



**US Army Corps
of Engineers**
Rock Island District

OPERATION AND MAINTENANCE MANUAL

POTTERS MARSH REHABILITATION AND ENHANCEMENT

**UPPER MISSISSIPPI RIVER
ENVIRONMENTAL MANAGEMENT PROGRAM**

**POOL 13
RIVER MILES 522.5 - 526
CARROLL AND WHITESIDE COUNTIES, ILLINOIS**

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1. INTRODUCTION.

a. Purpose and Scope.

(1) This manual serves as a guide for the operation and maintenance of Potters Marsh Rehabilitation and Enhancement project. It provides operation and maintenance instructions for the major features of this environmental management project. The instructions are consistent with the general procedures presented in the April 1992 Definite Project Report. This document is written for project and management personnel who are familiar with the project and does not contain detailed information which is common to site personnel or which is presented in other existing manuals or regulations.

(2) The intent of the operating instructions is to provide information which allows orderly and efficient use of the constructed features to meet project goals and objectives. The intent of the maintenance instructions is to present preventative maintenance information consisting of systematic inspections and subsequent corrective actions which should ensure long-term utilization of equipment and features. A timely preventative maintenance program reduces and virtually eliminates breakdown of essential equipment and prevents major damage to constructed features by early corrective action.

(3) This manual provides the general standards of maintenance and establishes an initial frequency of maintenance inspections which should ensure satisfactory project performance.

b. Use of Manual.

(1) This manual is divided into the following sections: Section I: Introduction; Section 2: Historical

Summary; Section 3: Description of Project Features; Section 4: Inspections; Section 5: Operation and Maintenance of Project Features; and Section 6: Performance Monitoring and Assessment.

(2) Sections 2 and 3 present historical summaries and descriptions of actual features constructed for this project. Section 4 includes project inspection procedures, and Section 5 presents operation and maintenance instructions for each project feature. Section 6 summarizes monitoring activities conducted through construction as well as an overview of continued monitoring actions. Performance monitoring is considered necessary to properly evaluate effects of the constructed project features.

(3) The attached drawings have been included to provide general project "as-built" plans and typical sections.

2. HISTORICAL SUMMARY.

a. Authorization and Location.

(1) This project is authorized by the 1985 Supplemental Appropriations Act (Public Law 99-88) and Section 1 103 of the Water Resources Development Act of 1986 (Public Law 99-662). The project was funded and constructed under this authorization by the U.S. Army Corps of Engineers, Rock Island District, in cooperation with the U.S. Fish and Wildlife Service (USFWS) and the Illinois Department of Natural Resources (Illinois DNR) formerly the Department of Conservation (DOC).

(2) The Potters Marsh complex encompasses approximately 2,305 acres of aquatic, wetland, and terrestrial habitat. It is located in Pool 13 on the Illinois side of the Upper Mississippi River navigation channel between river miles (RM) 522.5 and 526 in both Carroll and Whiteside Counties, Illinois, approximately 1 mile west of the city of Thomson, Illinois.

b. Planning and Construction Activities.

(1) Summary. Table 2.1 provides a summary of planning and construction activities.

TABLE 2.1
SUMMARY OF PLANNING AND CONSTRUCTION ACTIVITIES

Project Phase	Purpose	Responsible Agency	Item	Significant Events	Date	Remarks
Pre-project	Identify and define problems and establish need of project.	CORPS/USFWS	Fact Sheet	Submitted to ASA 1/	MAR 87	--
				Approved by ASA	MAY 88	--
Design	Quantify project objectives, perform preliminary design, satisfy NEPA and permit requirements, develop performance evaluation plan, obtain project approval for construction.	CORPS	Definite Project Report	Draft	JULY 91	--
				Final	APRIL 92	--
				Approved	JUNE 92	--
				NEPA Compliance		
				SHPO Concurrence	29 MAY 91	--
				Public Review	18 JAN 92	--
				FONSI for EA	3 APR 92	--
				Permits		
				Section 401	13 APR 92	--
				Section 404	30 APR 92	--
Construction	Finalize plans and specifications, obtain operation and maintenance agreement, advertise and award construction contract, construct project.	CORPS	Plans and Specifications	Final	MAR 93	--
				Approved	MAY 93	--
				Real Estate		
				O&M Agreement	MAY 93	Ref. App. A
				Construction Contract		
				Awarded	SEP 93	--
Post-Construction	Operate and maintain project.	USFWS	Substantially Complete		DEC 95	--
						Reference Sections 4 and 5
	Perform evaluation monitoring.	CORPS				Reference Section 6

Notes:

1/ Assistant Secretary of the Army

(2) Goals and Objectives. Goals and objectives were formulated during the design phase. Table 2.2 provides a summary of project goals and objectives.

TABLE 2.2 PROJECT GOALS, OBJECTIVES, AND ENHANCEMENT POTENTIAL				
Goal	Objective	Unit of Measure	Enhancement Potential	
			Existing	Target
Rehabilitate and Enhance Aquatic Habitat	Restore and create fisheries habitat	Acre-Feet of Deep Water	150	244
	Reduce sediment input	Acre-Feet of Deep Water	6.9	36.9
Enhance Habitat for Migratory Birds Through Wetland Rehabilitation	Increase migratory bird feeding and resting area	Acres of Managed Marsh	0	35
		Acres of Grassland	0	7
	Increase waterfowl brood habitat & fall feeding sites	Acres of Potholes	2	6.8

(3) Project Design. The project was designed by the Rock Island District, U.S. Army Corps of Engineers, in cooperation with the USFWS and the Illinois DNR. Design considerations and investigations are presented in the Definite Project Report dated April 1992.

(4) Construction Contract. The construction contract, number DACW25-93-C-0115, was awarded to J. F. Brennan, La Crosse, Wisconsin, on 11 September 1993 in the amount of \$2,018,325. This bid was approximately 64% of the Government Estimate. The construction contract was supervised by the Rock Island District, U.S. Army Corps of Engineers.

(5) Construction Problems. Alignment D required resurvey when it became apparent that the original alignment would take the channel directly through a vegetated island

at the lower end of Mallard Bay. The modification for resurvey was awarded at \$4,322.48.

Due to a higher percentage of sand in the dredged material than had been anticipated, a modification for surveying the containment area, degrading of the grassland area, deletion of the remainder of alignments D and G, and additional fine material dredging was negotiated. This modification was required because the higher than anticipated percentage of sand was threatening to leave the placement site as one large mound of sand and a smaller area of permanently standing water. This configuration would not have been conducive to the managed marsh operation. Another concern addressed under this modification was a potential shortage of topsoil due to the smaller percentage of fines and organic material in the dredged material. The modification was awarded at \$182,380.00.

c. Actual Project Costs. The actual project costs are presented in Table 2.3.

TABLE 2.3 ACTUAL PROJECT COSTS						
POTTERS MARSH, ILLINOIS, HABITAT REHABILITATION AND ENHANCEMENT PROJECT (DACW25-91-C-0057)						
Item	Description	Quantity	U/M	U/P	Amount	
0001	Performance Bond	1	LS	\$ 9,000.00	\$ 9,000.00	
0002	Mobilization and Demobilization	1	LS	221,000.00	221,000.00	
0003	Clearing and Grubbing	1	LS	100,000.00	100,000.00	
0004	Access Road Embankment	1	LS	46,000.00	46,000.00	
0005	Dredged Material Containment Dike	1	LS	378,000.00	378,000.00	
0006	Hydraulic Dredging	426,009	CY	2.25	958,520.25	
0007	Potholes Created by Mechanical Excavation	11	EA	4,000.00	44,000.00	
0008	Potholes Created by Explosives	7	EA	4,250.00	29,750.00	
0009	Stoplog Structure	1	LS	20,000.00	20,000.00	
0010	Water Well	1	LS	35,000.00	35,000.00	

TABLE 2.3 (Continued)
ACTUAL PROJECT COSTS

Item	Description	Quantity	U/M	U/P	Amount
0011	Electrical Work				
0011A	By the Contractor	1	LS	42,000.00	42,000.00
0011B	By Interstate Power Company at the Expense of the Contractor	1	LS	22,000.00	22,000.00
0012	Granular Surfacing	1,600	TN	12.50	20,000.00
0013	Seeding	1	LS	50,000.00	50,000.00
0014	Culvert	1	LS	1,000.00	1,000.00
0015	Realign Traverse D	1	LS	4,322.48	4,322.48
0016	Containment Modifications	1	LS	182,380.00	<u>182,380.00</u>
			Subtotal		\$2,162,972.73
	TOTAL CONSTRUCTION				\$2,162,972.73
	PLANNING, ENGINEERING, AND DESIGN				637,232.55
	CONSTRUCTION MANAGEMENT				175,158.05
	TOTAL PROJECT COSTS				\$2,975,363.33

d. Project References. Table 2.4 summarizes related project references.

TABLE 2.4 PROJECT REFERENCES		
Title	Date	Purpose
Upper Mississippi River System Environmental engineering and Management Program, Definite Project Report (R-9) with Integrated Environmental Assessment, Potters Marsh, Illinois, Rehabilitation and Enhancement, U.S. Army Corps of Engineers, Rock Island District	Apr 92	Provides planning, engineering, and sufficient construction details of the selected plan for project approval purposes.
Construction As-Builts	Apr 96	Provides as-built construction drawings.
Manufacturer's Data (Shop Drawings)	Apr 96	Provides detailed operation and maintenance instructions for specific pieces of equipment as recommended by the manufacturer.
Performance Evaluation Report	TBP ^{1/}	Provides summary of project performance based on project post-construction monitoring.

^{1/} To Be Prepared.

3. DESCRIPTION OF PROJECT FEATURES.

a. Project Data. Table 3.1 presents a summary of project data.

TABLE 3.1 PROJECT DATA SUMMARY		
Item	Quantity	U/M
<i>Hydraulic Dredging</i>		
Main Channel		
Dredge Volume	312,712	Cubic Yards
Length	24,100	Feet
(Average) Bottom Width	50	Feet
(Average) Depth Below Flat Pool	8	Feet
Side Slopes	2:1	Horizontal:Vertical
Deep Holes		
Dredge Volume	72,794	Cubic Yards
Length	1,000	Feet
(Average) Bottom Width	200	Feet
(Average) Depth Below Flat Pool	12	Feet
Side Slopes	2:1	Horizontal:Vertical
Sediment Trap Dredging (Channel)		
Dredge Volume	36,526	Cubic Yards
Length	2,100	Feet
(Average) Bottom Width	50	Feet
(Average) Depth Below Flat Pool	10	Feet
Side Slopes	2:1	Horizontal:Vertical
Sediment Trap Dredging (Hole)		
Dredge Volume	3,977	Cubic Yards
Length	60	Feet
(Average) Bottom Width	200	Feet
(Average) Depth Below Flat Pool	10	Feet
Side Slopes	2:1	Horizontal:Vertical
Well		
Submersible Pump	1	500 gpm at 30' TDH
Well Depth	115	Feet
Well Diameter	12	Inches
Electric Power Source		
Primary Supply	7,200	V, 1 phase
Transformer Size	15	kVA, 1 phase
Inflow Pipe	8	CI
Water Control Structure		
Concrete	54	Cubic Yards
Weir Length	4	Feet
Invert Elevation	584.5	MSL

TABLE 3.1 (Continued)
PROJECT DATA SUMMARY

Item	Quantity	U/M
Access Road		
Length	5,100	Feet
Width	12	Feet with crushed stone surface
Mechanical Potholes		
Number	11	Each
Water Surface	3.27	Acres
Depth	3-4	Feet
Blasted Potholes		
Number	7	Each
Water Surface	2.4	Acres
Depth	5±	Feet

b. General Description. The Potters Marsh project consists of aquatic habitat enhancement by hydraulic channel dredging and wetland habitat enhancement by creating grassland habitat, creating a managed marshland, and increasing waterfowl nesting and brood habitat and fall feeding sites by creation of potholes. Water for the managed marshland is provided by a well located on the containment/managed marshland unit dike. The water level control is provided by the containment dikes and a stoplog structure which are used to impound water to a depth of approximately 1.5 feet.

c. Aquatic Habitat Channels. Segments 2 and 3 of the hydraulic dredging were dredged to restore and provide additional backwater complex aquatic habitat (see dredging plan plates 4-8). Overwintering and summer thermal refuge area for fish was restored. The bottom width of the dredging was 50 feet with a depth of 8 feet below flat pool. A deep hole was dredged in each of these segments. The deep holes are each 500 feet long by 200 feet wide and 12 feet deep. Side slopes in these segments are 2 horizontal on 1 vertical (see typical section plate 13).

d. Sediment Trap. A mechanically excavated deep hole sediment trap was created immediately below the existing causeway (see dredging plan plate 3). The deep hole is 200 feet wide by 60 feet long by 10 feet deep (see typical section plate 13).

Segment 1 hydraulic dredging in upper Potters Slough is also considered part of the sediment trap feature. Segment 1 is approximately 2,100 feet long with a 50-foot bottom width and 10-foot depth. The side slopes are 2 horizontal on 1 vertical.

e. Potholes. Both mechanical excavation and explosives were used in the creation of open water depressions within the developing mudflats and higher terrestrial habitat. These holes have filled with water and will provide secluded open water for ducks and geese.

f. Managed Marshland.

(1) Annual Management Plan. The managed marsh area will be inundated with approximately 1.5 feet of water in either the fall or the spring. If flooded in the fall, water levels will be maintained throughout the fall and spring migration periods. The inundation will provide feeding and resting areas for migratory birds. In the spring, the area will be drained by withdrawing the stoplogs. Every 3 to 5 years, the area will be flooded with over 3 feet of water for approximately 50 days to eliminate undesirable vegetation.

(2) Water Supply Well. The well has been sized to fill the marshland to 1.5 feet in 20 days. The well plans and details are shown on plates 3 and 18.

The well is provided with a 500 gpm submersible pump. The pump is housed in a vandal-resistant protective casing. The outlet has been provided with a splash pad which was slightly modified with additional erosion protection following pump testing. Underground electrical power is provided to the site, and all necessary electrical equipment is located on a power pole in the vicinity of the pump station, as shown on plates 14, 15, and 16.

(3) Water Control Structure. Operation of the managed marsh requires the use of one concrete stoplog water control structure (see plates 18 - 22). The water control structure has one 4-foot stoplog bay. The water control structure has a steel grate deck to allow easy access for cleanout.

(4) Site Access. Access to the project is gained by a crushed stone access road (see plan plate 2). The first 800-foot segment of the access road follows a previously existing access road alignment from the refuge parking lot at the project site to the former agricultural lease field. The remainder of the road is new construction. The road is 10 feet wide with 1-foot shoulders and surfaced with 6 inches of crushed stone (see typical sections plate 13). The road is used by USFWS personnel for operation and maintenance activities. The access road also facilitates delivery of materials for seeding and operation and maintenance of the well and water control structure.

Access to the site is controlled by the USFWS with a locked gate to prevent public vehicular access to the refuge area and to minimize consequent disturbance.

g. Grassland. A grassland was developed on a 7-acre area in the southernmost portion of the contained placement site. This area was graded to be the same elevation as the top of the dike. The area was seeded with selected grasses and prairie forbs.

4. INSPECTIONS

a. General

(1) An active maintenance program is based on inspections and subsequent servicing, adjustment, or repair. The two main objectives of inspections are to: (1) ensure project serviceability by timely and thorough inspections, thereby avoiding or reducing maintenance costs, and (2) document the condition of the project as a baseline for consideration of rehabilitation for project damage resulting from a major storm or flood event.

(2) The two types of inspections for the project are: (1) Project Inspection by the Site Manager, and

(2) Joint inspection by the Site Manager and personnel from the U.S. Army Corps of Engineers, Rock Island District.

b. Project Inspection by Site Manager.

(1) The Project Inspection should be performed by the Site Manager or appropriate representative for the purpose of noting routine deficiencies and initiating corrective actions. This inspection will be performed at periods not exceeding 12 months and will follow inspection guidance presented in subsequent sections of this manual. It is suggested that the inspection be conducted every May, which is representative of after-spring flood conditions. Other Project Inspections should occur as necessary after high water events or as scheduled by the Site Manager.

(2) 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 Potter's Marsh 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 B. 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.

c. Joint Inspection by Site Manager and U.S. Army Corps of Engineers.

(1) Routine. A Joint Inspection by the Site Manager and the Corps of Engineers shall be made in accordance with ER 1 130-2-339. The purpose of this inspection is to assure that adequate maintenance is being performed as presented in the Detailed Project Report and this manual. One exception to the maintenance requirements as found in the above stated regulation is in the mowing frequency (see section 5.b.(2) of this manual). This exception was mutually agreed upon by the Sponsor and the Corps of Engineers. The District Engineer or Authorized Representative should have access to all portions of the constructed project upon coordination with the Site Manager for this purpose.

(2) Catastrophic. A Joint Inspection by the Site Manager and the Corps of Engineers should be formally requested by the Site Manager immediately following a specific storm or flood event which causes damage exceeding the annual operation and maintenance as specified in this manual and the DPR. The Project Inspections by the Site Manager and Joint Inspections results will be the basis for determining maintenance responsibility and potential rehabilitation by the Corps of Engineers.

5. OPERATION AND MAINTENANCE OF PROJECT FEATURES.

a. General.

(1) This section presents operation and maintenance instructions for the major project features which were designed and constructed to minimize operation and maintenance requirements.

(2) Steps will be taken by the Site Manager to correct conditions disclosed by Project Inspections or Joint Inspections. Regular maintenance repair measures will be accomplished during the appropriate season as scheduled by the Site Manager to ensure structure serviceability. Appropriate advance measures will be taken to ensure the availability of adequate labor and materials to meet contingencies.

(3) Project features should be continuously maintained and operated to obtain maximum benefits. No encroachment or trespass which will adversely affect the efficient operation or maintenance of the project should be permitted upon the constructed features. No improvement should be passed over, under, or through the constructed features, nor should any excavation or construction be permitted within these features without prior approval by the Corps of Engineers, Rock Island District. Such improvements or alterations which are desirable and permissible should be constructed in accordance with standard engineering practice. Advice regarding the effect of proposed improvements or alterations on the functioning of the project and information concerning methods of construction acceptable under standard engineering practice should be obtained from the District Engineer or, if

otherwise obtained, should be submitted for approval. Drawings or prints showing improvements or alterations as finally constructed should be furnished to the District Engineer after completion of such work.

(4) The capability of the USFWS to carry out the maintenance responsibilities described below will be contingent upon the passage of sufficient appropriations for that purpose by Congress.

b. Containment Dike.

(1) Operation.

(a) During operational inundation period, the dike should be inspected to be certain that:

(i) There are no indications of slides or sloughs developing;

(ii) Wave wash or scouring action is not occurring;

(iii) No low reaches of dike below design grade exist which may be overtopped; and

(iv) No other conditions exist which might endanger the structure.

(b) Appropriate advance measures should be taken to insure availability of adequate labor and materials to meet contingencies. Steps should be taken to control any condition which endangers the dike and to repair the damaged section.

(2) Maintenance.

(a) The Site Manager should provide at all times such maintenance as may be necessary to ensure the serviceability of the dike in time of inundation. Measures should be taken to promote the growth of sod, control burrowing animals, provide routine burns (1 burn per year) on the dike extending 5 feet horizontally from the toe of the dike, remove wild, woody growth and drift deposits, and repair damage caused by erosion or other forces.

(b) Project inspections should be made by the Site Manager to ensure that the above maintenance measures are being effectively carried out and to be certain that:

(i) no unusual settlement, sloughing or material loss of grade or dike cross section has taken place;

(ii) no caving has occurred on either the landside or the riverside of the dike which might affect the stability of the dike section;

(iii) no seepage, saturated areas, or sand boils are occurring;

(iv) no action is being taken, such as burning grass and weeds during inappropriate seasons, which will retard or destroy the growth of sods;

(v) the crown of the dike is shaped to drain readily;

(vi) there is no unauthorized grazing or vehicular traffic on the dike; and

(vii) encroachments are not being made on the dike which might endanger the structure or hinder its proper and efficient functioning during times of inundation.

(c) Such inspections should be made prior to the beginning of an inundation period, immediately following major high water periods, and otherwise at intervals necessary to insure the best care of the levee or one time per year as stated in section 6. Steps should be taken to correct conditions disclosed by such inspections. Regular maintenance repair measures should be accomplished during the appropriate season as scheduled by the Site Manager.

c. Stoplog Structure.

(1) Operation.

(a) When the managed marsh is in use, the stoplogs in the perimeter water control structure should be installed. The stoplogs should remain in place until the marsh is not in use.

(b) A stoplog lifting hook is furnished with the project for the installation and removal of the stoplogs. This tool should be stored in a secure place to allow ready use when needed.

(2) Maintenance.

(a) The water control structure should be inspected immediately following draining of the marsh or a high water event to determine whether seepage is taking place along the lines of its contact with the embankment. Corrective action should be taken upon discovery of any adverse conditions at the structure.

(b) Project inspections of the control structure should be made by the Site Manager to be certain that:

(i) stoplogs, headwalls, staff gages, stoplog keepers, steel rails, posts and grating are in good operating condition;

(ii) inlet and outlet channels are open;

(iii) sediment and debris buildup is not occurring in CMP or inlet and outlet bays;

(iv) care is being exercised to prevent the accumulation of trash and debris near the structure; and

(v) erosion is not occurring adjacent to the structure which might endanger its function.

(c) Steps should be taken to repair damage, replace missing or broken parts, or remedy adverse conditions disclosed by such inspections.

d. Well.

(1) Operation. To inundate the marsh, the pump must be activated manually. The pump also must be deactivated manually once the desired interior water elevation is achieved. Pumping to maintain interior elevations during marsh operation also will be by manual activation/deactivation. To recover a 0.5-foot drop in interior water level, approximately 5 days of pumping will be required. Once initial flooding is completed, total water level drops during the impoundment period due to seepage, infiltration, and evaporation are not expected to exceed 0.5 foot. Water levels should be monitored periodically to assure adequate water levels are maintained.

(2) Maintenance. Well inspections should be performed by the Site Manager. Steps should be taken to correct conditions disclosed by such inspections. The well inspection should include the following:

(a) Well. Visually inspect the protective casing and bollards and the discharge platform to discover any adverse conditions. Conditions that may affect the operation of the marsh should be corrected as soon as practicable.

(b) Controls. All electrical controls and associated wiring should be examined closely and their overall condition assessed. Watertight connections should be inspected for integrity. Any corroded, loose, or broken contacts should be cleaned, tightened, and repaired as needed.

(c) Pump.

(i) The pump should periodically be observed for indications of improper operation or damage. The pump will automatically shut down through the control and status unit located in the electrical panel on high stator winding temperature, stator casing leakage, or high lower bearing temperature.

(ii) Site Manager should have an authorized representative conduct pump inspections and maintenance and repair work in accordance with Pump Manufacturers Installation, Care, and Maintenance Manual. Ancillary equipment such as cables, level sensors, starter and monitoring equipment should also be periodically inspected. Damaged components should be repaired or replaced by a qualified mechanic or electrician.

e. Potholes.

(1) Operation. Specific operation requirements will be performed as determined by the Site Manager. The potholes should be inspected following high water events.

(2) Maintenance. The potholes should be cleared of debris. The banks should be kept clear of large trees.

f. Grassland Planting.

(1) Operation. Specific operation requirements will be performed as determined by the Site Manager. Survival and growth of grassland species will be monitored by the Rock Island District, U.S. Army Corps of Engineers, for 5 years by periodically inspecting the planting sites. Remedial actions shall be taken by the Site Manager as necessary to insure survival. The Site Manager should keep records of any herbicide application, as well as record of inspections and any corrective actions taken to insure survival. These records should be kept for a minimum of 5 years.

(2) Maintenance. Weedy and woody vegetation should be controlled for a minimum of 2 growing seasons by a combination of controlled burns and herbicide application. Woody vegetation should not be allowed to exceed a height of 1 foot during this maintenance period.

g. Access Road.

(1) Operation. The road should be inspected periodically and after high water events to assure that there have been no slides, sloughing, or washed out sections. The culvert should be inspected to assure no

debris is accumulating in the openings and that it allows water to continue to flow freely under the road.

(2) Maintenance. Any deficiencies noted during inspection of the access road should be corrected by shaping, grading, or placing rock as required. Any debris accumulating at the openings of the culvert should be removed.

6. PROJECT REHABILITATION OR ABANDONMENT.

a. 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 Potter's Marsh 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 or specific storms.

b. Project Rehabilitation or Abandonment. Should inspection of the project area following a major flood or natural disaster disclose substantial damage to any of the major components of the project that appears to exceed the annual operation and maintenance as specified in this manual and the Definite Project Report, the Corps and the USFWS should meet and discuss the appropriate course of action in light of the original project design. The inspections by the District Manager (as summarized in the submitted checklist) 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. Repair of damage attributable to lack of maintenance is 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.

This wording is what we use with the St. Paul District.

7. PERFORMANCE MONITORING AND ASSESSMENT.

a. General. The purpose of this section is to summarize monitoring and data collection aspects of the project. Table 6.1 presents the principal types, purposes, and responsibility of monitoring and data collection. Table 6.2 summarizes actual monitoring and data parameters grouped by project phase, responsible agency, and data collection intervals. Changes to the monitoring plan should be coordinated with the USFWS, the Illinois DNR, and the U.S. Army Corps of Engineers.

b. Post-Construction.

(1) General. Table 6.3 presents the post-construction evaluation plan. The monitoring parameters were developed to measure the effectiveness of the stated goals. The Site Manager should follow Table 6.3, as shown, to make annual field observations. These observations are summarized in checklist form in Appendix B. The annual field observations and the quantitative monitoring parameters will form the basis of project evaluation. The monitoring proposed focuses in large part on physical response to the project, i.e., acre-feet of water, surface acres of potholes, and acres of warm season grasses and forbs. A meeting was held in January 1996 to discuss the potential biological performance monitoring of the Potters Marsh project.

(2) Pothole Monitoring. Potters Marsh presents a unique opportunity to study the effectiveness of two types (blasted and mechanically excavated) of potholes in a big river floodplain. Monitoring may indicate which design is more effective at attracting wildlife and providing life requisites for those species.

The targeted species used in the pothole justification were waterfowl. Waterfowl depend upon high protein foods during brood and migration periods. Measuring the invertebrate populations of the potholes is critical in determining their impact to the waterfowl that may feed upon them.

Invertebrates will inhabit submergent and emergent plants. The vegetation also will be used as concealment cover for broods (family groups) of ducks and other nongame wildlife

species. Species of plants and amount of cover were important aspects that the group agreed to study.

Observational data of adult and juvenile ducks during critical periods of the year (brood and migration) are needed to determine home range and production of the site. Volunteer organizations may be installing artificial nest platforms on some of the potholes. Ms. Linda Miller of the USFWS will coordinate the volunteer effort. Use of these structures may be monitored as well.

(3) Other Feature Biological Monitoring. The dredged channels have already begun to attract overwintering fish. While it is difficult to net, trap, or shock fish under ice conditions, the best sampling methodology is a winter creel survey. Ice fishermen will be censused on their catch. Data can then be used to make conclusions on how well the fish response is to the feature. The Illinois Department of Natural Resources (Mr. Dan Sallee) has provided background information on the Potters Marsh fishery and a cost estimate of a creel survey. Summer fish use of the project will be surveyed by the Illinois DNR.

Managed marsh vegetation will be monitored by the USFWS through the management of the marsh. Types and coverage of plants will be recorded as the marsh matures with subsequent water fluctuation and planned burns.

The Illinois Natural History Survey has planned on completing a post-construction study of the State endangered turtle species, Blandings turtle. Preconstruction studies have been completed.

The USFWS may be able to conduct fish studies on the site through their fisheries assistance office. Fish and Wildlife Service will request funding for fisheries monitoring. This work will only be completed if funds become available.

The USFWS is now completing waterfowl counts two ways. Aerial counts of Pool 13 are flown weekly during the fall migration. A specific count of the lower Pool 13 is being recorded. Weekly on-ground observation by refuge staff is also being done. These observations may be supplemented with bag checks of duck hunters using the area.

TABLE 6.1
MONITORING AND PERFORMANCE EVALUATION PLAN

Type Of Activity	Purpose	Responsibility	Instructions
Pre-Project Monitoring	Establish need of proposed project features	Sponsor	--
Baseline Monitoring and Data Collection for Design	Establish baseline monitoring consistent with goals and objectives and meet specific requirements	Corps of Engineers	See plate 22
Construction Monitoring	Continue monitoring, assess construction impacts, and meet permit requirements	Corps of Engineers	Include in construction contract documents
Performance Evaluation Monitoring	Continue monitoring and assess performance of project relative to goal and objectives	Sponsor (field observations)	See Table 6.2
		Corps of Engineers (quantitative)	See Table 6.3
Analysis of Biological Responses	Evaluate predictions and assumptions made during initial WHAG analysis	USFWS	<u>1/</u>

1/ Annual waterfowl census data will be obtained from the USFWS to determine waterfowl response to the project.

TABLE 6.2
ANNUAL POST-CONSTRUCTION FIELD OBSERVATION 1/

Goals	Objective	Unit of Measure	Enhancement Feature	Field Observation
Rehabilitate and Enhance Aquatic Habitat	Restore and create fisheries habitat	Acre-feet of water	Hydraulically dredged channel, segments 2&3	Describe presence of snags, debris, channel sedimentation, or vegetation
			Improve water quality	Describe presence of fish stress or kills
	Reduce sediment input	Acre-feet of water	Hydraulically dredged channel, segment 1 & mech. excavate hole below causeway	Describe presence of snags, debris, channel sedimentation, or vegetation
Enhance Wetland Habitat for Migratory Waterfowl	Provide controlled water levels during waterfowl migration	Acres	Managed marshland unit	Presence of waterfowl
	Prairie and grass dominance	Acres	Grass and forbs plantings	Survival of plantings
	Increase waterfowl brood habitat & fall feeding sites	Acres	Pothole creation	Presence of vegetation and presence of waterfowl
	Increase total wetland values for migratory waterfowl	Habitat Suitability Indices & Habitat Units	All	Annual presence of waterfowl

1/ To be submitted to the Corps of Engineers by the USFWS with annual management report for Cooperative Agreement Lands.

TABLE 6.3
POST-CONSTRUCTION QUANTITATIVE MEASUREMENTS

Goals	Objective	Unit of Measure	Enhancement Feature	Monitoring Plan	Monitoring Intervals (Years)
Rehabilitate and Enhance Aquatic Habitat	Restore and create fisheries habitat	Acre-feet of water	Hydraulically dredged channel, segments 2&3	Soundings	5 <u>1/</u>
			Improve water quality	Perform water quality tests at stations 2 and 3	2W Apr-Sep M Oct-Mar
	Reduce sediment input	Acre-feet of water	Hydraulically dredged channel, segment 1 & mech. excavate hole below causeway	Soundings	5 <u>1/</u>
Enhance Wetland Habitat for Migratory Waterfowl	Provide controlled water levels during waterfowl migration	Acres	Managed marshland unit	Perform areal surveys	5 <u>1/</u>
	Increase desirable grassland species dominance	Acres	Grass and forbs plantings	Vegetation transect	1
	Increase waterfowl brood habitat & fall feeding sites	Acres	Pothole Creation	Acres of potholes	5 <u>1/</u>
	Increase total wetland values for migratory waterfowl	Habitat Suitability Indices & Habitat Units	All	WHAG analysis	1,15,50

1/ First monitoring activity to occur in the first year after construction.

APPENDIX A

OPERATION, MAINTENANCE, AND REHABILITATION AGREEMENT

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 POTTERS MARSH
CARROLL AND WHITESIDE COUNTIES, ILLINOIS

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 (DA) will operate in constructing, operating, maintaining, and rehabilitating the Potters Marsh, Illinois, 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 lands 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 at Potters Marsh 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 are 100 percent Federal.

III. GENERAL SCOPE

The project to be accomplished pursuant to this MOA shall consist of backwater channel hydraulic dredging, creation of a sediment trap, construction of a managed marshland with a grassland area on the confined placement site (CPS), and creation of potholes to increase waterfowl breeding habitat and fall feeding sites.

IV. RESPONSIBILITIES

A. The DA is responsible for:

1. Construction: Construction of the project which consists of dredging 20,700 lineal feet (394,000 cubic yards) for overwintering fish habitat; dredging 2,100 lineal feet (49,000 cubic yards) for a sediment trap; drilling one well with submersible pump; constructing CPS; improving an existing and

constructing a service road to managed marshland/CPS; establishing 32.5-acre managed marshland and 7-acre grassland area on the CPS with a stoplog structure; seeding the CPS dike with grass after dredged material settlement; and creating 23 isolated potholes for waterfowl use.

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 DA will construct the Potters Marsh Fish and Wildlife Enhancement Project as described in the Definite Project Report with Integrated Environmental Assessment, Potters Marsh Rehabilitation and Enhancement dated April 1992, 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 DA encounters potential delays related to construction of the project, the DA will promptly notify the USFWS of such delays.

4. **Maintenance of Records:** The DA 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 DA shall maintain such books, records, documents, and other evidence for a minimum of 3 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, Rock Island, the USFWS shall accept the project and shall operate, maintain, and repair the project as defined in the Definite Project Report with Integrated Environmental Assessment, Potters Marsh Rehabilitation and Enhancement dated April 1992, 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
Federal Building, Fort Snelling
Twin Cities, Minnesota 55111

DA: District Engineer
U.S. Army Engineer District, Rock Island
Clock Tower Building
P.O. Box 2004
Rock Island, Illinois 61204-2004

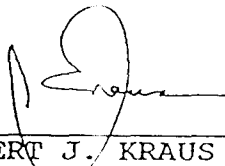
EFFECTIVE DATE OF MOA:

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

THE DEPARTMENT OF THE ARMY


**THE U.S. FISH AND WILDLIFE
SERVICE**

BY:



ALBERT J. KRAUS
Colonel, U.S. Army
District Engineer

BY:



SAM MARLER
Regional Director
U.S. Fish and Wildlife
Service

DATE:

18 May 1993

DATE:

12 May 1993

APPENDIX B
SITE MANAGER'S
PROJECT INSPECTION AND MONITORING RESULTS

Item

Condition

c. Well

- Protective casing
- Bollards
- Outlet pad
- Displaced/missing riprap
- Electrical controls
- Pump
- Other

d. Potholes

- Debris
- Woody vegetation encroachment
on banks
- Other

e. Vegetation - Grassland Planting

- Grassland and forb species
- Woody vegetation encroachment
- Other

f. Access

- Road - granular surfacing, etc.
- Drainage - CMP

2. COMMENTS

Site Manager

APPENDIX C
DISTRIBUTION LIST

DISTRIBUTION:

Mr. William F. Hartwig
Regional Director
U.S. Fish and Wildlife Service, Region 3
Federal Building, Fort Snelling
Twin Cities, Minnesota 55111

Mr. Keith Beseke
EMP Coordinator
U. S. Fish and Wildlife Service
51 E. 4th Street, Room 101
Winona, Minnesota 55987 (3 copies)

Mr. Jim Fisher
U.S. Fish and Wildlife Service
51 E. 4th Street, Room 101
Winona, Minnesota 55987

Mr. Ed Britton
U.S. Fish and Wildlife Service
Post Office Building
Savanna, Illinois 61074

Mr. Rick Nelson
U.S. Fish and Wildlife Service
4469 48th Avenue Court
Rock Island, Illinois 61201

Mr. Marvin Hubbell
Illinois Department of Natural Resources
524 S. Second Street
3rd Floor Planning Room 310
Springfield, Illinois 62706

Mr. Russ Gent
LTRM Bellevue Field Station
206 Rose Street
Bellevue, Iowa 52031

Ms. Holly Stoerker
Upper Mississippi River Basin Association
415 Hamm Building
408 St. Peter Street
St. Paul, Minnesota 55102

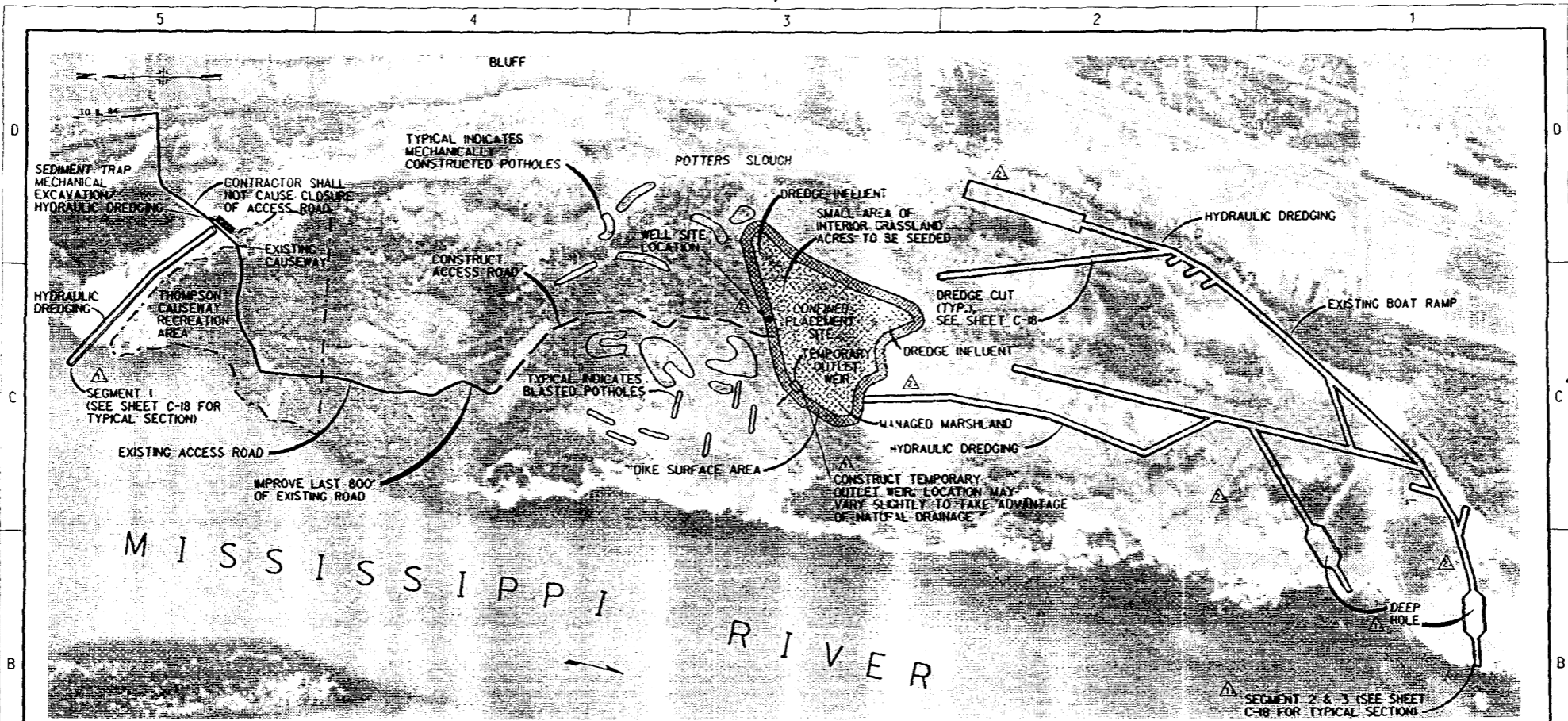
Mr. Robert L. Delaney
Environmental Management Technical Center
575 Lester Avenue
Lake Onalaska, Wisconsin 54650

Division Engineer
U.S. Army Engineer Division, North Central
ATTN: CENCN-PD/CENCN-CO
111 North Canal Street
Chicago, Illinois 60606

District Engineer
U.S. Army Engineer District, Rock Island
Clock Tower Building - P.O. Box 2004
Rock Island, Illinois 61204-2004
ATTN:

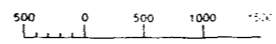
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CENCN-ED-H	CENCN-PD-W
CENCN-CD	CENCN-OD-T
CENCN-ED-G	CENCN-PP-M

PLATES



MECHANICAL POTHOLES	
POT HOLE NUMBER	MINIMUM AREA FEET ² /ACRES
1	15,900/.36
2	14,100/.32
3	8,500/.19
4	12,200/.28
5	9,700/.22
6	7,700/.17
7	18,300/.42
8	10,000/.23
9	17,000/.39
10	15,200/.34
11	15,400/.35
TOTAL	144,000/3.27

- NOTES:
1. CONTRACTOR'S ACTIVITIES WITHIN THE THOMPSON CAUSEWAY RECREATION AREA SHALL BE LIMITED TO ACCESS AND PRIMARY ELECTRICAL WORK. NO DREDGE LINES SHALL BE LAYED THROUGH ANY PORTION OF THE AREA. ALL WORK WITHIN THE AREA SHALL BE COORDINATED WITH THE PARK RANGER AS SPECIFIED.
 2. BLASTED POT HOLES WILL BE CONSTRUCTED TO THE MINIMUM DIMENSION SHOWN ON SHEET C-19 OBTAINING EXACT DIMENSIONS AS SHOWN ON THIS SHEET (C-17) IS NOT REQUIRED.
 3. THE DREDGE INFLUENT PIPE SHALL BE MOVED A MINIMUM OF TWO TIMES DURING DREDGE OPERATION. THE INFLUENT LINE SHALL BE LOCATED ON THE EAST SIDE OF THE CONTAINMENT DIKE ANYWHERE BETWEEN THE TWO LOCATIONS INDICATED.
 4. CONTRACTOR WORK LIMITS SHALL BE FIFTEEN FEET OUTSIDE TOE OF ACCESS ROAD AND CONTAINMENT DIKE.



- LEGEND:
- SEGMENT 1
 - SEGMENT 2
 - SEGMENT 3

Revisions		Date	Approved
Symbol	Description		
△	REVISED AS CONSTRUCTED	03 MAY 1993	W. REH/BLK
△	AND 91 - WINTER REVISIONS	2/16/93	DJH

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

Designed by: JHW
Drawn by: DJH
Checked by: REH/BLK

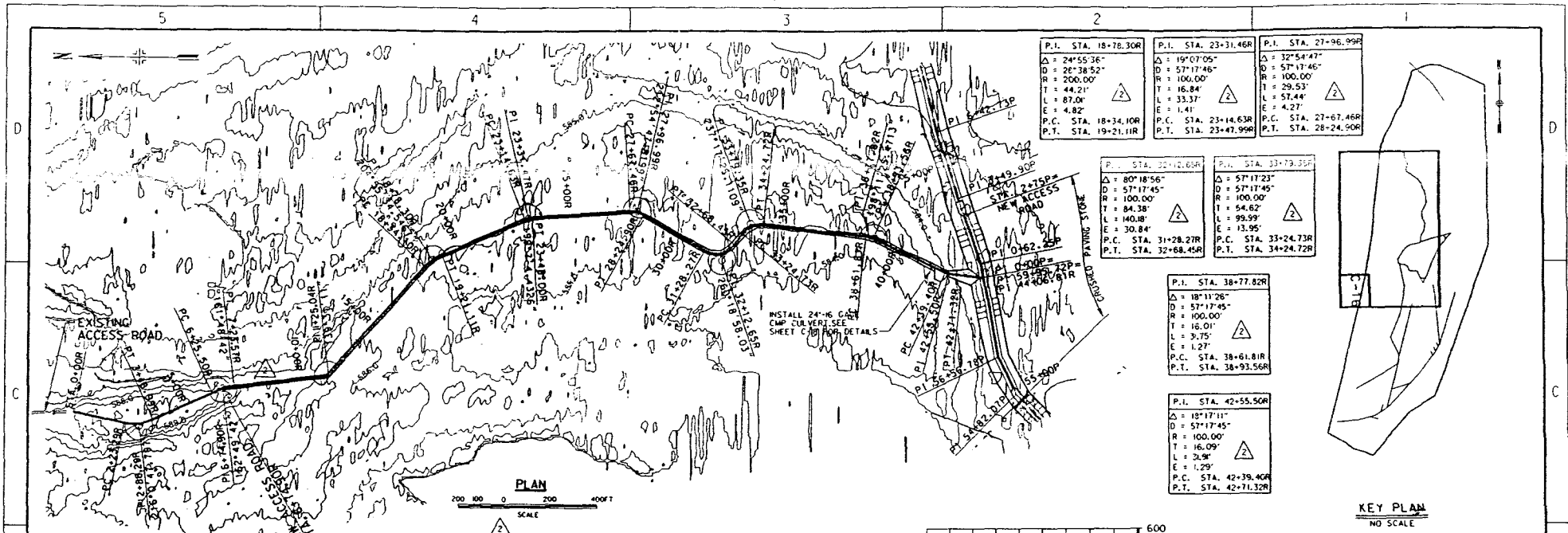
Reviewed by: DJH
Approved by: ALBERT J. HANCO, CO. ENGINEERS

UPPER MISSISSIPPI RIVER SYSTEM
ENVIRONMENTAL MANAGEMENT PROGRAM
POOL 13, RIVER MILE 523.5 - 526.5
POTTERS MARSH

LOCATION PLAN

Scale: AS SHOWN
Date: 25 MAY 1993
Drawing: ML 13-132
Sheet: C-1

Sheet Reference Number: 2/16/93
Solicitation Number: DACW-93-B-0018
Sheet 2 of 28

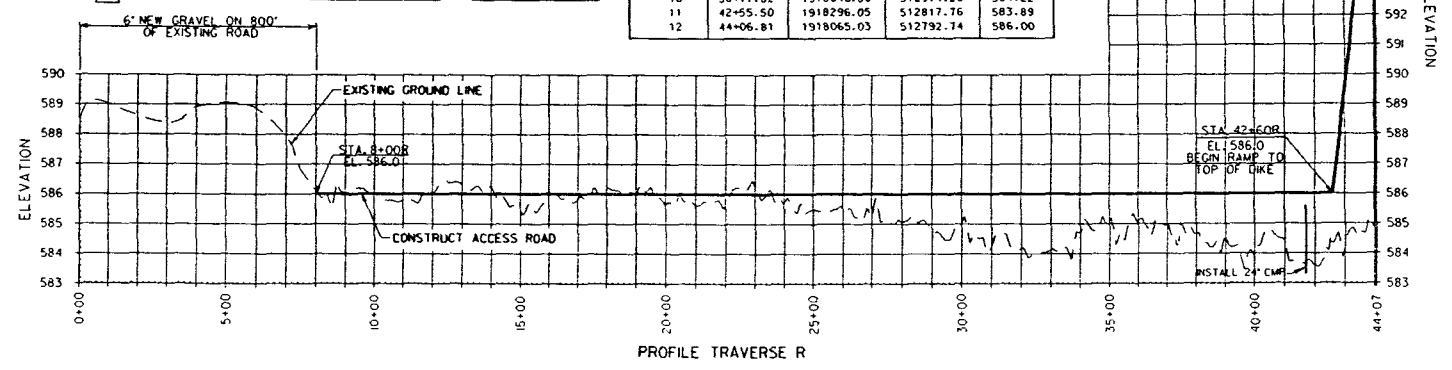


TRAVERSE POINTS				
TRAVERSE POINT	STATION	COORDINATES		ELEV.
		NORTH	EAST	
1	0+00.00	1922047.91	512228.41	590.34
2	2+48.29	1921765.57	512169.86	588.13
3	6+74.90	1921405.42	512331.03	587.71
4	9+69.67	1921143.53	512188.24	586.15
5	18+78.30	1920515.68	512877.20	586.07
6	23+31.47	1920096.42	513052.84	586.00
7	27+96.99	1919631.51	513082.20	585.07
8	32+12.65	1919261.61	512877.98	584.37
9	33+79.35	1919144.75	513029.78	584.45
10	38+77.82	1918640.06	512974.28	584.22
11	42+55.50	1918296.05	512817.76	583.89
12	44+06.81	1918065.03	512792.74	586.00

P.I. STA. 2+88.29R
 $\Delta = 36^{\circ}00'47.05''$
 $D = 28^{\circ}38'52.40''$
 $R = 200'$
 $T = 65.01'$
 $L = 105.71'$
 $E = 10.30'$
 P.C. STA. 2+23.29R
 P.T. STA. 3+48.99R

P.I. STA. 6+74.90R
 $\Delta = 17^{\circ}10'18''$
 $D = 17^{\circ}30'28''$
 $R = 327.26'$
 $T = 49.41'$
 $L = 96.08'$
 $E = 3.71'$
 P.C. STA. 6+25.49R
 P.T. STA. 7+23.57R

P.I. STA. 11+25.04R
 $\Delta = 40^{\circ}28'49''$
 $D = 25^{\circ}01'08''$
 $R = 229.01'$
 $T = 84.44'$
 $L = 64.80'$
 $E = 15.07'$
 P.C. STA. 10+40.60R
 P.T. STA. 12+02.40R



- NOTES:
1. STATION 0+00 SPIKE IN POST.
 2. TEMPORARY BENCH MARK SPIKE (6\"/>

FIELD BOOK FC-92-6

Symbol	Revisions Description	Date	Approved
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∇	AMD. "1" - MINOR REVISION		

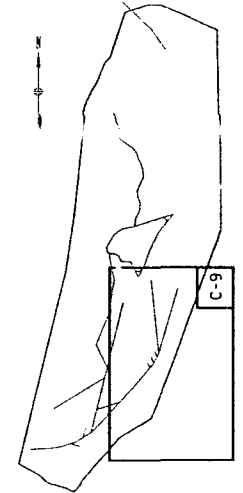
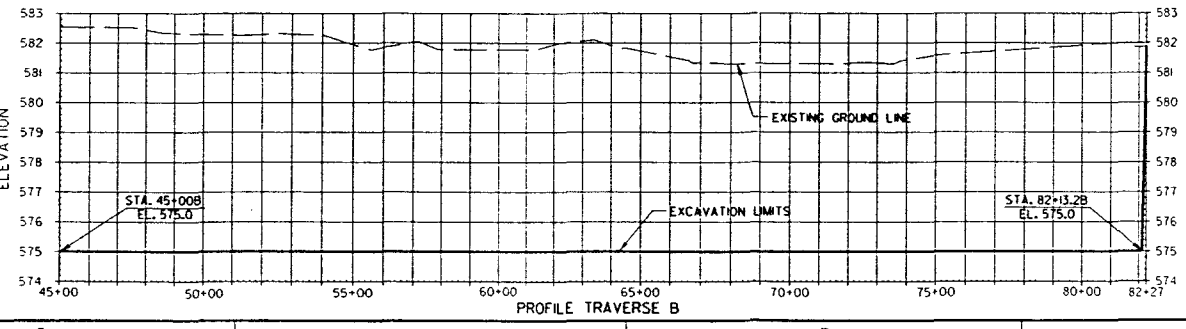
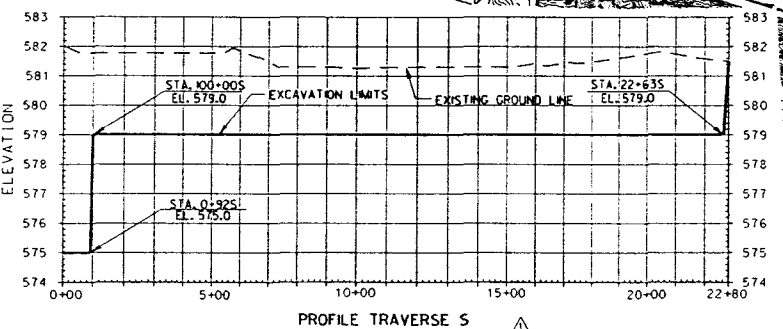
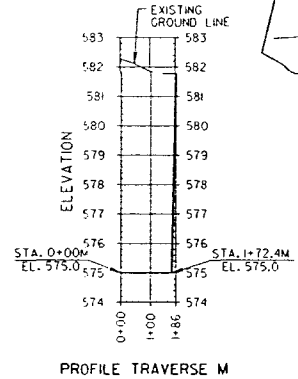
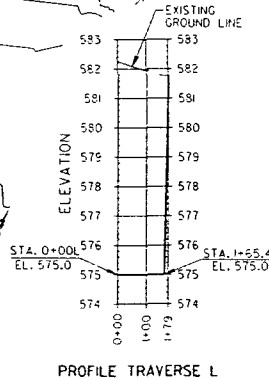
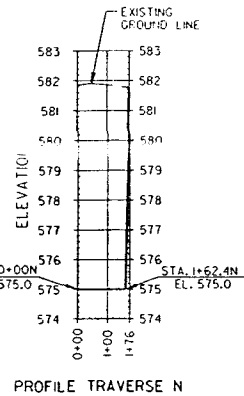
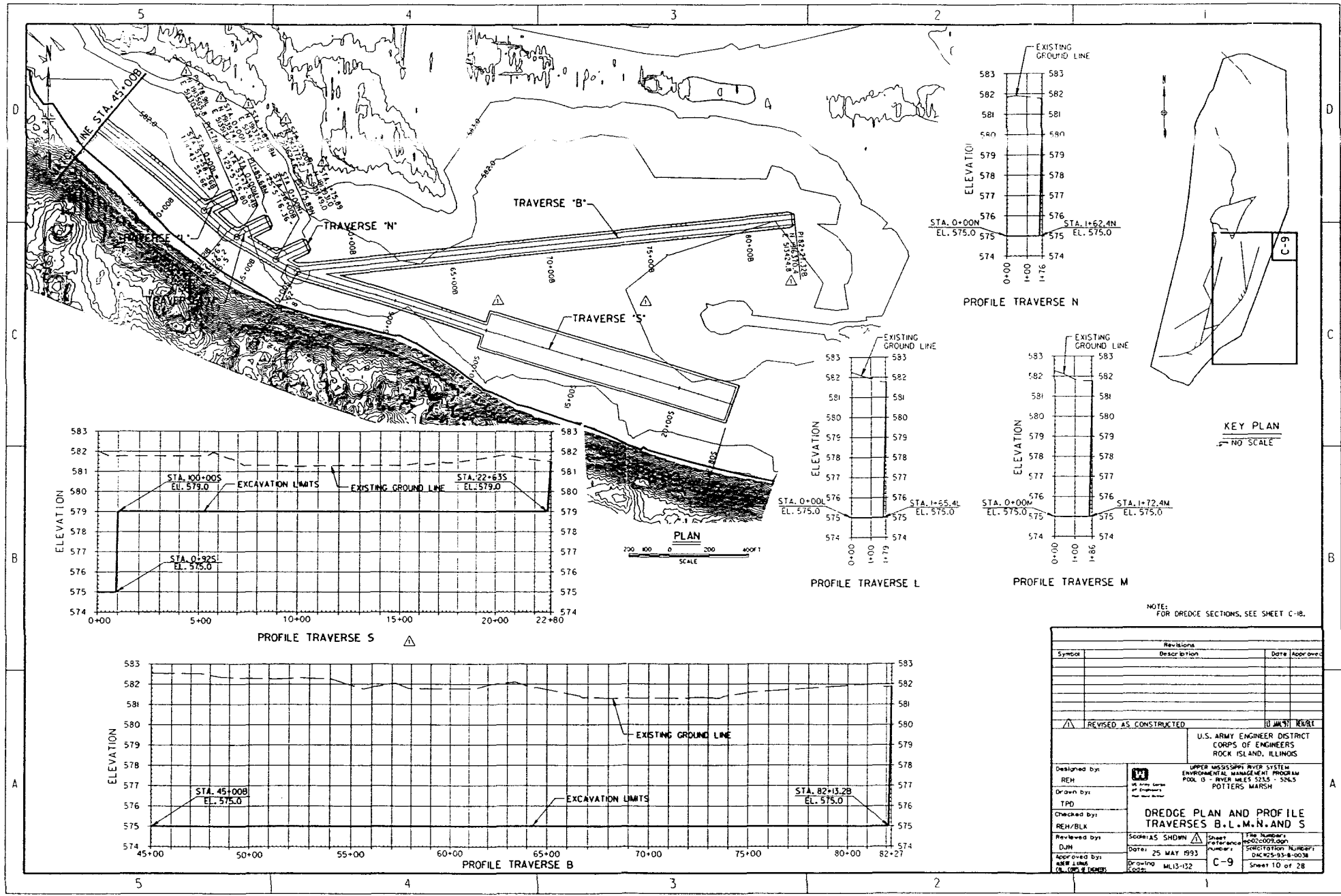
U.S. ARMY ENGINEER DISTRICT
 CORPS OF ENGINEERS
 ROCK ISLAND, ILLINOIS

DESIGNED BY: REH
 DRAWN BY: TPO
 CHECKED BY: REH/BLK
 REVIEWED BY: DJH
 APPROVED BY: [Signature]

PROJECT: UPPER MISSISSIPPI RIVER SYSTEM ENVIRONMENTAL MANAGEMENT PROGRAM
 POOL 13 - RIVER MILES 523.5 - 526.5
 POTTERS MARSH

ACCESS ROAD PLAN AND PROFILE
 STA. 0+00 TO STA. 44+07R

DATE: 25 MAY 1993
 SHEET: C-16
 SHEET 17 OF 28



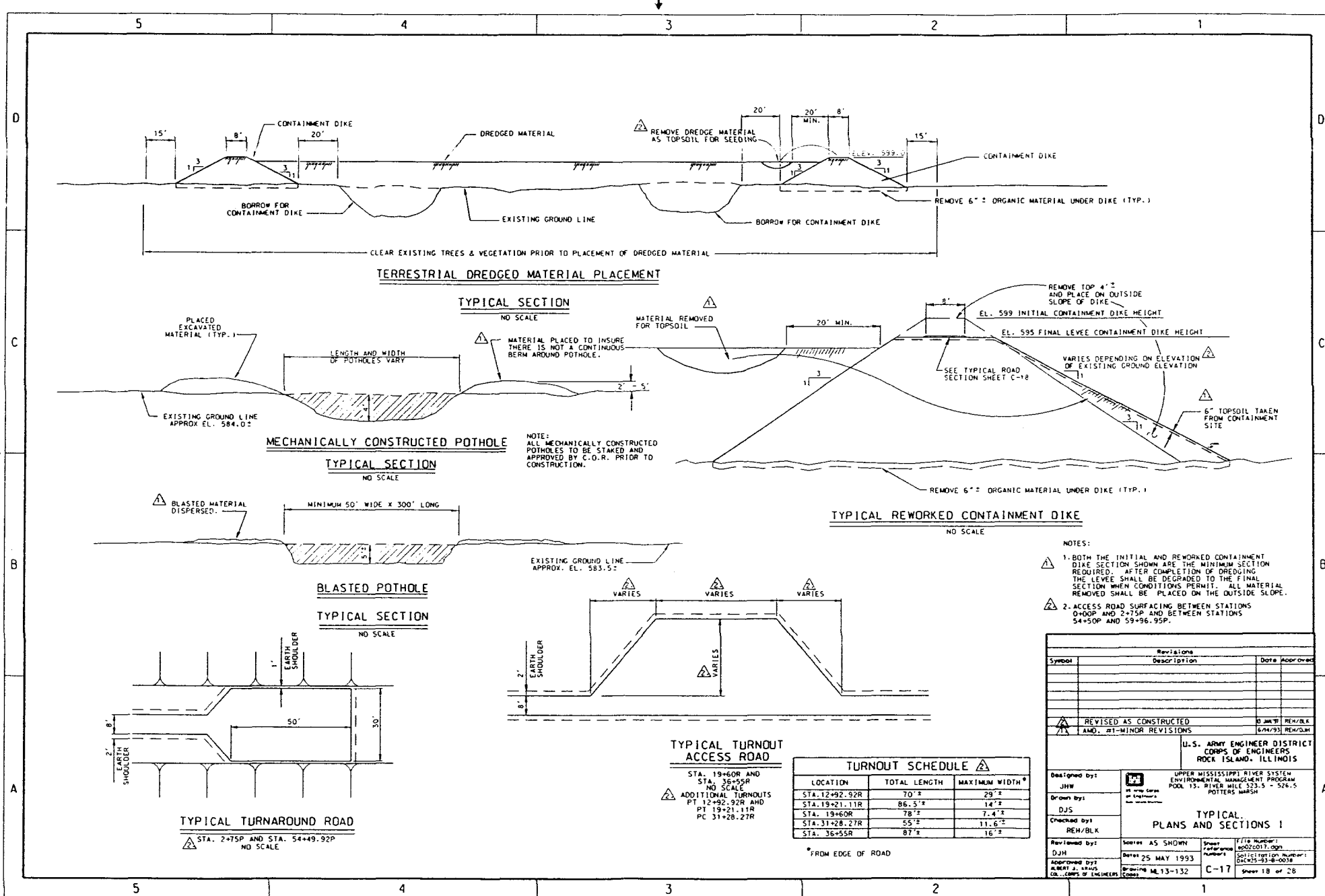
NOTE:
FOR DREDGE SECTIONS, SEE SHEET C-18.

Revisions			
Symbol	Description	Date	Approved
△	REVISED AS CONSTRUCTED	0 JAN 87	REH/BLK

U.S. ARMY ENGINEER DISTRICT
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ROCK ISLAND, ILLINOIS

Designed by: REH		UPPER MISSISSIPPI RIVER SYSTEM ENVIRONMENTAL MANAGEMENT PROGRAM POOL 0 - RIVER MILES 523.5 - 526.5 POTTERS MARSH	
Drawn by: TPD			
Checked by: REH/BLK	DREDGE PLAN AND PROFILE TRAVERSES B, L, M, N, AND S		
Reviewed by: DUM	Scale: AS SHOWN	Sheet Number: 10000009.000	File Number: 10000009.000
Approved by: ALR (LWS)	Date: 25 MAY 1993	Construction Number: 10000009.000	Reference: 10000009.000
Drawn Code: ML13-132	Drawing Code: ML13-132	Sheet 10 of 28	

08-7429-1001 08140
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 10000009.000



- NOTES:
- BOTH THE INITIAL AND REWORKED CONTAINMENT DIKE SECTION SHOWN ARE THE MINIMUM SECTION REQUIRED. AFTER COMPLETION OF DREGGING THE LEVEE SHALL BE DEGRADED TO THE FINAL SECTION WHEN CONDITIONS PERMIT. ALL MATERIAL REMOVED SHALL BE PLACED ON THE OUTSIDE SLOPE.
 - ACCESS ROAD SURFACING BETWEEN STATIONS 0+00P AND 2+75P AND BETWEEN STATIONS 2+50P AND 59+96.95P.

Revisions		
Symbol	Description	Date Approved
△	REVISED AS CONSTRUCTED	0 24/91 REH/BLK
△	AND 21-MINOR REVISIONS	0 24/93 REH/BLK

U.S. ARMY ENGINEER DISTRICT
 CORPS OF ENGINEERS
 ROCK ISLAND, ILLINOIS

Designed by: JHW
 Drawn by: DJJ
 Checked by: REH/BLK
 Reviewed by: DJJ
 Approved by: ALBERT A. HAYES
 COL., CORPS OF ENGINEERS

UPPER MISSISSIPPI RIVER SYSTEM
 ENVIRONMENTAL MANAGEMENT PROGRAM
 POOL 13, RIVER MILE 523.5 - 526.5
 POTTERS WASH

TYPICAL
 PLANS AND SECTIONS I

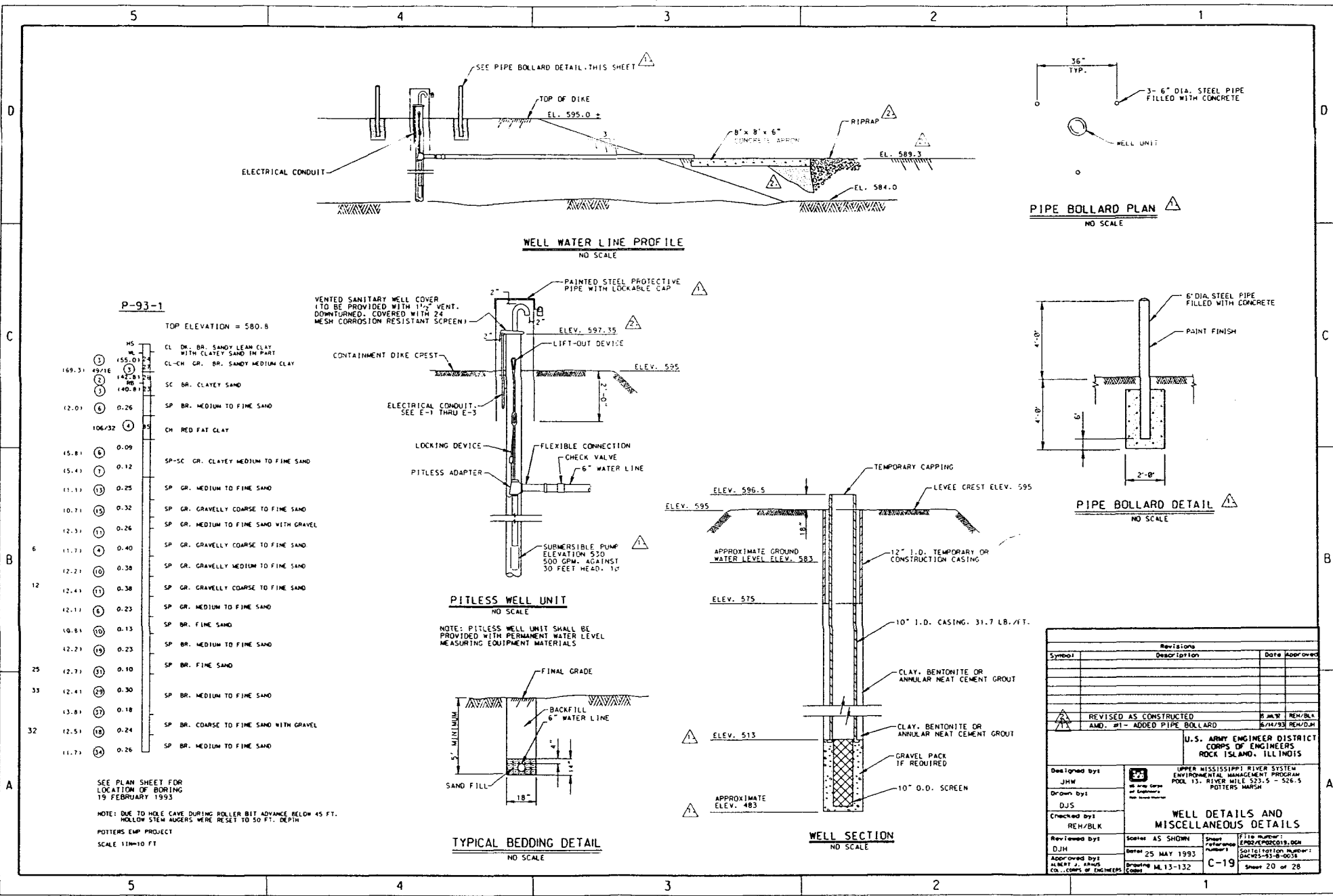
Series AS SHOWN
 Date: 25 MAY 1993
 Sheet: 18 of 28

File Number: 6020017.dgn
 Registration Number: DICK25-93-8-0030

TURNOUT SCHEDULE △		
LOCATION	TOTAL LENGTH	MAXIMUM WIDTH*
STA. 12+92.92R	70'±	29'±
STA. 19+21.11R	86.5'±	14'±
STA. 19+60R	78'±	7.4'±
STA. 31+28.27R	55'±	11.6'±
STA. 36+55R	87'±	16'±

* FROM EDGE OF ROAD

04/18/93 04:13
 01/04/93 04:13



Revisions		
Symbol	Description	Date Approved
	REVISED AS CONSTRUCTED	8 JUN 93 REH/BLK
	AMD. #1 - ADDED PIPE BOLLARD	6/14/93 REH/DJM

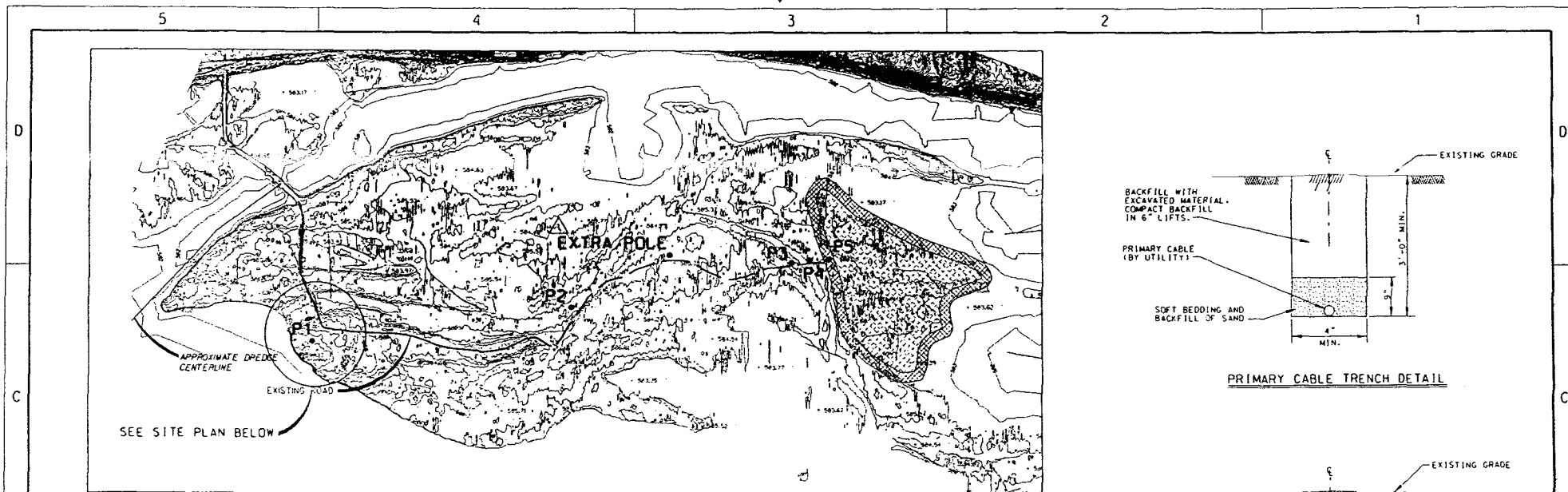
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

UPPER MISSISSIPPI RIVER SYSTEM
ENVIRONMENTAL MANAGEMENT PROGRAM
POOL 13, RIVER MILE 523.5 - 526.5
POTTERS MARSH

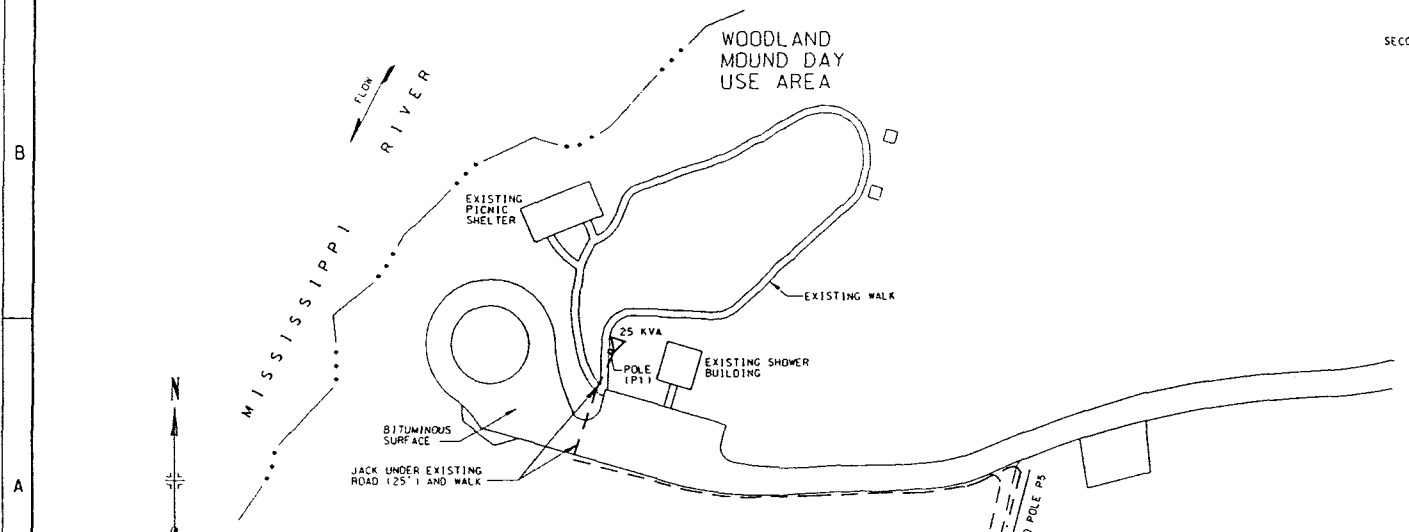
Designed by: JHM
Drawn by: DJS
Checked by: REH/BLK
Reviewed by: DJH
Approved by: ALBERT J. ARMS
CO. CHIEF OF ENGINEERS

Scale: AS SHOWN
Date: 25 MAY 1993
Drawing: ML 13-132

Sheet reference: EPOB/EMDC013.DGN
Specification number: DACW25-93-B-0038
Sheet: C-19
Sheet 20 of 28

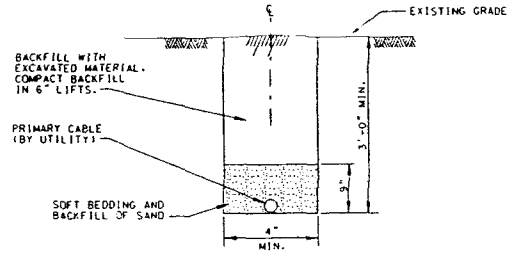


POWER POLE SITE PLAN

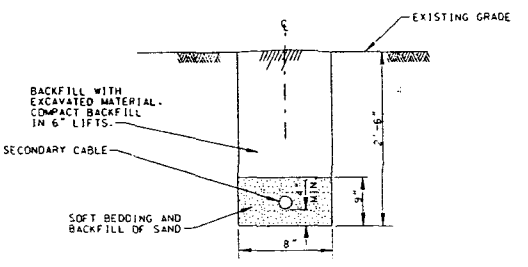


PARTIAL ELECTRICAL SITE PLAN

NOTE:
TRENCH APPROXIMATELY 5 FEET FROM
EDGE OF ROAD. COORDINATE WITH
CONTRACTING OFFICER.



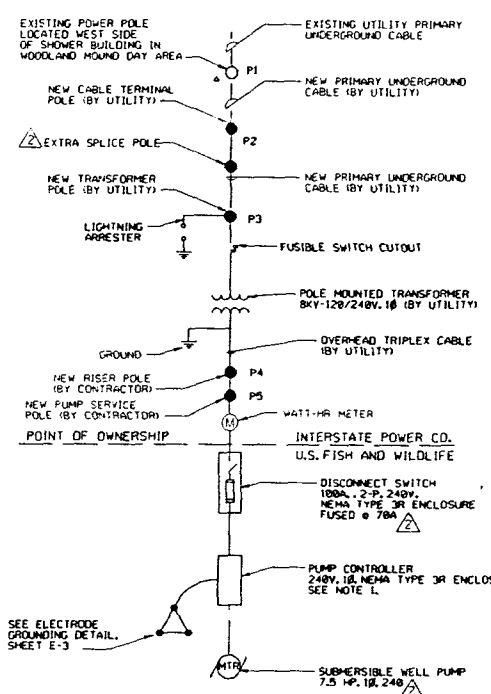
PRIMARY CABLE TRENCH DETAIL



SECONDARY CABLE TRENCH DETAIL

Revisions		
Symbol	Description	Date Approved
REVISIONS REVISOR'S INITIALS DATE		
U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS ROCK ISLAND, ILLINOIS		
Designed by: CJA	U.S. Army Corps of Engineers (Logo)	UPPER MISSISSIPPI RIVER SYSTEM ENVIRONMENTAL MANAGEMENT PROGRAM POOL 13, RIVER MILE 523.5 - 526.5 POTTERS MARSH
Drawn by: TPD/DD	ELECTRICAL DETAILS	
Checked by: CJA	Scale: NO SCALE	Sheet: 22 of 28
Reviewed by: DJH	Date: 25 MAY 1993	File number: EPC-EM-0002.DGN
Approved by: ALBERT J. BRUNS COL., CORPS OF ENGINEERS	Drawing number: ML 13-132	Specification number: DACW25-93-R-0018

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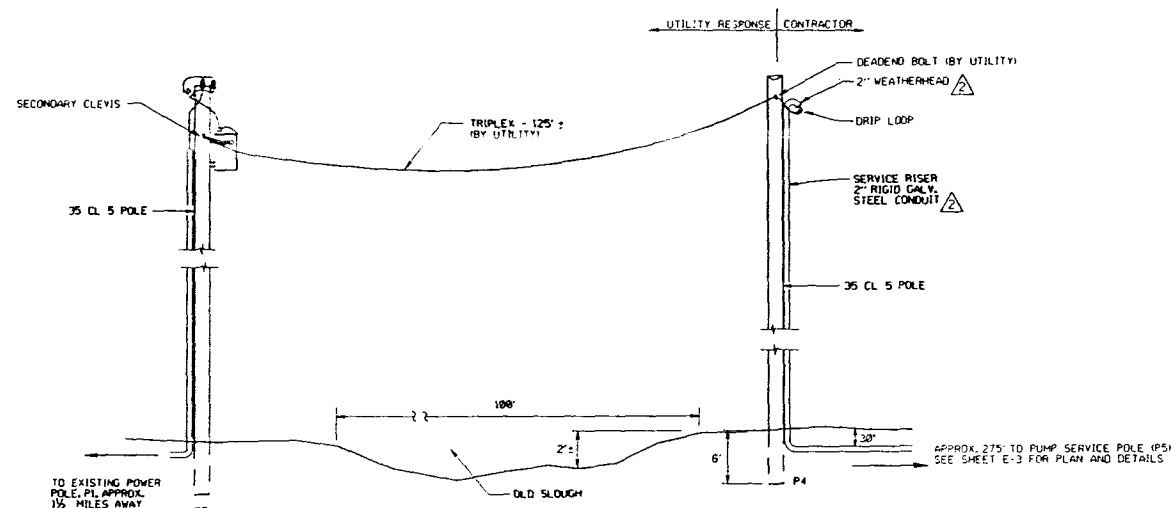
ELECTRICAL ONE-LINE DIAGRAM

NOTES:

1. PUMP MANUFACTURER TO FURNISH PUMP CONTROLLER AND CABLE BETWEEN PUMP CONTROLLER AND PUMP MOTOR.
2. NO SPLICES SHALL BE MADE TO PUMP MANUFACTURER SUPPLIED CABLE.
3. FOR PUMP STATION SITE PLAN, SEE SHEET S-1.
4. FOR ELECTRICAL SITE PLAN, SEE SHEET E-2.

LEGEND

- EXISTING WOOD POWER POLE
- △ EXISTING POLE MOUNTED TRANSFORMER WITH KVA RATING
- 35 CL5 NEW WOOD POWER POLE, DENOTING LENGTH IN FEET & DIAMETER IN INCHES
- NEW UNDERGROUND CABLE
- NEW OVERHEAD CABLE
- ⊥ GROUNDING
- P3 POWER POLE NUMBER
- MTR MOTOR
- (M) METER



PARTIAL SITE PLAN

SCOPE OF WORK

- A. CONTRACTOR WORK INCLUDES BUT IS NOT LIMITED TO THE FOLLOWING:
 1. PROVIDE TRENCH AND BACKFILL FOR PRIMARY CABLE (FURNISHED AND INSTALLED BY UTILITY).
 2. FURNISH AND INSTALL POLE (P4).
 3. FURNISH AND INSTALL SERVICE RISER CONDUIT, AND WEATHERHEAD ON POLE (P4).
 4. PROVIDE CONNECTIONS AT POLE (P4) BETWEEN UTILITY'S TRIPLEX AND SERVICE CONDUCTORS TO METER.
 5. INSTALL METER BASE, FURNISHED BY UTILITY.
 6. PROVIDE GROUNDING FOR DISCONNECT SWITCH AND SUBMERSIBLE PUMP.
 7. FURNISH AND INSTALL POLE (P5).
 8. FURNISH AND INSTALL PUMP CONTROLLER, DISCONNECT SWITCH, AND SECONDARY SURGE ARRESTER.
 9. FURNISH AND INSTALL SERVICE CONDUCTORS FROM POLE (P4) TO PUMP CONTROLLER ON POLE (P5).
 10. FURNISH AND INSTALL PUMP CABLE FROM PUMP CONTROLLER TO PUMP.
 11. FURNISH AND INSTALL SECONDARY CONDUITS AND APPURTENANCES.
 12. FURNISH AND INSTALL APPROX. 35 FEET OF FOUR INCH PVC CONDUIT UNDER BITUMINOUS SURFACE ROAD AT WOODLAND HOUND DAY USE AREA.
- B. UTILITY WORK INCLUDES BUT IS NOT LIMITED TO THE FOLLOWING (WORK TO BE ACCOMPLISHED BY UTILITY COMPANY AT THE EXPENSE OF THE CONTRACTOR):
 1. PROVIDE SERVICE FROM THE POLE LOCATED AT THE SOUTH END OF THOMPSON CAUSEWAY TO POLE (P4) LOCATED NEAR THE SUBMERSIBLE PUMP.
 2. FURNISH AND INSTALL UNDERGROUND PRIMARY CABLE, TERMINATIONS, P2 AND P3 POLES, CUTOUPS, ARRESTERS, GROUND RODS AND OVERHEAD TRANSFORMER, EXTRA POLE.
 3. FURNISH AND INSTALL OVERHEAD TRIPLEX CABLE FROM TRANSFORMER POLE (P3) TO POLE (P4).
- C. COORDINATE WITH INTERSTATE POWER COMPANY:

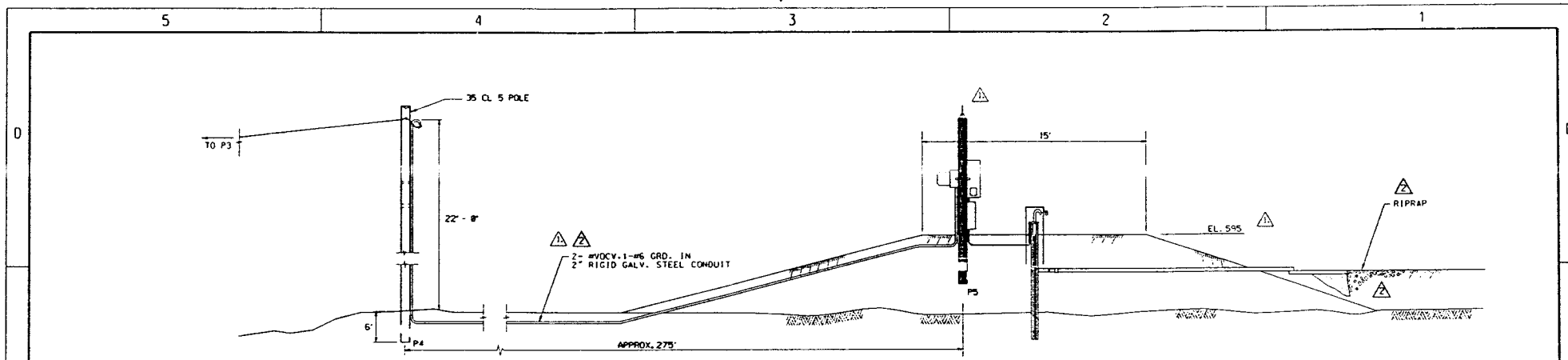
MR. BRUCE BIELEHA
201 NORTH SECOND STREET
P.O. BOX 818
CLINTON, IA 52733-0818
TELEPHONE NUMBER (319) 243-2611
- D. COORDINATE WITH FULTON PARK RANGER:

MR. JOHN KNIBBLE
LOCK AND DAM 13 IRANGER STATION
FULTON, ILLINOIS
TELEPHONE NUMBER (815) 589-3229

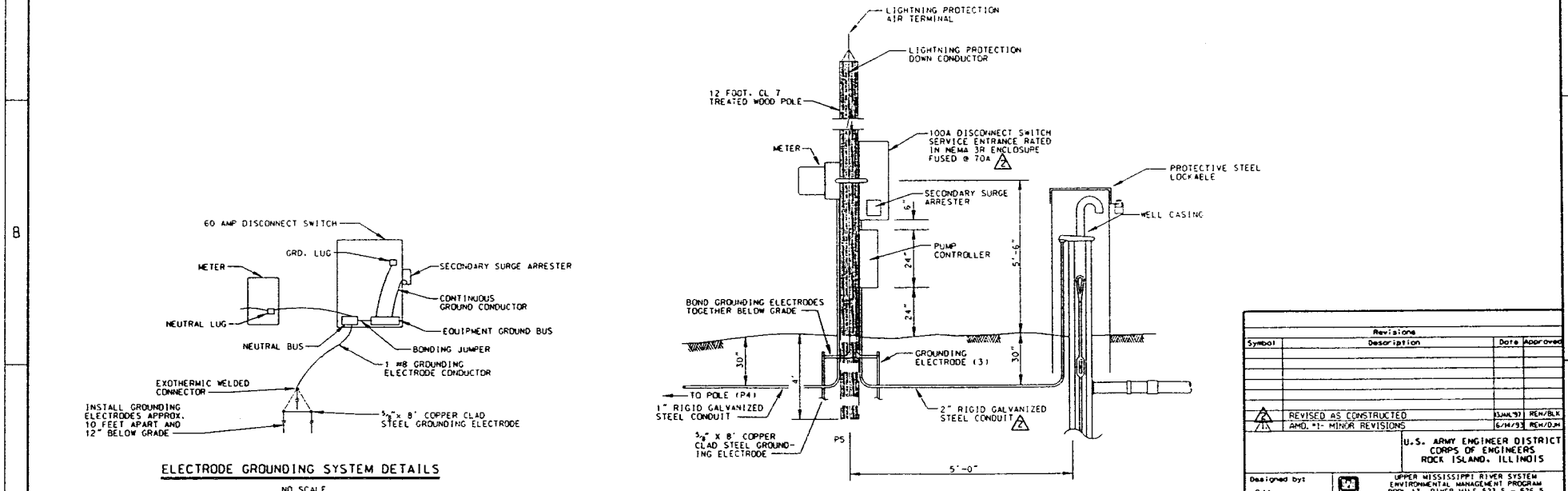
Revisions		
Symbol	Description	Date Approved
△	REVISED AS CONSTRUCTED	3 JUN 92 MEMBER
△	AMD. #1 - MINOR REVISION	23 JAN 92 MEMBER

U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS ROCK ISLAND, ILLINOIS	
Designed by: CJA	
Drawn by: DJS/DO	
Checked by: CJA	
Reviewed by: DJM	
Approved by: ALEX J. IRVING COL., CORPS OF ENGINEERS	UPPER MISSISSIPPI RIVER SYSTEM ENVIRONMENTAL MANAGEMENT PROGRAM POOL 13, RIVER MILE 323.5 - 526.5 POTTERS MARSH
ELECTRICAL ONE-LINE DIAGRAM AND DETAILS	
Scale: NO SCALE	Sheet: 21 of 28
Date: 25 MAY 1993	File Number: 60000001-000
Drawing No. 13-132	Specification Number: DACMS-93-00018
E-1	Sheet 21 of 28

13-132 (REV. 11/81) 13-132
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PUMP SERVICE ELEVATION
NO SCALE



PUMP SERVICE DETAIL
NO SCALE

ELECTRODE GROUNDING SYSTEM DETAILS
NO SCALE

- NOTES:**
1. BOND GROUNDING OF WELL CASING TO POWER SUPPLY GROUND.
 2. LIGHTNING PROTECTION SYSTEM ATOP WOOD POLE SHALL BE A CLASS 1 INSTALLATION PER NFPA 780.

Revisions		Date	Approved
Symbol	Description		
	REVISED AS CONSTRUCTED	6/14/93	REN/DJH
	AMD #1- MINOR REVISIONS		

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

Designed by: CJA	UPPER MISSISSIPPI RIVER SYSTEM ENVIRONMENTAL MANAGEMENT PROGRAM POCK 13, RIVER MILE 523.5 - 526.5 POTTERS MARSH
Drawn by: TPD/DD	
Checked by: CJA	ELECTRICAL DETAILS
Reviewed by: DJH	
Approved by: ALBERT J. FRANK COL., CORPS OF ENGINEERS	Scale: NO SCALE
	Sheet: 23 of 28
	File Number: 60024003.dgn
	Date: 25 MAY 1993
	Drawing: ML13-132
	Sheet: 23 of 28

06-1181-1317 (9/93)
 61-100-1181-1317-1001-1001-1001

