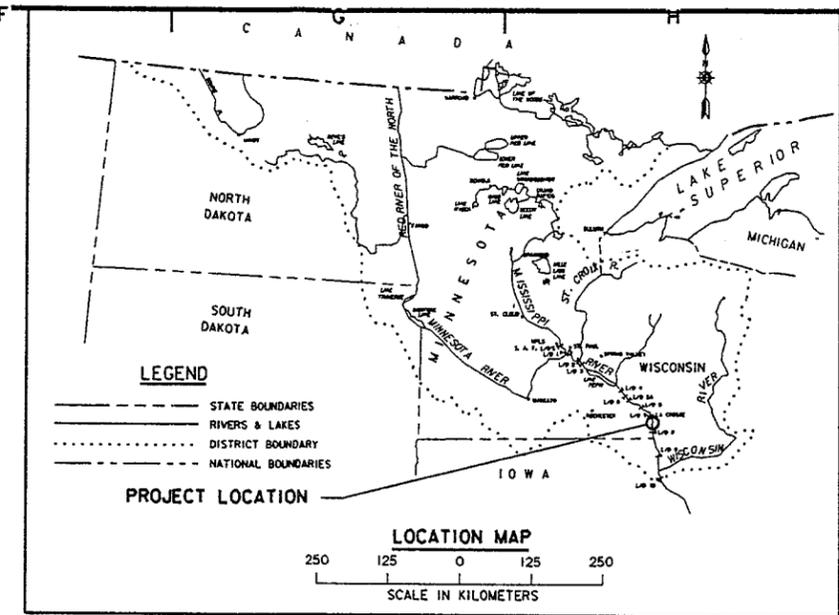
APPENDIX A

PROJECT DRAWINGS

CONTRACT DRAWING EAST CHANNEL HREP



SITE MAP
SCALE IN METERS



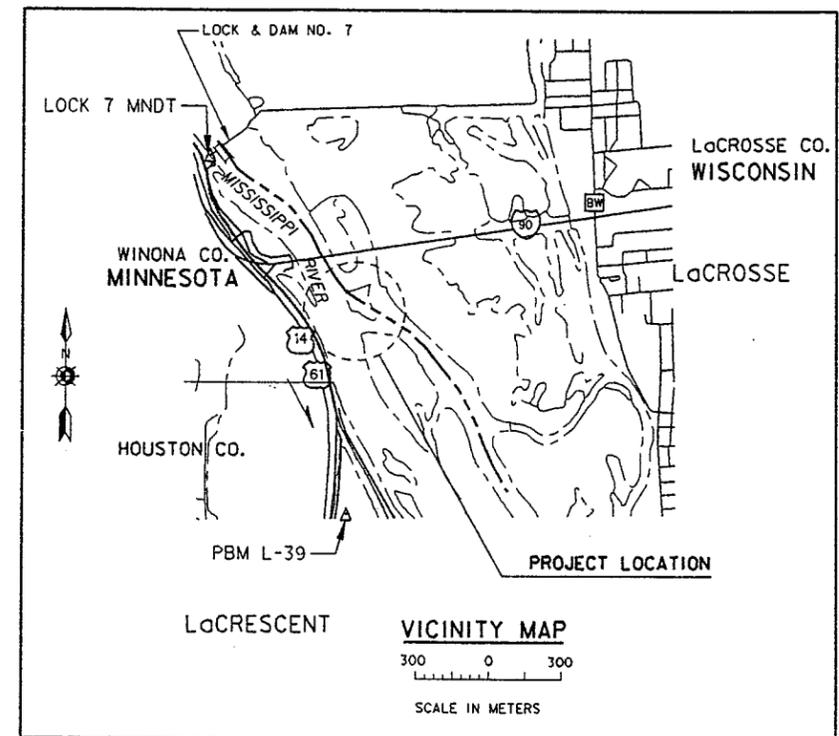
LEGEND

- STATE BOUNDARIES
- RIVERS & LAKES
- - - DISTRICT BOUNDARY
- NATIONAL BOUNDARIES

PROJECT LOCATION

LOCATION MAP

250 125 0 125 250
SCALE IN KILOMETERS



PROJECT LOCATION

VICINITY MAP

300 0 300
SCALE IN METERS

DRAWING INDEX		
DRAWING NO.	SHT.	TITLE
M-L8-10/020	1	LOCATION, VICINITY MAP & DRAWING INDEX
M-L8-61/034	2	I-90 BAY PLAN STA. PO+00 TO STA. P1+25
M-L8-61/035	3	I-90 BAY PLAN STA. O+00 TO STA. I+27
M-L8-61/036	4	I-90 BAY PROFILE & SECTIONS
M-L8-61/037	5	LOWER ISLAND 98 PLAN
M-L8-61/038	6	MINNESOTA ISLAND PLAN
M-L8-61/039	7	LOWER ISLAND 98 & MINNESOTA ISLAND PROFILE & SECTIONS

REFERENCE DRAWINGS INDEX	
DRAWING NO.	TITLE
M-L8-14/017	DURATION CURVES JANUARY-JUNE
M-L8-14/018	DURATION CURVES JULY-DECEMBER
M-L8-14/019	HYDROGRAPHS 1988-1989
M-L8-14/020	HYDROGRAPHS 1990-1994

- LEGEND**
- — — APPROXIMATE WATER SURFACE
 - △ CONTROL POINT
 - FILL
 - ○ ○ ○ RIPRAP - PLAN VIEW
 - ○ ○ ○ RIPRAP - SECTION VIEW
 - x - x - TEMPORARY SNOW FENCE
 - 2 SECTION DESIGNATION
 - 61/036 DRAWING ON WHICH SECTION IS SHOWN OR TAKEN

NOTES:

- ESTABLISHED HORIZONTAL CONTROL STATION IS LOCK 7 MNDT
NAD 83 METRIC COORDINATES:
X: 1 016 090.562 98
Y: 199 865.063 05
- ESTABLISHED VERTICAL CONTROL STATION IS PBM L-39. THE ELEVATION IS 198.358 7 METERS. THE LOCATION IS AT RIVER JUNCTION, ABOUT 1 MILE ABOVE LA CRESCENT, MN. BRONZE PLATE EMBEDDED IN E END OF W TOWER OF DOUBLE SEMAPHORE TOWER 800 FEET N OF RIVER JUNCTION BLOCK HOUSE OF CHICAGO MILWAUKEE ST. PAUL & PACIFIC RR.

SIGNATURE NOTE: (ADDED DURING AS-BUILT STAGE)
THE NAMES BELOW INDICATE SIGNATURES OF THE OFFICIALS SIGNING THIS SET OF DOCUMENTS. THIS DRAWING HAS BEEN REVISED AND REPLOTTED AND NEW SIGNATURES WERE NOT OBTAINED.

APPROVAL RECOMMENDED BY:

ALLEN L. GEISEN, ACTING
CHIEF PE-D BRANCH

HELMER O. JOHNSON
CHIEF PE-H BRANCH

ROBERT F. POST
CHIEF ENGINEERING AND PLANNING DIVISION

APPROVED BY:
J.M. WONSIK, COL.
DISTRICT COMMANDER

TECHNICAL MANAGER

CHIEF COST ENGINEERING & SPECIFICATIONS SECTION

CHIEF GENERAL ENGINEERING SECTION

CHIEF STRUCTURAL ENGINEERING SECTION

CHIEF MECH/ELEC/ARCH SECTION

CHIEF GEOTECHNICAL AND GEOLOGY SECTION

CHIEF HYDRAULICS SECTION

CHIEF HYDROLOGY SECTION

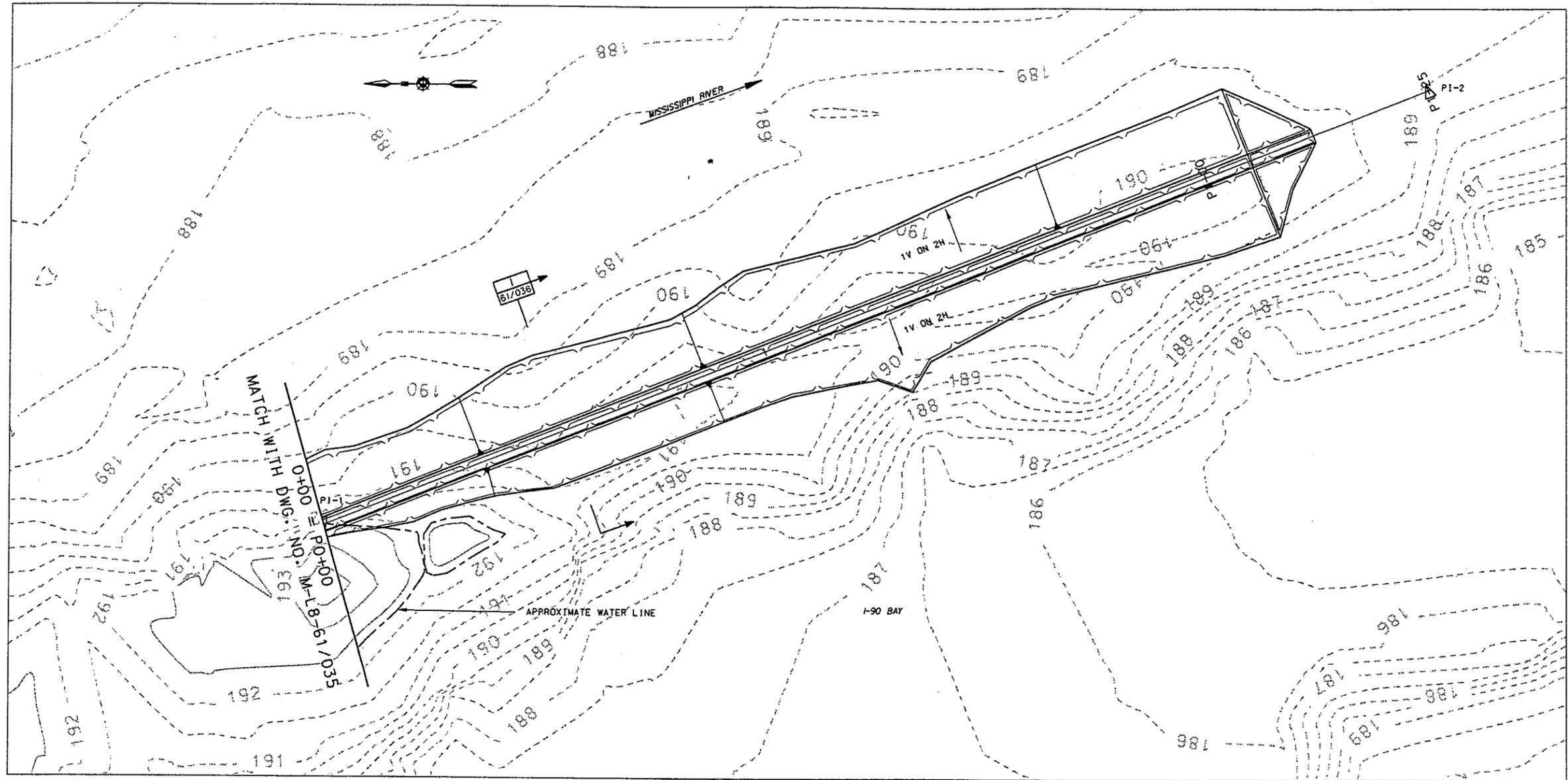
AS-BUILT AS OF COMPLETION DATE	8/97	DATE	APPR.
Symbol			

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CHECKED:	AS SHOWN:	MAY 1996
DRAWN:	CADD FILE NAME:	
DESIGNED:	SOL. NO.:	DACW37-96-B-0008
CHECKED:	AE APPROVING OFFICIAL:	

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

EAST CHANNEL HREP
LOC. VIC MAP & DWG INDEX

DRAWING NUMBER:
M-L8-10/020
SHT 1 OF 7

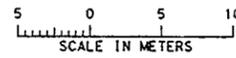


PENINSULA CONTROL LINE DATA

POINT	PROJECT COORDINATES		BEARING DIRECTION	DISTANCE
	NORTHING	EASTING		
PI-1	198 615.1317	1 017 027.0359	S 21°35'35.6592" E	125.000
PI-2	198 498.9040	1 017 073.0380		

PLAN

I-90 BAY



NOTES:

1. ORIGINAL DATA COMPILED NAD 27 US FOOT. MAPPING DATA COMPILED NAD 83 METRIC.
2. ORIGINAL DATA FROM 03 MARCH 1994 LAND SURVEYS & 03-04 MAY 1994 BATHYMETRIC SURVEYS.
3. ALL UNITS ARE IN METERS UNLESS OTHERWISE NOTED.
4. WORK LIMITS ARE 3 METERS LANDWARD OF THE ROCK FILL/SAND FILL.

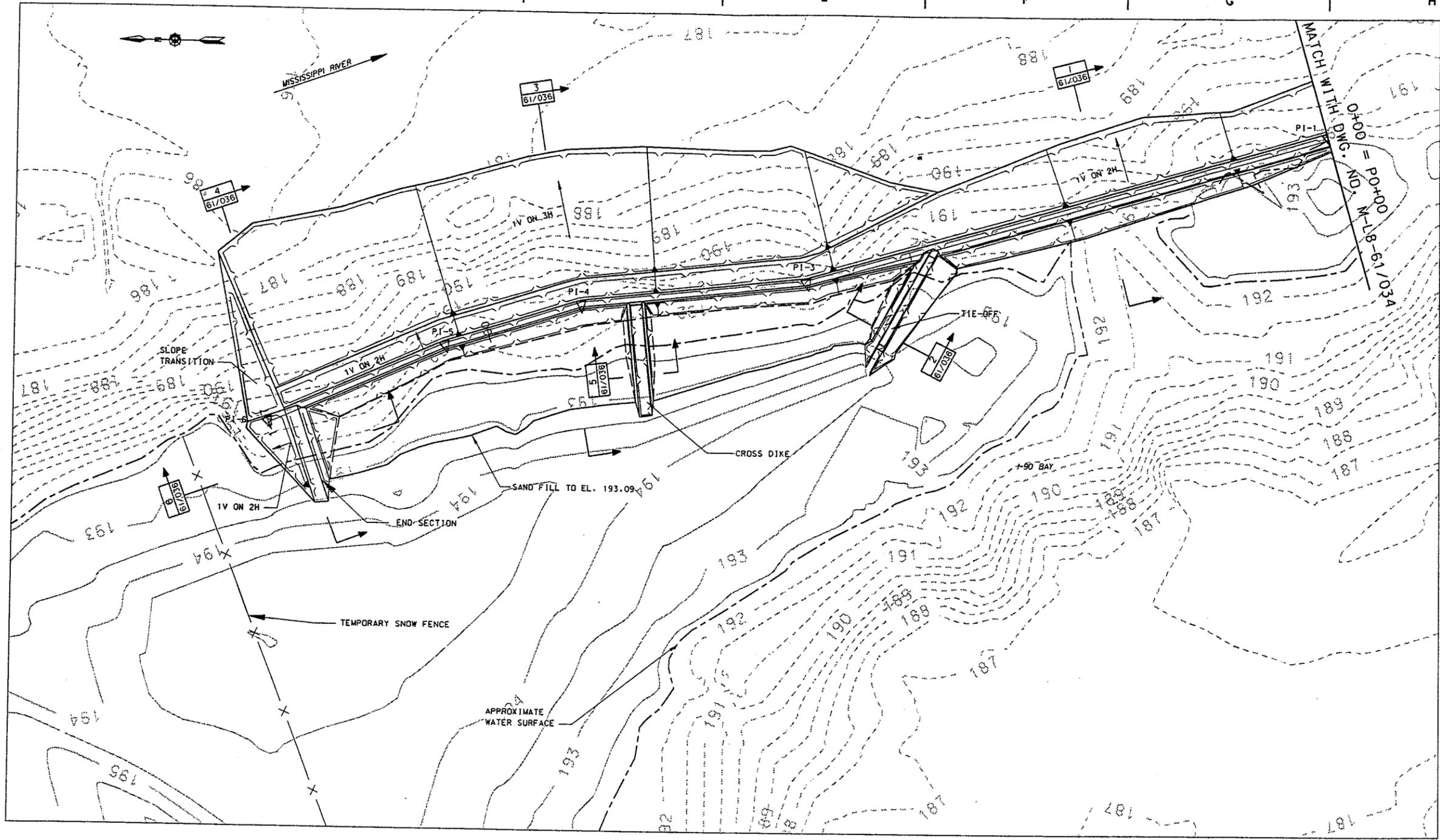
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		8/97	

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

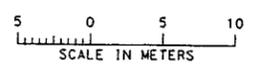
EAST CHANNEL HREP
BANK PROTECTION
I-90 BAY PLAN
STA. P0+00 TO STA. P1+25

DRAWING NUMBER:
M-L-8-
61/034
SHT 2 OF 7



PLAN

I-90 BAY



BERM CONTROL LINE DATA

POINT	PROJECT COORDINATES		BEARING DIRECTION	DISTANCE
	NORTHING	EASTING		
PI-1	198 615.1317	1 017 027.0359		
PI-3	198 675.0859	1 017 009.8795	N 15°58'07.7606" W	62.361
PI-4	198 701.1735	1 017 007.1004	N 6°04'51.3143" W	26.235
PI-5	198 716.9601	1 017 002.2208	N 17°10'34.1783" W	16.523
PI-6	198 737.127	1 016 993.351	N 23°44'28.4850" W	22.032

NOTES:

1. ORIGINAL DATA COMPILED NAD 27 US FOOT. MAPPING DATA COMPILED NAD 83 METRIC.
2. ORIGINAL DATA FROM 03 MARCH 1994 LAND SURVEYS & 03-04 MAY 1994 BATHYMETRIC SURVEYS.
3. ALL UNITS ARE IN METERS UNLESS OTHERWISE NOTED.
4. WORK LIMITS ARE 3 METERS LANDWARD OF THE ROCKFILL/SAND FILL.

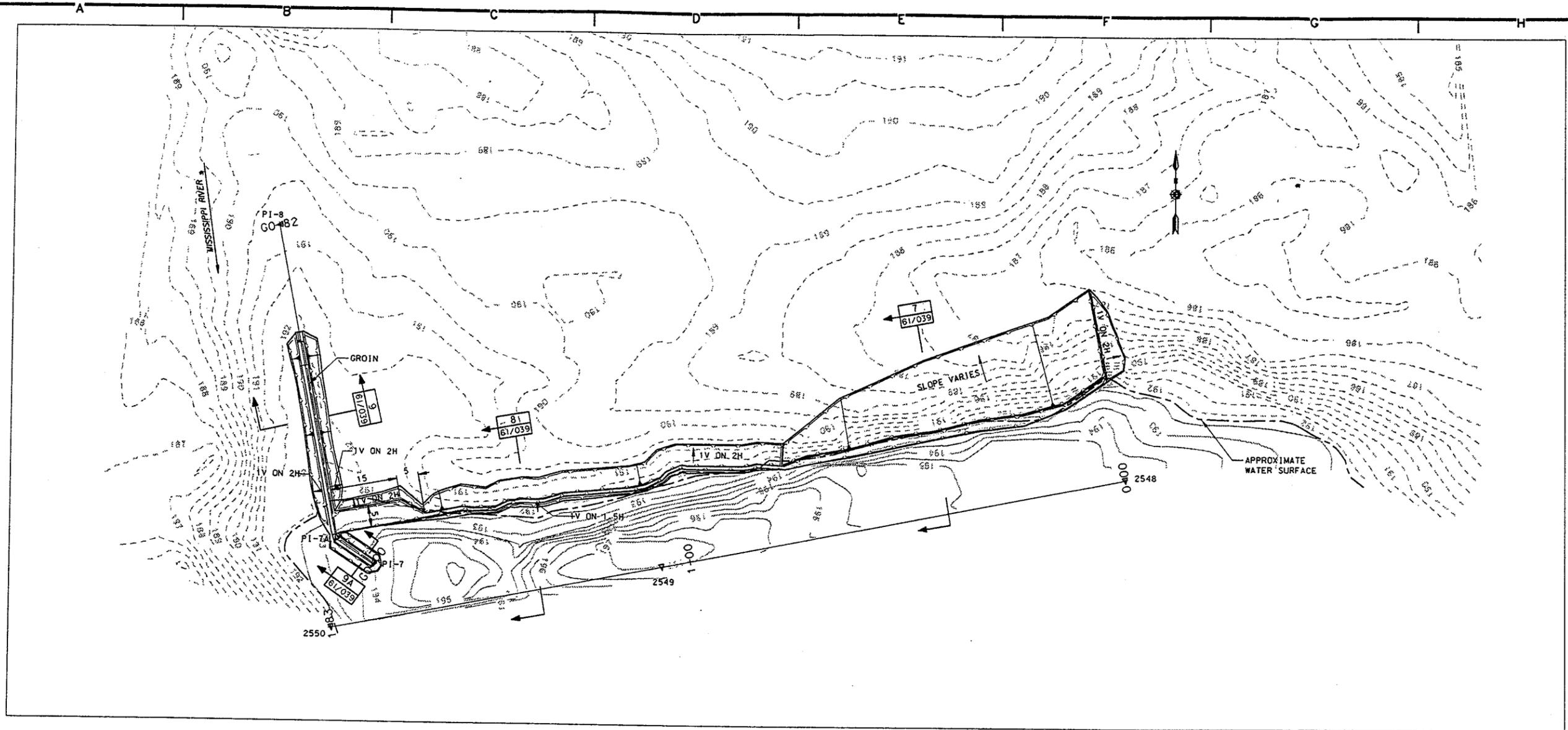
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		8/97	

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CAS	SOL. NO:	
DESIGNED:	DACW37-96-B-0008	
SMG	AE APPROVING OFFICIAL:	
CHECKED:		
PMF		

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

EAST CHANNEL HREP
BANK PROTECTION
I-90 BAY PLAN
STA. 0+00 TO STA. 1+27

DRAWING NUMBER:
M-L-8-
61/035
SHT 3 OF 7

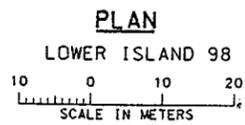


BASELINE CONTROL DATA

POINT	PROJECT COORDINATES		BEARING DIRECTION	DISTANCE
	NORTHING	EASTING		
2548	198 635.9681	1 017 531.2782	S 78°57'56.1188" W	106.681
2549	198 615.5495	1 017 426.5694	S 78°57'53.7096" W	76.199
2550	198 600.964	1 017 351.779		

GROIN CONTROL LINE DATA

POINT	PROJECT COORDINATES		BEARING DIRECTION	DISTANCE
	NORTHING	EASTING		
PI-7	198 615.3364	1 017 360.8750	N 56°19'27.8158" W	10.000
PI-7A	198 620.8813	1 017 352.5531	N 11°02'04.3281" W	71.636
PI-8	198 691.193	1 017 338.842		



NOTES:

1. ORIGINAL DATA COMPILED NAD 27 US FOOT. MAPPING DATA COMPILED NAD 83 METRIC.
2. ORIGINAL DATA FROM 03 MARCH 1994 LAND SURVEYS & 03-04 MAY 1994 BATHYMETRIC SURVEYS.
3. ALL UNITS ARE IN METERS UNLESS OTHERWISE NOTED.
4. WORK LIMITS ARE THE TOP OF BANK ON THE ISLAND.

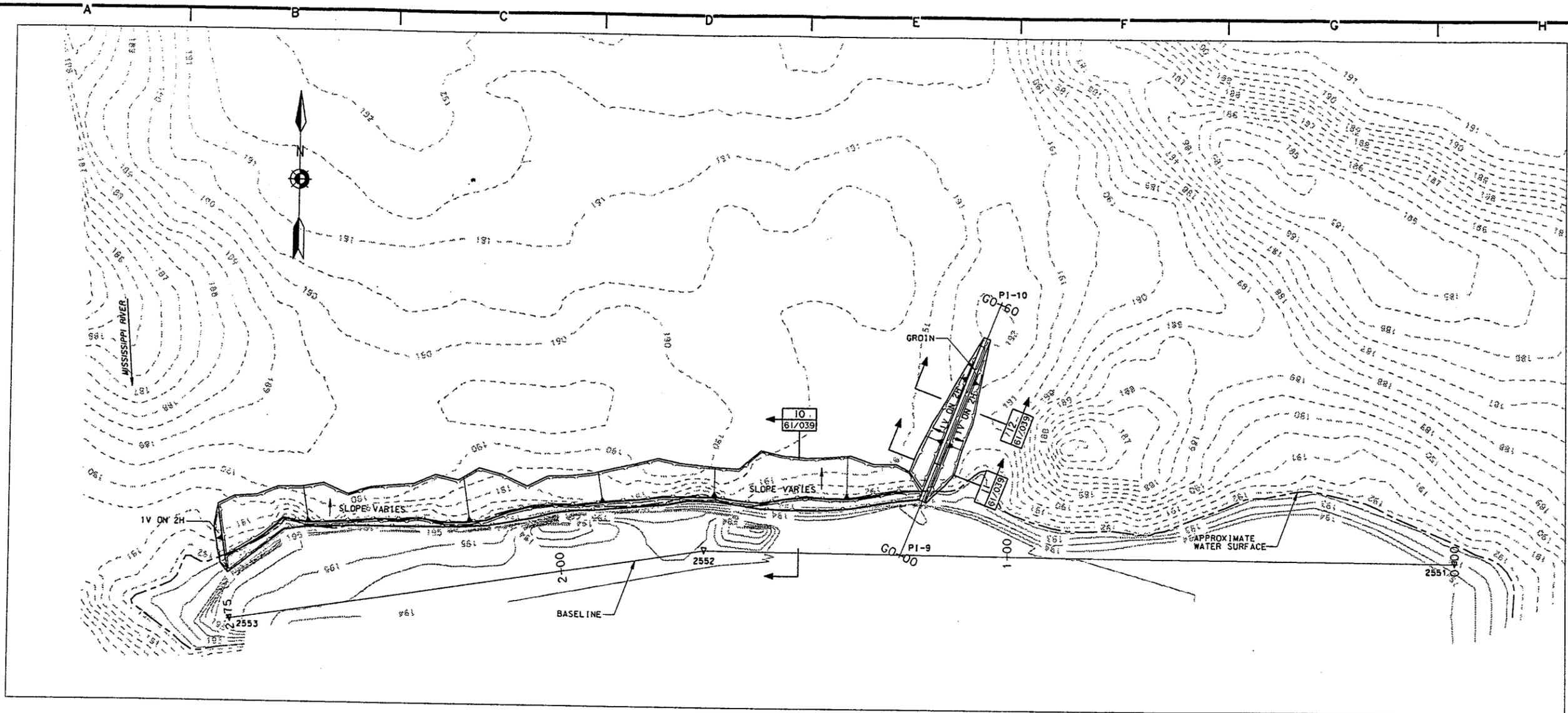
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		8/97	

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PMF		

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**EAST CHANNEL HREP
BANK PROTECTION
LOWER ISLAND 98
PLAN**

DRAWING NUMBER:
M-L8-
61/037
SHT 5 OF 7



PLAN
MINNESOTA ISLAND

10 0 10 20
SCALE IN METERS

BASELINE CONTROL DATA

POINT	PROJECT COORDINATES		BEARING DIRECTION	DISTANCE
	NORTHING	EASTING		
2551	198 260.8589	1 017 781.4110	N 89°26'14.8203" W	167.640
2552	198 262.5048	1 017 613.7789	S 81°02'29.9342" W	107.358
2553	198 245.787	1 017 507.730		

GROIN CONTROL LINE DATA

POINT	PROJECT COORDINATES		BEARING DIRECTION	DISTANCE
	NORTHING	EASTING		
PI-9	198 262.0738	1 017 657.6741	N 21°24'45.5064" E	60.110
PI-10	198 318.035	1 017 679.619		

NOTES:

1. ORIGINAL DATA COMPILED NAD 27 US FOOT. MAPPING DATA COMPILED NAD 83 METRIC.
2. ORIGINAL DATA FROM 03 MARCH 1994 LAND SURVEYS & 03-04 MAY 1994 BATHYMETRIC SURVEYS.
3. ALL UNITS ARE IN METERS UNLESS OTHERWISE NOTED.
4. WORK LIMITS ARE THE TOP OF BANK ON THE ISLAND.

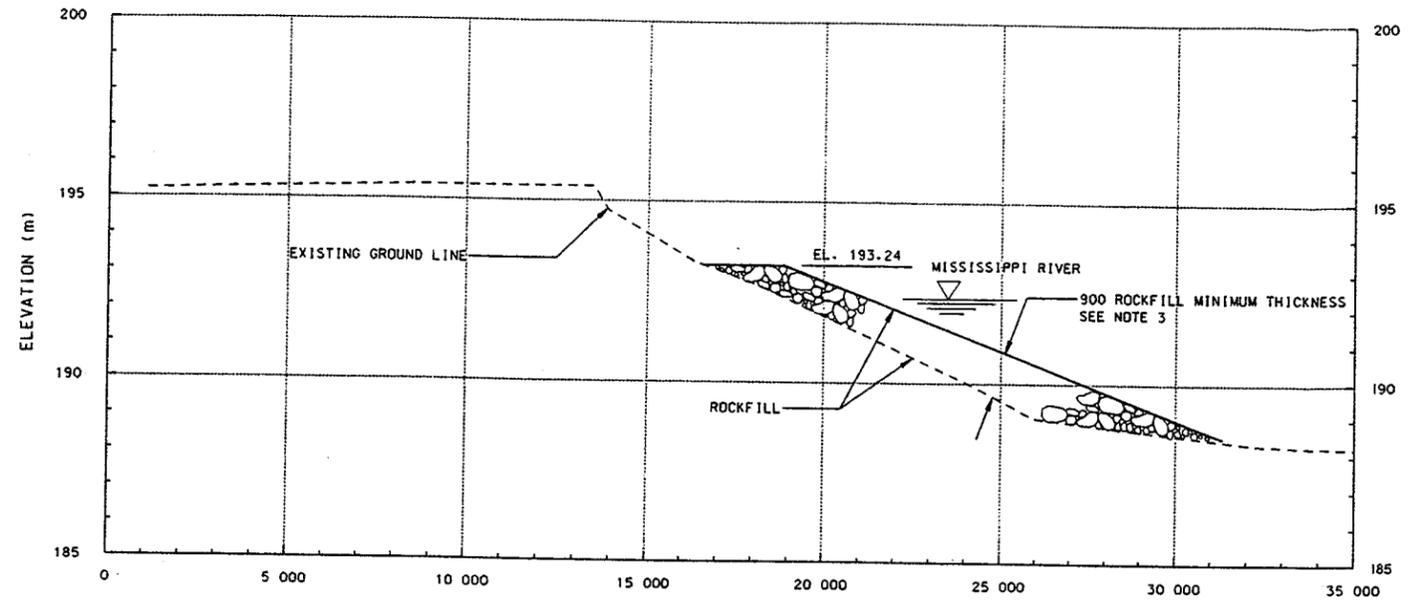
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		8/97	

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CHECKED:		
PMF		

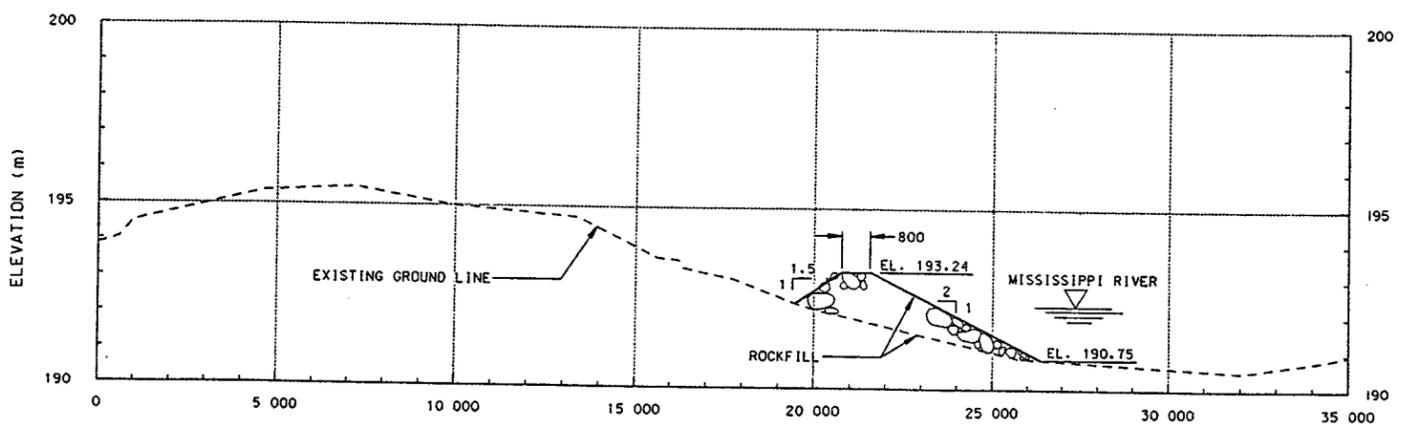
DEPARTMENT OF THE ARMY
ST. PAUL DISTRICT
CORPS OF ENGINEERS
ST. PAUL, MINNESOTA

EAST CHANNEL HREP
BANK PROTECTION
MINNESOTA ISLAND
PLAN

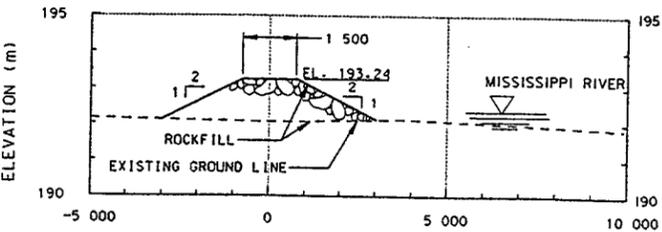
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M-L8-
61/038
SHT 6 OF 7



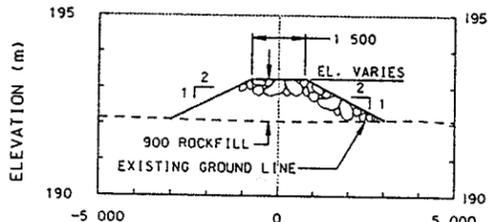
TYPICAL SECTION 7
LOWER ISLAND 98
STA. 0+00 TO STA. 0+75
61/038



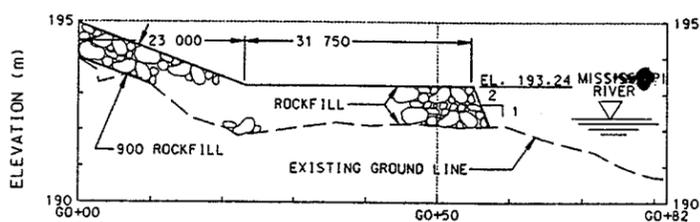
TYPICAL SECTION 8
LOWER ISLAND 98
STA. 0+75 TO STA. 1+50
61/035



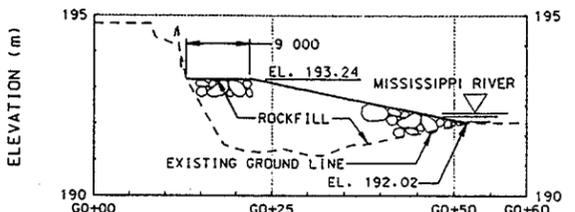
TYPICAL SECTION 9
LOWER ISLAND 98
STA. 60+20 TO STA. 60+55
61/037



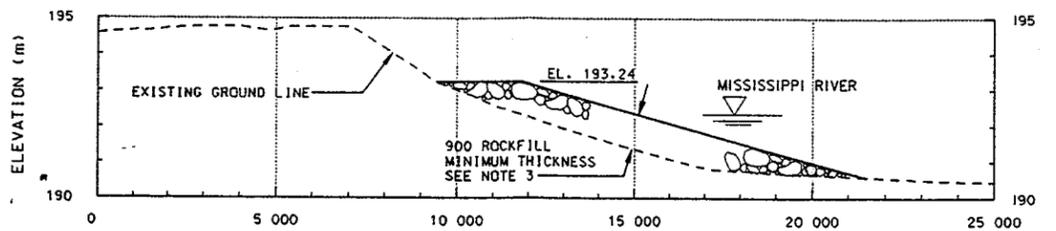
TYPICAL SECTION 9A
LOWER ISLAND 98
STA. 60+00 TO STA. 60+12
61/037



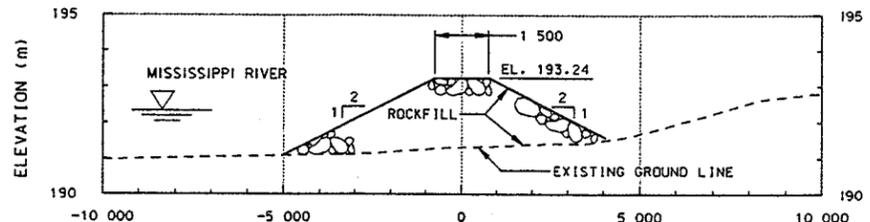
GROIN PROFILE
LOWER ISLAND 98



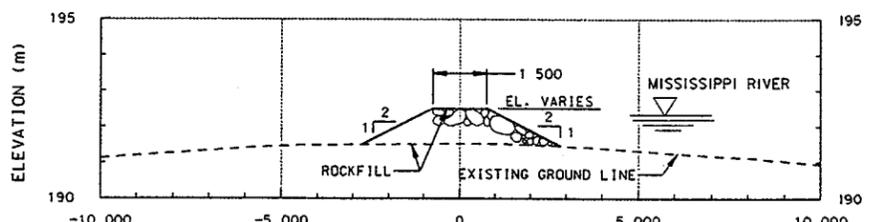
GROIN PROFILE
MINNESOTA ISLAND



TYPICAL SECTION 10
MINNESOTA ISLAND
STA. 1+22 TO STA. 2+75
61/038



TYPICAL SECTION 11
MINNESOTA ISLAND
STA. 60+15 TO STA. 60+21.90
61/038



TYPICAL SECTION 12
MINNESOTA ISLAND
STA. 60+21.90 TO STA. 60+51.96
61/038

- NOTES:
1. ALL UNITS ARE IN MILLIMETERS UNLESS INDICATED OTHERWISE.
 2. ALL ELEVATIONS ARE IN METERS, USGS 1912 ADJ.
 3. ROCKFILL IS TO BE PLACED ON THE EXISTING SLOPE. IF EXISTING SLOPE IS STEEPER THAN 1V ON 2.5H FINISHED SLOPE SHOULD BE 1V ON 2.5H. ROCKFILL EXTENDS UNTIL SLOPE FLATTENS OUT.

AS-BUILT AS OF COMPLETION DATE	8/97	Appr.
Symbol		

DESIGNED: SCALE: DATE: CAS/JJP AS SHOWN MAY 1996	DESIGNED: DATE: CAS/JJP AS SHOWN MAY 1996
CHECKED: CADD FILE NAME: MBGXP039.DGN	CHECKED: CADD FILE NAME: MBGXP039.DGN
DRAWN BY: MAC/TJJ SOL. NO:	DRAWN BY: MAC/TJJ SOL. NO:
DESIGNED: DACW37-96-B-0008	DESIGNED: DACW37-96-B-0008
AE APPROVING OFFICIAL: PUF	AE APPROVING OFFICIAL: PUF
PE-D	PE-D

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

EAST CHANNEL HREP
BANK PROTECTION
LOWER ISL. 98 & MINNESOTA ISL.
PROFILE & SECTIONS

DRAWING NUMBER:
M-L8-
61/039
SHT. 7 OF 7

APPENDIX B

MEMORANDUM OF AGREEMENT

MEMORANDUM OF AGREEMENT
BETWEEN
THE U.S. FISH AND WILDLIFE SERVICE
AND
THE DEPARTMENT OF THE ARMY
FOR
ENHANCING FISH AND WILDLIFE RESOURCES
OF THE
UPPER MISSISSIPPI RIVER SYSTEM
EAST CHANNEL PROJECTS
LA CROSSE COUNTY, WISCONSIN AND WINONA 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 East Channel Projects 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, all construction costs of those fish and wildlife features for the East Channel projects are 100 percent Federal, and pursuant to Section 107(b) of the Water Resources Development Act of 1992, Public Law 102-580, all costs of operation and maintenance for the East Channel projects are 100 percent Federal.

III. GENERAL SCOPE

The project to be accomplished pursuant to this MOA shall consist of rehabilitating and improving the fish and wildlife habitat at three locations in upper pool 8 of the Mississippi River. The peninsula forming the I-90 Bay would be stabilized using rock bank protection. In addition, a former portion of the peninsula would be restored using a rock berm. The heads of Lower Island 98 and Minnesota Island would be stabilized using a variety of rock bank protection designs.

IV. RESPONSIBILITIES

A. The DOA is responsible for:

1. Construction. Construction of the project which consists of stabilizing 120 meters and restoring 105 meters of the peninsula protecting the I-90 Bay using rock. Stabilizing the heads of Lower Island 98 and Minnesota Island using rock.

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, the DOA will construct the East Channel projects as described in the Definite Project Report/Environmental Assessment, East Channel Habitat Rehabilitation and Enhancement Projects, dated September 1995, 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 the DOA encounters potential delays related to construction of the project, the DOA will promptly notify the 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. The 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 "East Channel Habitat Rehabilitation and Enhancement Project," dated September 1995, 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: Regional Director
U.S. Fish and Wildlife Service
Bishop Henry Whipple Federal Building
1 Federal Drive
Fort Snelling, Minnesota 55111-4056

DOA: District Engineer
St. Paul District
U.S. Army Corps of Engineers
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.

DEPARTMENT OF THE ARMY

U.S. FISH AND WILDLIFE SERVICE

BY: 
(signature)

BY: 
(signature)

J. M. WONSIK
Colonel, Corps of Engineers
St. Paul District

 WILLIAM F. HARTWIG
Regional Director
U.S. Fish and Wildlife
Service

DATE: JAN 5 1996

DATE: JAN 23 1996

APPENDIX C

CHECKLIST FORM COVERING INSPECTIONS

APPENDIX D

**CONSTRUCTION SPECIFICATION SECTIONS
FOR REPAIR MATERIAL**

SECTION 02250

ROCKFILL

INDEX

<u>PARAGRAPH</u>	<u>DESCRIPTION</u>	<u>PAGE</u>
1	GENERAL	02250-1
2	PRODUCTS	02250-2
3	EXECUTION	02250-4
	ROCKFILL GRADATION CURVE	02250-7
	GRADATION ANALYSIS WORKSHEET	02250-8
	ENG FORM 4055	02250-9

SECTION 02250

ROCKFILL

1. GENERAL

1.1 SCOPE. This section covers rockfill.

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 construction.

1.4.5 The Contractor shall submit in accordance with SECTION: SUBMITTAL PROCEDURES 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 metric tonne (MT) equal to 1000 kg 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 0.94 tonnes per cubic meter, regardless of actual weight.

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

<u>Item</u>	<u>Unit</u>
I-90 Bay Rockfill	MT
Rockfill - Lower Island 98	MT
Rockfill - Minnesota Island	MT

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 nor 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.

2.2 SOURCES AND EVALUATION. Stone materials shall be produced from the sources listed in Section 00830: Attachment No. 3 - Known 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 in accordance with SECTION: SUBMITTAL PROCEDURES 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. The Contracting Officer shall be provided a minimum of 24 hours notice before each test. 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 in accordance with SECTION: SUBMITTAL PROCEDURES 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 100 mm 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 100 mm 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:

<u>Material</u>	<u>Minimum Sample Size</u>
Rockfill	6 MT

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.

<u>Material</u>	<u>Minimum Number of Tests</u>
Rockfill	1 test prior to placement, and 1 test per 2,000 MT 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 placement is completed to determine the placement tolerances of rockfill. Survey cross sections shall be performed at intervals of 15 meters and at locations of all significant breaks in configuration 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 1:100 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.

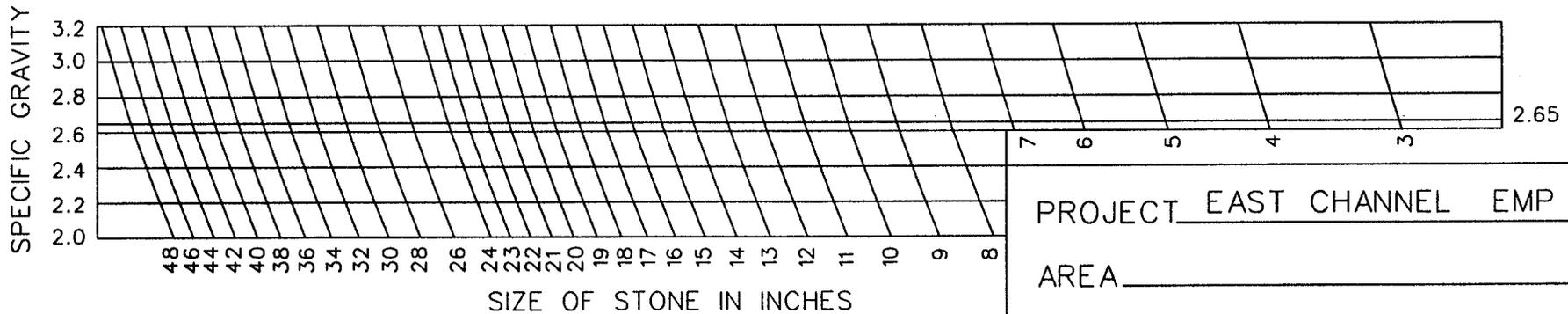
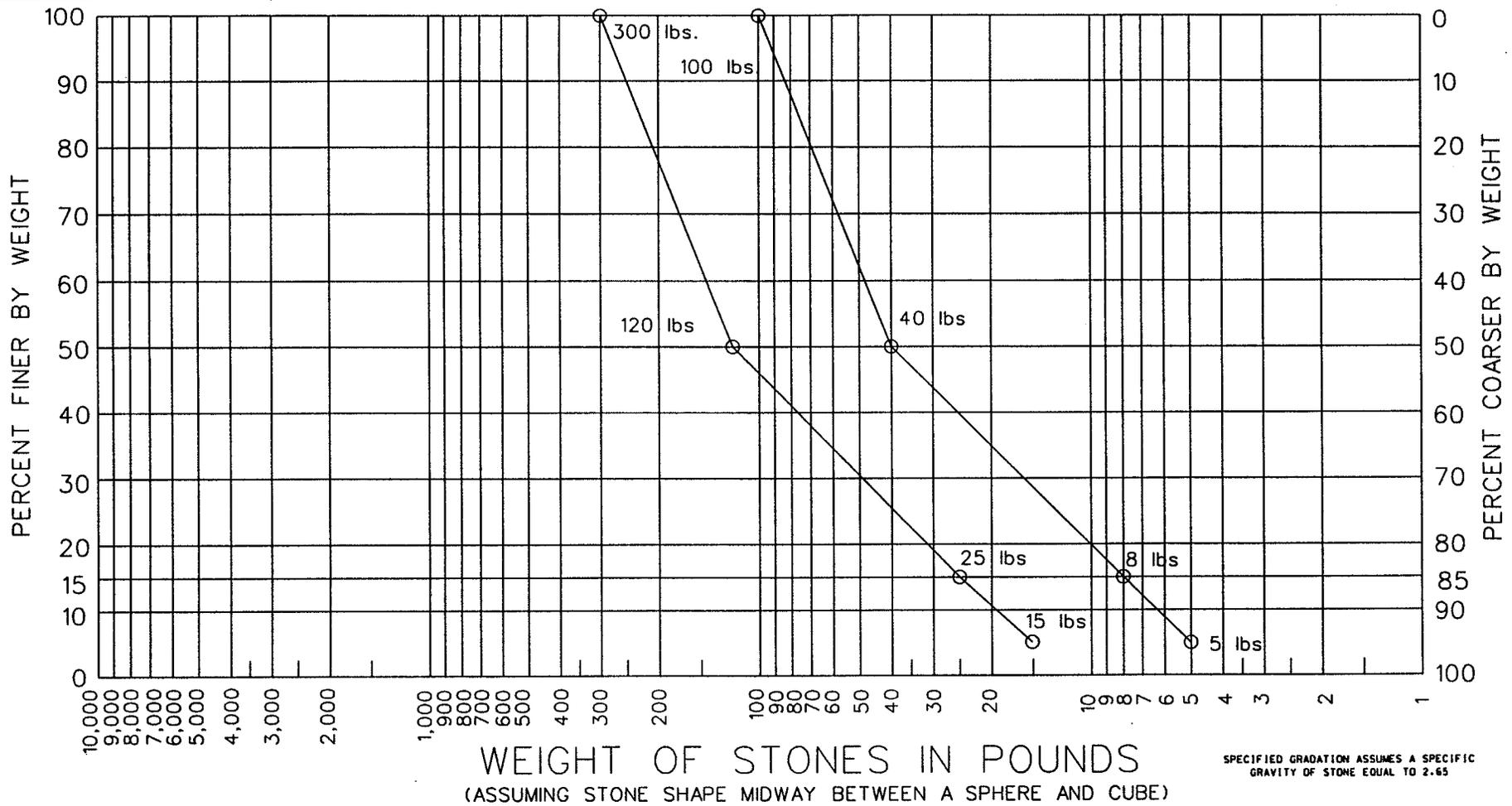
3.5 FOUNDATION PREPARATION. Foundation areas shall be cleared of woody vegetation materials that could prevent proper placement of rockfill. Removal of driftwood, snags, wood debris and brush within the limits of bank protection construction shall be considered part of the bank protection construction 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 150 mm above and 75 mm below the prescribed grade, except either extreme shall not be continuous over an area greater than 20 square meters. 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 EAST CHANNEL EMP

AREA _____

DATE _____

RIPRAP/ROCKFILL GRADATION CURVE

