



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY

ST. PAUL DISTRICT, CORPS OF ENGINEERS
SIBLEY SQUARE AT MEARS PARK
190 FIFTH STREET EAST, SUITE 401
ST. PAUL, MN 55101-1638

April 30, 2007

Planning, Programs, and Project Management Division
Environmental and Economic Analysis Branch

SUBJECT: Embankment Repair; Locks and Dams 6 and 7; Upper Mississippi River Navigation Project

Dear Interested Parties:

Enclosed for your review are the Environmental Assessment and Finding of No Significant Impact (FONSI) for the proposed embankment repair project at Locks and Dams 6 and 7 of the Upper Mississippi River Navigation Project. The proposed work consists of placing rock riprap protection on portions of the existing embankments at the two facilities.

We ask that you review these documents and return your comments to us within 30 days. If we have not received your comments by that time, we will assume that you concur with our findings, and we will sign the FONSI.

If you have questions about the project, please call Mr. Richard Beatty at (651) 290-5273.

Sincerely,

A handwritten signature in black ink, appearing to read "Terry J. Birkenstock", is written over a horizontal line. The signature is stylized and cursive.

for Terry J. Birkenstock
Chief, Environmental and Economic
Analysis Branch

Enclosure

**DRAFT
ENVIRONMENTAL ASSESSMENT
LOCKS AND DAMS 6 AND 7 EMBANKMENT/WINGWALL REPAIR
UPPER MISSISSIPPI RIVER**

April 2007

DRAFT
ENVIRONMENTAL ASSESSMENT
LOCKS AND DAMS 6 AND 7 EMBANKMENT/WINGWALL REPAIR
UPPER MISSISSIPPI RIVER

Table of Contents

	<u>Page</u>
1.0 INTRODUCTION	EA-1
2.0 AUTHORITY AND NEED FOR THE ACTION	EA-1
3.0 PROPOSED ACTION	EA-2
3.1 Lock and Dam 6	EA-2
3.2 Lock and Dam 7	EA-2
4.0 AFFECTED ENVIRONMENT	EA-3
4.1 Socioeconomic Resources	EA-3
4.2 Natural Resources	EA-4
4.3 Cultural Resources	EA-5
5.0 ENVIRONMENTAL EFFECTS	EA-5
5.1 Socioeconomic Resources	EA-6
5.2 Natural Resources	EA-7
5.3 Cultural Resources	EA-7
6.0 ALTERNATIVES	EA-7
7.0 COORDINATION	EA-7
8.0 APPLICABLE ENVIRONMENTAL LAWS AND REGULATIONS	EA-8

Sheets

- 1. Location Map**
- 2. Lock and Dam 6 - Proposed Action**
- 3. Lock and Dam 7 – Proposed Action (Part 1)**
- 4. Lock and Dam 7 – Proposed Action (Part 2)**
- 5. Lock and Dam 6 - Embankment Cross Sections**
- 6. Lock and Dam 7 - Embankment Cross Sections**
- 7. Lock and Dam 7 – French Island Spillway Plan Views**

ATTACHMENTS

1. Table 1 – Impact Matrix

DRAFT
ENVIRONMENTAL ASSESSMENT
LOCKS AND DAMS 6 AND 7 EMBANKMENT/WINGWALL REPAIR
UPPER MISSISSIPPI RIVER

1.0 INTRODUCTION

The St. Paul District, Corps of Engineers (Corps), has prepared this assessment of the environmental effects of proposed repair of the embankments at Locks and Dams 6 and 7. The proposed actions would be located in Pools 7 and 8 of the Upper Mississippi River Navigation Channel (Sheet 1). This assessment was completed to satisfy the requirements of the National Environmental Policy Act (NEPA) of 1969, Council on Environmental Quality regulations (40 CFR 1500-1508), and Corps regulations (Engineer Regulation 200-2-2).

2.0 AUTHORITY AND NEED FOR THE ACTION

The Corps is responsible for maintaining a navigable channel on the Mississippi River. Authority for continued operation and maintenance of the Mississippi River 9-Foot Channel Project is provided in the River and Harbor Acts of 1930 and 1932. Original authority for the Corps to work on the Mississippi River was provided in the River and Harbor Act of 1880. The proposed actions have been determined necessary to maintain the structures.

The proposed actions are needed to repair the earthen embankments at Locks and Dams 6 and 7 and the in-water erosion protection for the wingwalls of the French Island spillway at Lock and Dam 7. These actions would extend the useful life of the structures. Over the 70 years since the rock protection was placed, the riprap on the upstream side of the embankments has weathered and been undercut by wave action. The existing rock protection is of insufficient size to protect against the potential wave action, and substantial "benching" has occurred on portions of the embankment. A second problem on the embankment is the lack of protection on the tops and backsides of the structures. If these embankments were to be overtopped, these unprotected areas could erode and result in catastrophic loss of the structure and navigation pool. An additional problem at Lock and Dam 7 is the lack of adequate protection along the riverward side of each of the upstream wingwalls on the French Island emergency spillways.

The Corps has prepared the following NEPA documents for actions and activities related to this project:

- 1974: Environmental Impact Statement on operation and maintenance of the 9-foot navigation channel of the Upper Mississippi River from the head of navigation to Guttenberg, Iowa.

1987: Environmental Assessment on the major rehabilitation program on the Upper Mississippi River.

1997: Environmental Impact Statement – 9-Foot Channel Project, Channel Maintenance Management Plan, Upper Mississippi River, Head of Navigation to Guttenberg , Iowa.

3.0 PROPOSED ACTION

The majority of the proposed action would entail placing rock riprap on portions of the upstream and downstream side slopes of the embankments at Locks and Dams 6 and 7 (Sheets 2, 3 and 4). The proposed project sites are all immediately adjacent to spillway and dam structures. These areas are particularly critical because a breach in these areas could also result in the loss of the adjacent hardened structure. The specific proposed sites at each facility consist of the following.

3.1 Lock and Dam 6

a. On the downstream face of the earthen embankment, from the existing wingwall, the first 400 feet would be covered by a new layer of rock riprap protection. The protection would consist of 6 inches of bedding material (5-inch to pea-size material) overlaid with 12 inches of 3- to 9-inch rock that would extend from the top of the levee to a point approximately 10 feet beyond the toe of the existing rock protection (Sheet 5). Some rock protection is along the embankment from the wingwall to the end of the storage yard. This existing rock would be left in place and covered by the new protective material. The remainder of the embankment side slope proposed to be covered by rock protection has a grass covering and totals approximately 0.25 acre.

b. On the top of the levee, a 6-inch thick mat of articulated concrete would be placed along the 400-foot reach. Sufficient earthen material would be removed to allow the mat to be placed flush with the existing concrete walkway running along the embankment. This placement method would be done so that the elevation of the repaired embankment would not exceed the height of the existing embankment.

c. A 20-foot wide section of the new riprap would be chinked with the bedding material to provide a passage over the embankment for reptiles and other small animals. The pathway would extend up the new riprap and continue down the existing rock on upstream side of the embankment to the waters edge.

3.2 Lock and Dam 7

Five sections of the Lock and Dam 7 embankment would be treated (Sheets 6 and 7). The work in these areas would include placement of rock on the downstream and upstream side of the embankment and placement of an articulated concrete mat across the top of the embankment. In

total, approximately 2 acres of combined existing grassy area would be covered by the proposed work. The sites and actions consist of the following:

a. On the westernmost section that abuts the eastern end of the main dam, the work on the downstream side would be identical to the work done at Lock and Dam 6. In addition, on the upstream side the embankment, the existing rock would be overlain with 9 inches of bedding material and a 24-inch layer of 6- to 17-inch rock riprap (Sheet 6). This new protection would extend out an additional 10 feet beyond the existing toe.

b. The areas abutting both ends of the French Island Spillway would be treated. The upstream and downstream treatments would be the same as with item 1 above but would extend only 200 feet laterally along the embankment from the wingwalls.

c. The upstream side of both sides of the abutments at the Onalaska Spillway would be treated similarly to French Island Spillway. Only the western end would be treated on the downstream side.

d. An articulated concrete mat would be placed across the top of each of the embankment segments. No increase in levee height would occur.

e. A 25-foot swath would be chinked at each of the five sections similarly to that done at Lock and Dam 6.

f. At the French Island Spillway, rock would be placed waterward of each of the abutments along the upstream and downstream face of the wingwalls (Sheet 7). This rock protection would replace rock that had been placed at the time of original construction but has been moved or crushed by ice and high water flows. The new rock would extend up to 25 feet from the structure.

4.0 AFFECTED ENVIRONMENT

4.1 Socioeconomic Resources

Lock and Dam 6 is located on the Mississippi River in Winona County, Minnesota, and Trempealeau County, Wisconsin, approximately 10 miles downstream of Winona, Minnesota. Lock and Dam 7 is located 2 miles upstream from La Crosse, Wisconsin, in La Crosse County, Wisconsin, and Houston County, Minnesota.

Between 2000 and 2005, the population of Winona County decreased by 1.4 percent from 49,985 to 49,276. The civilian labor force is comprised of 28,172 persons. The average unemployment rate for Winona County in 2000 was 3.7 percent. This rate compares with the rate in Minnesota of 3.6 percent and for the United States as a whole of 4.8 percent. The manufacturing industry employs the most workers (24.3 percent) followed by educational, health and social services

(21.8 percent); retail trade (10.7 percent); and arts, entertainment and food services at (8.2 percent).

Winona County trails the Minnesota State average for high school graduates (84.0 percent compared to 87.9 percent), median household income (\$39,534 versus \$50,750) and is higher than State average in persons below poverty (9.7 percent versus 8.0 percent) and persons age 65 and over at 13.6 percent versus the State at 12.1 percent.

On the other side of the Mississippi River, two counties border the project areas. Trempealeau County meets the project area with a total population of 27,812, up 3.0 percent from 2000. The civilian labor force is comprised of 14,028 persons. The average unemployment rate for Trempealeau County in 2000 was 2.4 percent. This rate compares with the State rate in Wisconsin of 6.2 percent and for the United States as a whole of 4.8 percent. The manufacturing industry employs the most workers (28.6 percent) followed by educational, health and social services (19.5 percent); retail trade (9.3 percent); and agriculture and forestry (8.5 percent).

Trempealeau County trails the Wisconsin State average for high school graduates (80.9 percent compared to 85.1 percent), median household income (\$39,778 versus \$46,538), and persons below poverty (7.9 percent versus 9.0 percent) and is higher than State average in persons age 65 and over at 15.9 percent versus the State at 13.0 percent.

La Crosse County has a total population of 108,958, up 1.7 percent from 2000. The civilian labor force is comprised of 59,556 persons. The average unemployment rate for La Crosse County in 2000 was 2.9 percent. This rate compares with the State rate in Wisconsin of 6.2 percent and for the United States as a whole of 4.8 percent. The educational, health and social services industry employs the most workers (25.0 percent) followed by manufacturing (16.1 percent); retail trade (14.4.3 percent); and arts, entertainment and food services (9.3 percent).

La Crosse County trails the Wisconsin State average for median household income (\$41,137 versus \$46,538) and persons age 65 and over (15.9 percent versus 13.0 percent) and is higher than State average in high school graduates (89.7 percent versus 85.1 percent) and persons below poverty (9.7 percent versus 9.0 percent)

Both Locks and Dams 6 and 7 receive a moderate amount of use by recreational fishing boats and ice fishermen. Bank fishing is important on the spillways at both facilities. A requirement for this bank fishing is maintaining access to the banks and river channel itself. Keeping all available parking and boat ramp facilities available during construction would be a goal of the action.

4.2 Natural Resources

a. Terrestrial –The general project area provides habitat suitable for a variety of fish and wildlife species. Raccoons, squirrels, rabbits, muskrats, beavers, white-tailed deer, other small mammals, and numerous songbirds make extensive use of the floodplain forest areas provided by

the islands and riparian borders in the project vicinity. The specific project area is highly disturbed and has distinctly different habitat types. The downstream side of the embankment has sand substrate and moderate to sparse covering of grasses and other non-woody plant species. The upstream side has a rock riprap protective cover on top of the sand substrate. The flat, top portion of the embankments has gravel roadways or concrete sidewalks over the majority of the surface areas.

b. Aquatic Habitat - Species that use the proposed project area consist of both lentic and lotic species, including sauger, walleye, northern pike, crappie, bluegill, white bass, and freshwater drum. The tailwater area below the spillway provides excellent fish habitat. A mussel survey of the aquatic areas that would be covered by the proposed rock protection was completed in July 2006. A total of eight individuals, representing three commonly occurring species, were collected during a qualitative sampling by wading survey.

c. Threatened and Endangered Species - The following federally listed endangered or threatened species may occur in Pools 7 and 8 of the Upper Mississippi River: Higgins' eye pearl mussel (*Lampsilis higginsii*) and bald eagle (*Haliaeetus leucocephalus*). The Higgins' eye pearl mussel and the bald eagle are known to be present in the general project area. A number of active bald eagle nesting sites are present in upper Pool 8. Several of the proposed project sites are within the 0.25- and 0.5-mile buffer zones established for active nests. Bald eagles also use the tailwater areas below Locks and Dams 6 and 7 as a winter feeding area. No federally listed threatened or endangered mussel species were collected during the 2006 survey in the project area.

4.3 Cultural Resources

The Pool 6 and Pool 7 localities contain numerous cultural resources indicating continual human occupation for approximately 12,000 years. The Corps of Engineers and others have sponsored cultural resource surveys of the Pool 6 and Pool 7 areas. Within the Pool 6 locality, nearly 150 cultural resource sites have been recorded, while approximately 320 sites are recorded within the Pool 7 locality. Precontact cultural resources include lithic and artifact scatters, village sites, rock shelters, caves, petroglyphs, burials and burial mounds. Historic cultural resources include fur trade sites, early town sites, farmsteads, mills, a variety of historic standing structures, foundations, shipwrecks and river navigation structures. In 1986, Locks and Dams 6 and 7 were determined eligible for the National Register of Historic Places (NRHP) as part of the thematic group encompassing Locks and Dams 3 through 22. No other cultural resources have been identified in the proposed project area.

5.0 ENVIRONMENTAL EFFECTS

An environmental analysis has been conducted for the proposed action, and a discussion of the impacts follows. As specified by Section 122 of the River and Harbor Act of 1970, the categories of impacts listed in Table 1 (Attachment 1) were reviewed and considered in arriving

at the final determinations. The application process for a State of Wisconsin Water Quality Certificate will be initiated and obtained prior to any construction at L/D 7. The State of Minnesota has determined that the proposed action at L/D 6 would not need a State Protected Waters Permit.

5.1 Socioeconomic Resources

The increased protection to vulnerable portions of the embankments would decrease the likelihood of breaching the embankment and losing the navigation resulting in permanent beneficial impacts on transportation. The use of heavy equipment for transporting and placing riprap would generate air emissions from the use of petroleum products to run the equipment. Very localized, temporary, minor degradation of air quality would occur during the construction phase. Likewise, the aesthetic quality of the area would be adversely affected during construction from all the construction equipment. Construction activities would temporarily interfere with recreational bank fishing at the proposed project sites. After the construction period, the project areas will return to their preconstruction conditions and public uses.

5.2 Natural Resources

a. Terrestrial – The proposed riprap placement would convert 2.2 acres at L/D 7 and 0.3 acres L/D 6 of existing grassy area on the downstream side of the embankments to a rocky habitat. This activity would displace organisms currently dependent on the area for habitat but provide additional habitat for organisms adapted to rocky conditions. During project construction, bird and mammal species in the project vicinity could be negatively affected by the noise and disturbance of heavy equipment operating in the area. The disturbance would be short term. The access to interpool transfer and potential nesting areas resulting from the chinked area of the embankments would have permanent moderate beneficial impacts on turtle species in the area.

b. Aquatic Species - During construction, increases in turbidity and suspended solids would have a very localized suppressing effect on phytoplankton productivity. To reduce these impacts, a silt curtain would be placed around the disposal area of any open water placement of materials. These limited local effects would be minor, however, and plankton populations would recover quickly upon completion of construction activities. The proposed rock placement at the upstream toe of the embankment and in the scour areas near the French Island Spillway wingwalls would bury the existing fauna. However, recolonization of the new rock substrate by benthic organisms would be rapid. Therefore, the project effects on benthic organisms would be short term and minor. Fish species may avoid the area during construction. No in-water work would be permitted below the spillways during the period April 1 to June 15 to minimize impacts on spawning activities. Maintaining flows throughout the construction period would also minimize any potential impacts on fish usage of the downstream areas.

c. Threatened and Endangered Species - A biological assessment of the proposed project has been completed to determine the potential effects on the following species: Higgins' eye

pearly mussel (*Lampsilis higginsii*) and bald eagle (*Haliaeetus leucocephalus*). To minimize potential impacts on eagle nesting, construction activities would not occur within ¼ mile of the nests between March 1 and May 1, if eagles are nesting at the site. After May 1, no work will occur within 660 feet of a nest until fledging occurs. Because of absence of the protected mussel in the project area and the unsuitability of the habitat type, it is unlikely that any individuals of the mussel species would be impacted by the proposed action. Based on these conditions, it is our determination that the proposed action would have no effect on the protected species or their critical habitat.

5.3 Cultural Resources

Locks and Dams 6 and 7 are the only two known cultural resources located within the project area. In 1987, a Programmatic Agreement (PA) for rehabilitation of Locks and Dams 3 through 22 on the Upper Mississippi River was ratified between the Corps and the State Historic Preservation Officer (SHPO) of Minnesota (as well as other SHPOs and Federal entities). As stipulated in Table 12 of the PA, actions that do not affect significant features of the locks and dams (i.e., routine maintenance of embankments) may be carried out as proposed, and SHPO coordination is not necessary. Although the embankment structures help regulate the pools, they do not contribute to the historic character of facilities. For this reason, the Corps has determined that the proposed actions would have no adverse effects on historic properties

6.0 ALTERNATIVES

Two alternatives to the selected plan were evaluated:

No Action: With this alternative, rehabilitation of the structure would not occur. Taking no action would lead to further degradation of the structure, which could lead to significant damages during a major flood event. This alternative is not recommended because of its inability to meet the established objectives.

Removal of Existing Rock Protection: In place of overlaying the new rock protection, the existing rock protection would be removed and replaced by new rock. This alternative was not selected because it would increase costs substantially and would result in only minimally less impact on the environment.

7.0 COORDINATION

An on-site coordination meeting was held with the Minnesota and Wisconsin Departments of Natural Resources and the U.S. Fish and Wildlife Service. Recommendations received from these agencies were incorporated into the proposed action.

This assessment will be sent to the U.S. Environmental Protection Agency, the U.S. Fish and

Wildlife Service and State agencies for review. It will also be made available to other agencies and the public for review and comment.

8.0 APPLICABLE ENVIRONMENTAL LAWS AND REGULATIONS

Table 2 summarizes the status of project actions proposed by the Corps of Engineers in relation to applicable environmental laws and regulations.

Table 2 - Status of Project with Applicable Laws and Statutes

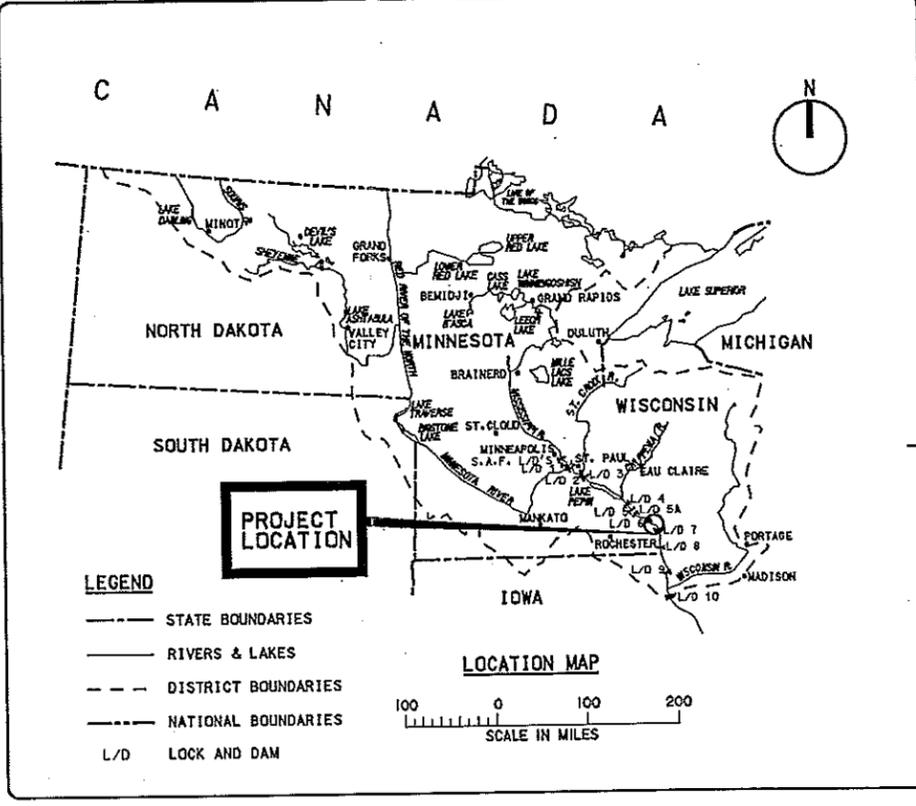
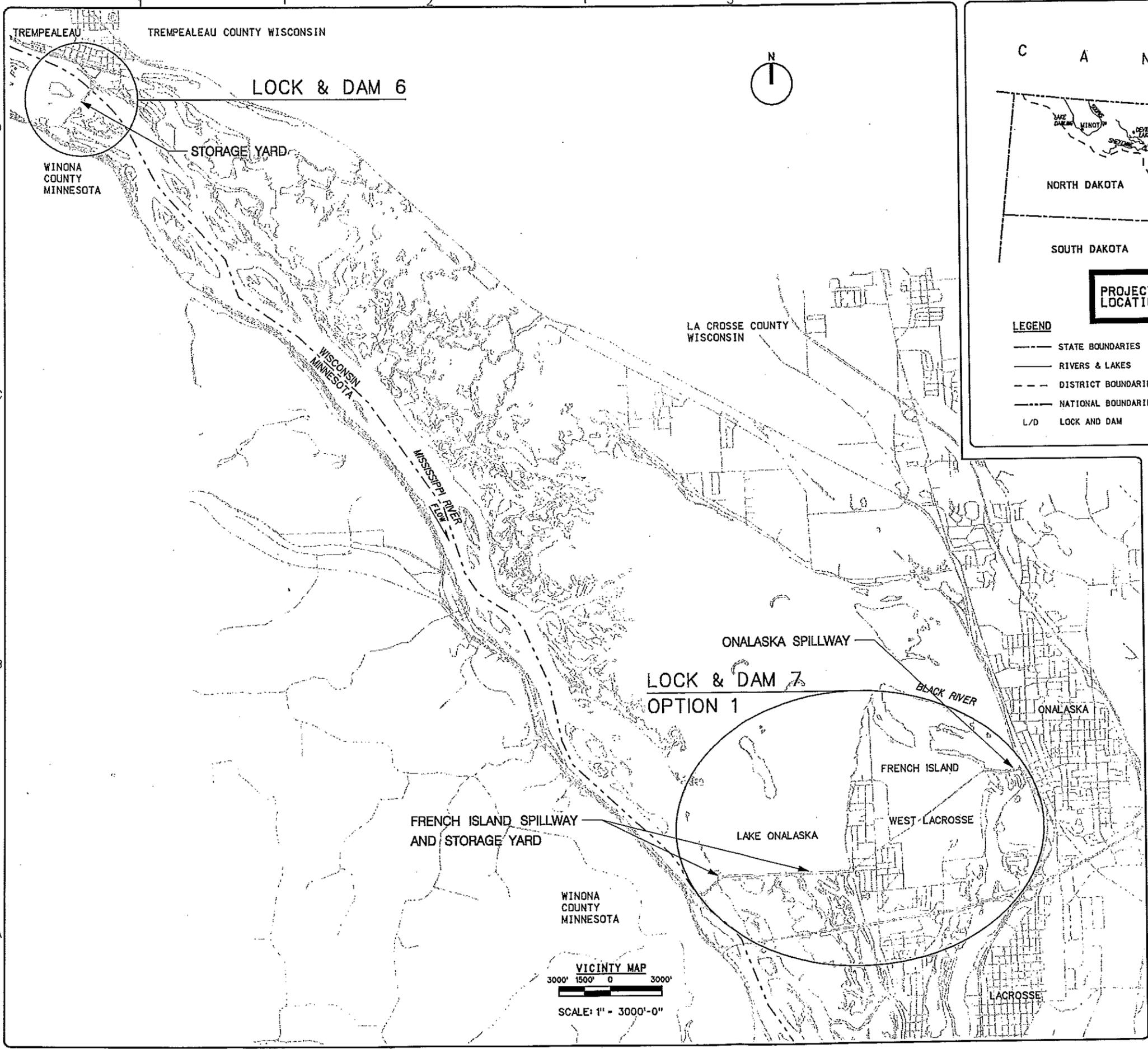
<u>STATUTES OR DIRECTIVES</u>	<u>COMPLIANCE STATUS</u>
<u>Federal Statutes</u>	
Archeological and Historic Preservation Act	Partial
Clean Air Act of 1977, as amended	Full
Clean Water Act of 1977, as amended	Partial
Endangered Species Act of 1973, as amended	Full
Federal Water Project Recreation Act, as amended	Full
Fish and Wildlife Coordination Act, as amended	Full
Land and Water Conservation Fund Act, as amended	Full
National Environmental Policy Act of 1969, as amended	Full
National Historic Preservation Act of 1966, as amended	Partial
Resource Conservation and Recovery Act	N/A
Rivers and Harbors Acts	Full
Watershed Protection and Flood Prevention Act, as amended	Full
Wild and Scenic Rivers Act, as amended	N/A
<u>Executive Orders, Memorandums, etc.</u>	
Floodplain Management (E.O. 11988) Full Protection of Wetlands (E.O. 11990)	Full
Environmental Effects Abroad of Major Federal Actions (E.O. 12114)	N/A
Analysis of Impacts on Prime and Unique Farmlands (CEQ Memorandum, August 11, 1980)	Full
Protection and Enhancement of Environmental Quality (E.O. 11514, as amended by E.O. 11991)	Full
Protection and Enhancement of the Cultural Environment (E.O. 11593)	Partial

All applicable laws and regulations listed in Table 2 will be fully complied with upon completion of the environmental review, except the Clean Water Act. Upon acquisition of the Wisconsin Department of Natural Resources State Water Quality Certificate, the proposed action would be in compliance with the Clean Water Act. The proposed project would not result in the conversion of agricultural lands to nonagricultural purposes. Therefore, the provisions of the Farmland Protection Policy Act of 1981 do not apply.

ATTACHMENT 1

EMBANKMENT REPAIR – LOCKS AND DAMS 6 AND 7
ENVIRONMENTAL ASSESSMENT MATRIX
 Section 122 of the River and Harbor and Flood Control Act of 1970 (P.L. 9611)

	MAGNITUDE OF PROBABLE IMPACTS						
	BENEFICIAL EFFECT			NO APPRECIABLE	ADVERSE EFFECT		
	SIGNIFICANT	SUBSTANTIAL	MINOR		MINOR	SUBSTANTIAL	SIGNIFICANT
1. Noise					TEMP		
2. Aesthetic Values					TEMP		
3. Recreational Opportunities					TEMP		
4. Transportation			X				
5. Public Health and Safety				X			
6. Community Cohesion (Sense of Unity)				X			
7. Community Growth and Development				X			
8. Business and Home Relocation				X			
9. Existing and Potential Land Use				X			
10. Controversy				X			
1. Property Values				X			
2. Tax Revenues				X			
3. Public Facilities and Services				X			
4. Regional Growth				X			
5. Employment				X			
6. Business Activity				X			
7. Farmland/Food Supply				X			
8. Water Supply				X			
9. Flooding Effects				X			
10. Energy Needs and Resources				X			
1. Air Quality					TEMP		
2. Terrestrial Habitat			X		TEMP		
3. Wetlands							
4. Aquatic Habitat				X			
5. Habitat Diversity and Interspersion					TEMP		
6. Biological Productivity					TEMP		
7. Surface Water Quality				X			
8. Water Supply				X			
9. Groundwater				X			
10. Soils				X			
11. Threatened or Endangered Species				X			
1. Historic Architectural Values				X			
2. Pre-Historic and Historic				X			



APPROVAL RECOMMENDED BY:

CHIEF	EC-D	BRANCH
CHIEF	EC-H	BRANCH
CHIEF	ENGR & CONST	DIVISION

PROJECT MANAGER _____

APPROVED BY: _____

DISTRICT ENGINEER _____

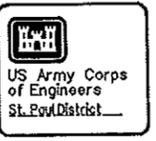
THIS PROJECT WAS DESIGNED BY THE ST. PAUL DISTRICT CORPS OF ENGINEERS. THE INITIALS OR SIGNATURES AND REGISTRATION DESIGNATIONS OF INDIVIDUALS APPEAR ON THESE PROJECT DOCUMENTS WITHIN THE SCOPE OF THEIR EMPLOYMENT AS REQUIRED BY FEDERAL REGULATIONS AND ALL DRAWINGS IN THIS SET.

CHIEF COST/SPEC/CIVIL/LA SECTION

CHIEF MECH/ELEC/STRU/ARCH SECTION

CHIEF GEOTECH/GEOLGY/SURV SECTION

CHIEF HYDRAULICS & HYDROLOGY SECT.



US Army Corps of Engineers
St. Paul District

Rev.	Date	Description	Appr.
1	APRIL 2007		

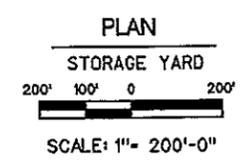
DEPARTMENT OF THE ARMY	ST. PAUL DISTRICT	COUS OF ENGINEERS	ST. PAUL, MINNESOTA
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File Name:	POOL.L047_COVLOC_0-000000.DWG	Plot Scale:	1:1000

CONSTRUCTION DRAWING
EMBANKMENT EROSION PROTECTION
LOCKS AND DAMS 6 AND 7
MISSISSIPPI RIVER
COVER SHEET
LOCATION AND VICINITY MAPS



CONTROL LINE "A" DATA

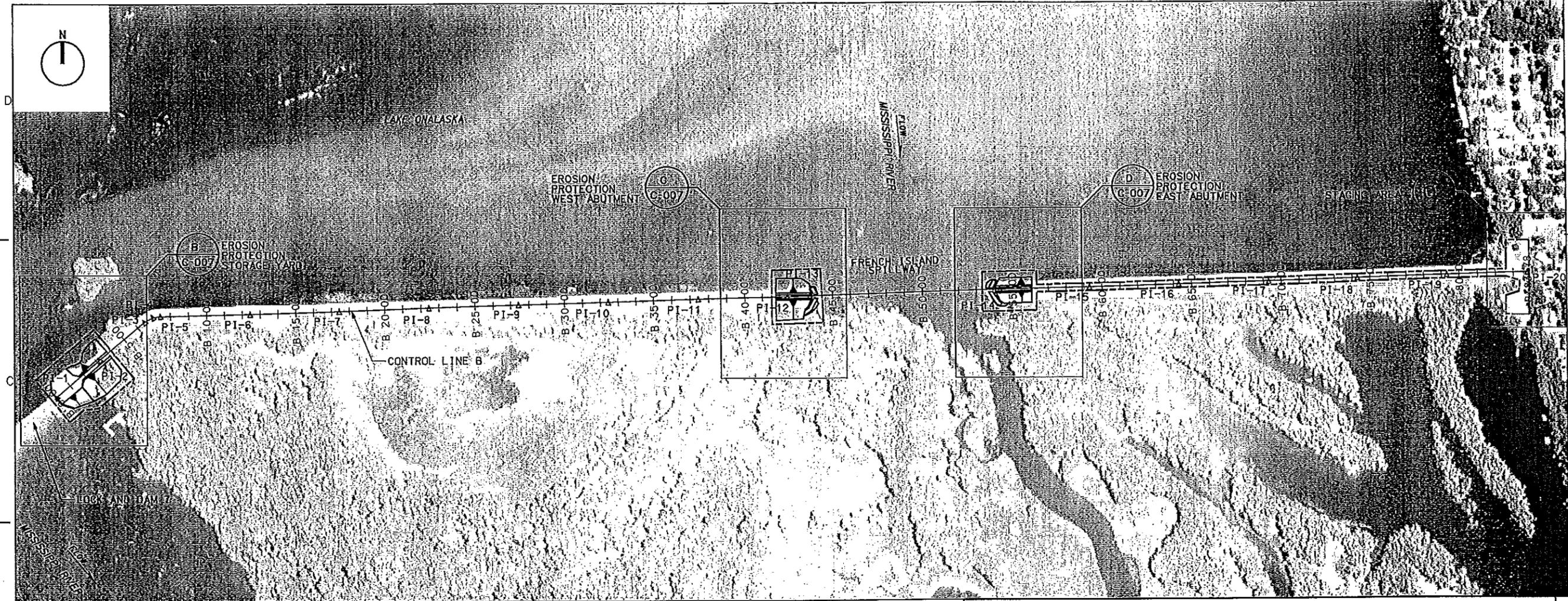
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P1-1A	A0+00.00			702281.167	3298235.190
P1-2A	A2+38.84	S 39°36'22" W	238.84'	702097.156	3298082.930
P1-3A	A5+95.45	S 40°33'53" W	356.61'	701826.247	3297851.022
P1-4A	A10+45.26	S 38°57'29" W	449.81'	701476.472	3297568.203
P1-5A	A21+32.83	S 39°00'39" W	1087.57'	700631.399	3296883.615
P1-6A	A24+80.15	S 39°27'10" W	347.32'	700363.213	3296662.910
P1-7A	A28+20.92	S 39°37'50" W	340.77'	700100.764	3296445.557



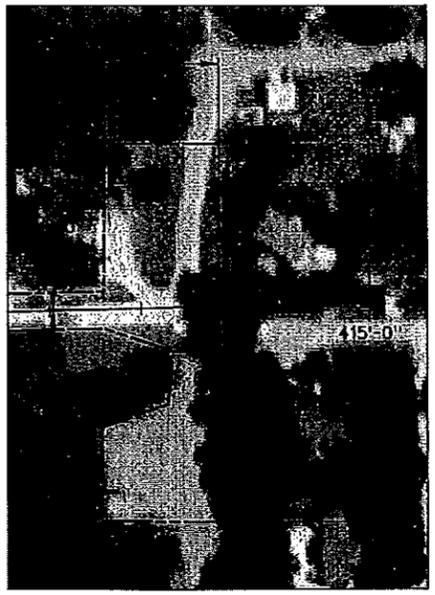
Symbol	Description	Date	Appr.
	BCCOE	APRIL 2007	

Designed by: EPP/DES	Checked by: LBM	Authority: PROJECT AUTHORITY	Plot Name: EPPS_LDRZ_PLANS_C-000002.DGN	Plot Date:
Date: MAR 08	Solicitation No.:	Drawing Number:		
DEPARTMENT OF THE ARMY ST. PAUL DISTRICT CORPS OF ENGINEERS ST. PAUL, MINNESOTA Horizontal Coordinate System: MINNESOTA STATE PLANE, SOUTH ZONE NAD 1983, US SURVEY FT Vertical Coordinate System: MSL NGVD 1972 (ADJ)				

CONSTRUCTION DRAWING
EMBANKMENT EROSION PROTECTION
LOCK AND DAM 6 AND 7
MISSISSIPPI RIVER
SITE DESIGN
LOCK AND DAM 6
PLAN



PLAN.
 STORAGE YARD & FRENCH ISLAND SPILLWAY
 300' 150' 0' 300'
 SCALE: 1" = 300'-0"



○ STAGING AREA
 SCALE:

CONTROL LINE DATA					
POINT ID	STATION	BEARING	DISTANCE(FT)	NORTHING (Y)	EASTING (X)
PI-1B	B 0+00.00			656107.436	3335048.426
PI-2B	B 3+18.50	N 49°25'28" E	318.50'	656314.602	3335290.340
PI-3B	B 6+48.16	N 50°02'38" E	329.67'	656526.314	3335543.042
PI-4B	B 7+01.57	N 60°30'52" E	53.41'	656552.602	3335589.533
PI-5B	B 7+44.78	N 82°13'29" E	43.20'	656558.447	3335632.340
PI-6B	B 12+44.80	N 88°44'46" E	500.03'	656569.390	3336132.246
PI-7B	B 17+44.80	N 88°17'15" E	500.00'	656584.331	3336632.023
PI-8B	B 22+44.81	N 87°56'38" E	500.00'	656602.271	3337131.705
PI-9B	B 27+44.81	N 88°10'23" E	500.00'	656618.212	3337631.451
PI-10B	B 32+44.81	N 88°24'08" E	500.00'	656632.153	3338131.261
PI-11B	B 37+44.81	N 88°10'23" E	500.00'	656648.094	3338631.007
PI-12B	B 42+44.83	N 88°37'53" E	500.02'	656660.037	3339130.880
PI-13B	B 43+71.23	N 88°10'23" E	126.41'	656664.067	3339257.221
PI-14B	B 54+30.89	N 88°17'32" E	1059.66'	656695.648	3340316.407
PI-15B	B 59+30.89	N 88°34'41" E	500.00'	656708.056	3340816.257
PI-16B	B 64+30.89	N 88°27'49" E	500.00'	656721.463	3341316.078
PI-17B	B 69+30.89	N 88°20'56" E	500.00'	656735.870	3341815.870
PI-18B	B 74+30.89	N 88°20'56" E	500.00'	656750.277	3342315.663
PI-19B	B 79+30.89	N 88°20'56" E	500.00'	656764.684	3342815.455
PI-20B	B 83+78.44	N 88°20'56" E	447.55'	656777.580	3343262.819

Designed by EPP/ACS	Drawn by EPP	Checked by JEM	Date MAY 06	Revision KC
Authority PROJECT AUTHORITY			Drawing Number	
File Name: P:\p001\p001_1067_P\PLAN07_L0-000000.dwg				

DEPARTMENT OF THE ARMY
 ST. PAUL DISTRICT
 OFFICE OF ENGINEERS
 ST. PAUL, MINNESOTA
 Horizontal Coordinates System
 MINNESOTA STATE PLANE, SOUTH ZONE
 NAD 1983, US SURVEY FT

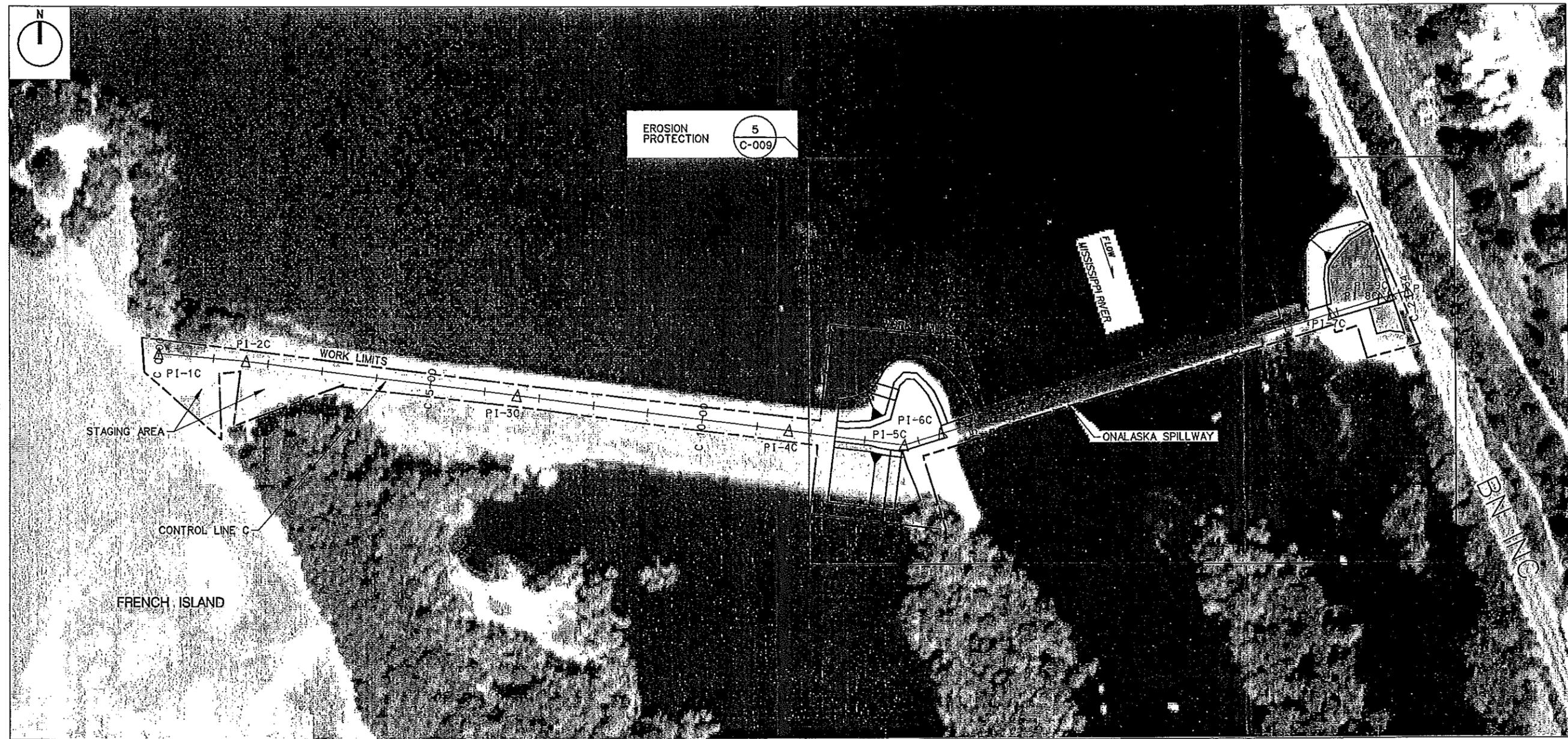
CONSTRUCTION DRAWING
 EMBANKMENT EROSION PROTECTION
 LOCK AND DAM 6 AND 7
 MISSISSIPPI RIVER
 SITE DESIGN
 LOCK AND DAM 7 OPTION 1

Rev.	Date	Description	Appr.
1	APRIL 2007		

DESIGNED BY C/AS	DATE MAY 08	SCALE AS SHOWN
DRAWN BY JAW	CHECKED BY JAW	PROJECT NUMBER 1007
PROJECT AUTHORITY FILE NAME 1007_EPS_LDRY_PLANTON_C-00007.DWG	PLANT SCALE	PLANT DATE

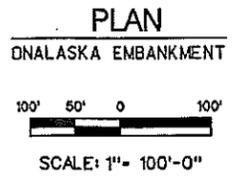
CONSTRUCTION DRAWING
EMBANKMENT EROSION PROTECTION
LOCK AND DAM 6 AND 7
MISSISSIPPI RIVER

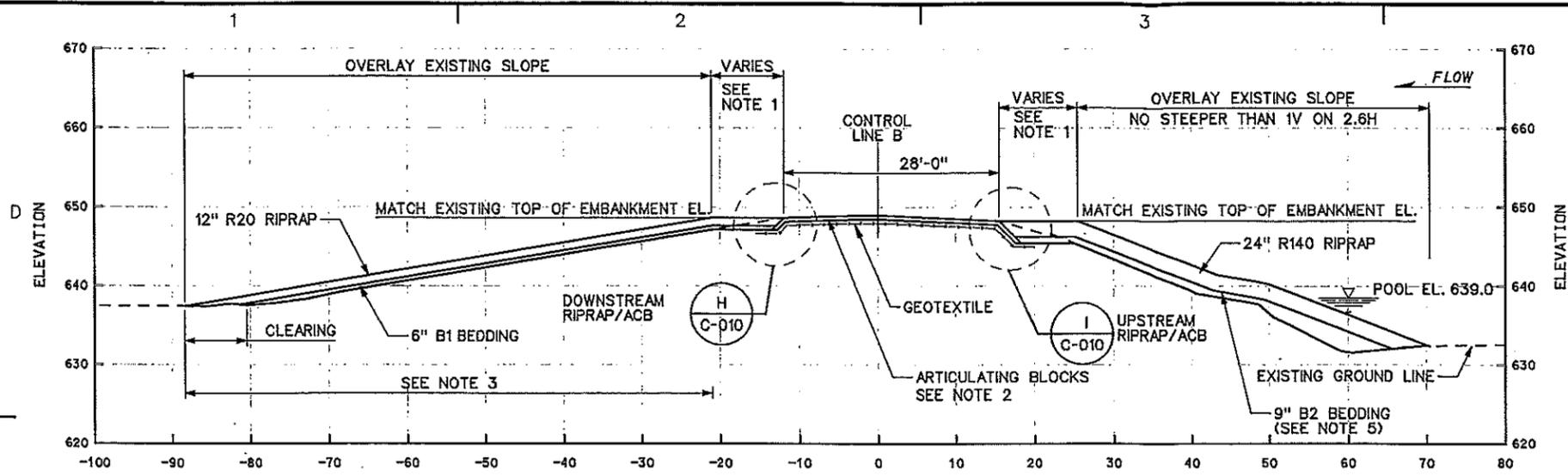
SITE DESIGN
LOCK AND DAM 7 OPTION 2
ONALASKA EMBANKMENT PLAN



CONTROL LINE DATA

POINT ID	STATION	BEARING	DISTANCE(FT)	NORTHING (Y)	EASTING (X)
PI-1C	C 0+00.00	S 85°01'33" E	159.88'	662613.343	3350840.151
PI-2C	C 1+59.88	S 82°44'02" E	500.00'	662599.481	3350999.427
PI-3C	C 6+59.88	S 82°44'02" E	500.00'	662536.243	3351495.412
PI-4C	C 11+59.88	S 82°44'03" E	213.30'	662473.004	3351991.396
PI-5C	C 13+73.17	N 73°09'04" E	70.43'	662446.027	3352202.978
PI-6C	C 14+43.60	N 73°09'04" E	744.15'	662466.441	3352270.383
PI-7C	C 21+87.75	N 73°16'22" E	96.67'	662682.130	3352982.585
PI-8C	C 22+84.42	N 75°03'18" E	18.32'	662709.954	3353075.167
PI-9C	C 23+02.74	N 76°04'18" E	31.64'	662714.678	3353092.865
PI-10C	C 23+34.38			662722.295	3353123.579

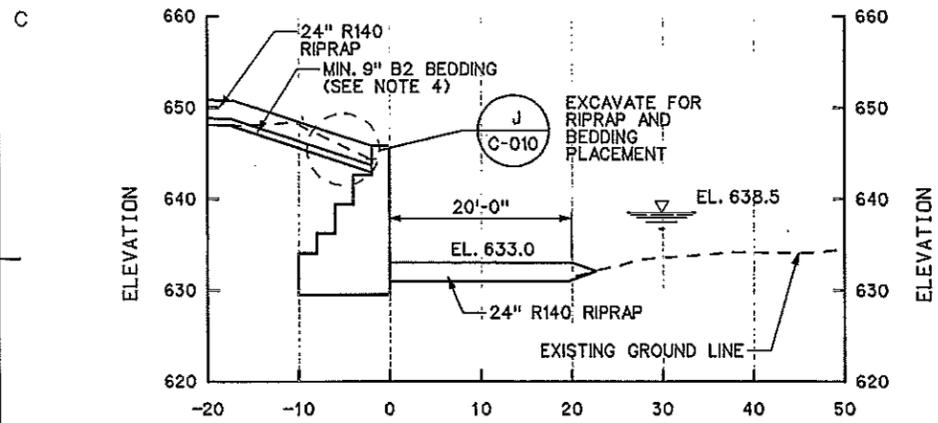




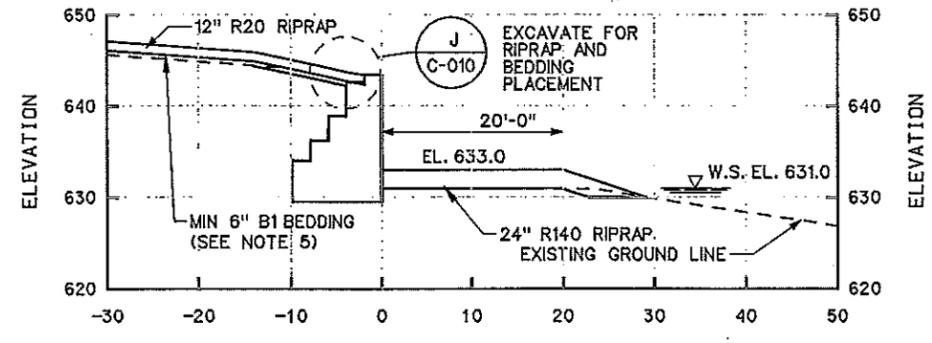
6 TYPICAL SECTION
 C-008 STA B 53+94 - STA B 55+94
 SCALE: AS SHOWN

NOTES:

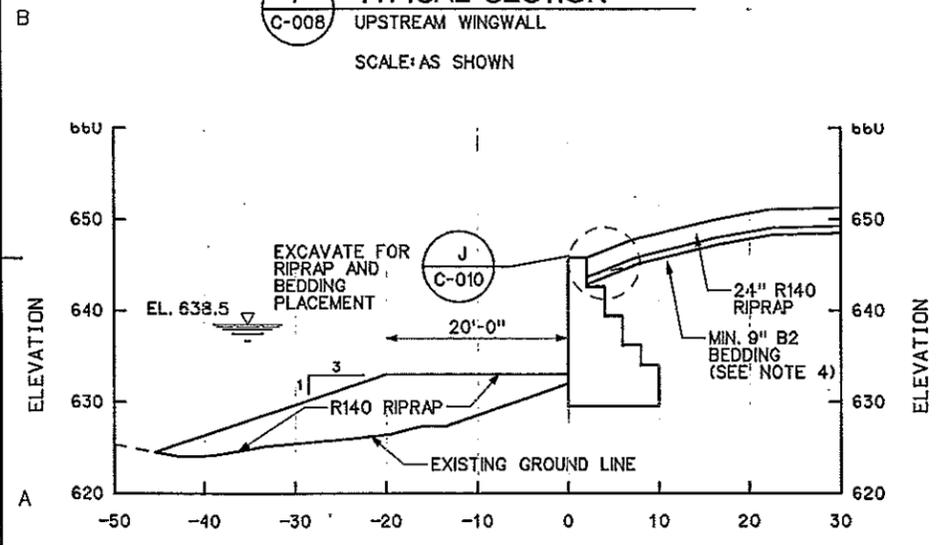
1. THE TOP WIDTH WILL VARY DUE TO THE CHANGING LOCATION OF THE TOP EDGE OF THE EMBANKMENT.
2. EXCAVATE 6" AND PLACE ARTICULATING BLOCKS BETWEEN THE EXISTING TOP EDGES OF THE EMBANKMENT. FILL HOLES IN ARTICULATING BLOCKS WITH AGGREGATE.
3. UNDERLAY ARTICULATING BLOCKS WITH GEOTEXTILE. EXTEND GEOTEXTILE 2' UNDER THE BEDDING.
4. A MINIMUM OF 9" OF BEDDING IS REQUIRED, HOWEVER, THERE SHALL BE NO MORE THAN IS NECESSARY TO PRODUCE THE MINIMUM SLOPE.
5. A MINIMUM OF 6" OF BEDDING IS REQUIRED, HOWEVER, THERE SHALL BE NO MORE THAN IS NECESSARY TO PRODUCE THE MINIMUM SLOPE.



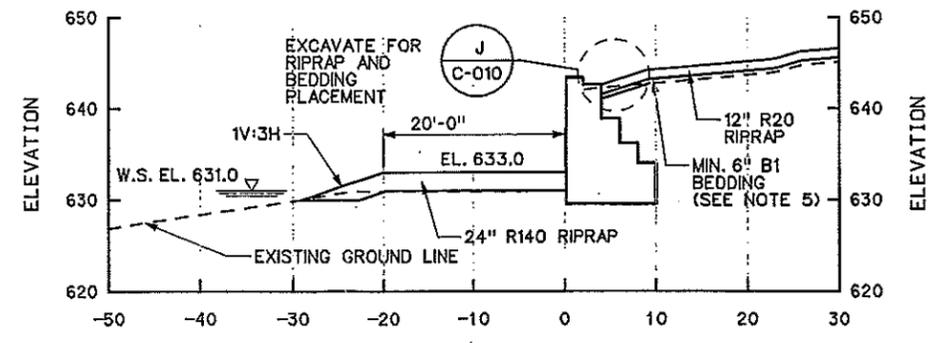
7 TYPICAL SECTION
 C-008 UPSTREAM WINGWALL
 SCALE: AS SHOWN



8 TYPICAL SECTION
 C-008 DOWNSTREAM WINGWALL
 SCALE: AS SHOWN



9 TYPICAL SECTION
 C-008 UPSTREAM WINGWALL
 SCALE: AS SHOWN



10 TYPICAL SECTION
 C-008 DOWNSTREAM WINGWALL
 SCALE: AS SHOWN



Rev.	xx	Date	Rev.	xx
Designed by	EPP/AS	Drawn by	AS	
Checked by	AS	Reviewed by	AS	
Author	AS	Project	AS	
File Name	Pool_LPS_L107_200711_C-30001.DGN	Plot Scale		
Plot Date		Plot Title		
Symbol		Description		Date
				Appr.

DEPARTMENT OF THE ARMY
 ST. PAUL DISTRICT
 CORPS OF ENGINEERS
 ST. PAUL, MINNESOTA
 Horizontal Coordinate System
 MINNESOTA STATE PLANE, SOUTH ZONE
 NAD 1983, US SURVEY FT
 Vertical Coordinate System
 MSL, NGVD 1912 (ADJ)

CONSTRUCTION DRAWING
 EMBANKMENT AND PROTECTION
 LOCK AND DAM 6 AND 7
 MISSISSIPPI RIVER
 SITE DESIGN
 LOCK AND DAM 7 OPTION 1
 FRENCH ISLAND TYPICAL SECTIONS 6-10

