SOLICITATION NO: W912P6-08-B-0003

US Army Corps of Engineers®

CHICAGO DISTRICT
LEADERS IN CUSTOMER CARE

DES PLAINES RIVER, ILLINOIS
LOCAL FLOOD PROTECTION
FLOODWALL 37
RIVER ROAD/MILWAUKEE AVENUE

CONSTRUCTION SOLICITATION AND SPECIFICATIONS

Solicitation
August 18, 2008

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SOLICITATION, OFFER, AND AWARD *(Construction, Alteration, or Repair)*	1. SOLICITATION NO. W912P6-08-B-0003	2. TYPE OF SOLICITATION [X] SEALED BID (IFB) [ ] NEGOTIATED *(RFP)*	3. DATE ISSUED 18-Aug-2008	PAGE OF PAGES 1 OF 75

IMPORTANT - The "offer" section on the reverse must be fully completed by offeror.

4. CONTRACT NO.	5. REQUISITION/PURCHASE REQUEST NO. W81G660550225	6. PROJECT NO.

7. ISSUED BY CODE W912P6	8. ADDRESS OFFER TO *(If Other Than Item 7)* CODE
U. S. ARMY ENGINEER DISTRICT, CHICAGO 111 NORTH CANAL STREET SUITE 600 CHICAGO IL 60606-7206 TEL: FAX:	**See Item 7** TEL: FAX:

9. FOR INFORMATION CALL:	A. NAME LINDA L ZAMAROCY	B. TELEPHONE NO. *(Include area code)* *(NO COLLECT CALLS)* 312.846.5374

SOLICITATION

NOTE: In sealed bid solicitations "offer" and "offeror" mean "bid" and "bidder".

10. THE GOVERNMENT REQUIRES PERFORMANCE OF THE WORK DESCRIBED IN THESE DOCUMENTS *(Title, identifying no., date):*

DES PLAINES RIVER, ILLINOIS LOCAL FLOOD PROTECTION FLOODWALL 37, RIVER ROAD/MILWAUKEE AVENUE, PROSPECT HEIGHTS AND MOUNT PROSPECT, COOK COUNTY, ILLINOIS

COMPETITION FOR THIS ACQUISITION IS LIMITED TO ELIGIBLE 8(a) BUSINESS FIRMS

Under this contract set, the Contractor will be responsible for providing all necessary labor, equipment, facilities, and materials to place 8,130 linear feet of earthen levee and floodwall; construction related activities include: earth work, three pump stations, ten outlet closures, one backflow structure, a raised driveway, a turn-around area, a swing gate and other work items identified in the Bid Schedule.

The North American Industry Classification System Code is 237990 with a size standard in dollars of $31.0 Million.

The estimated magnitude of cost for construction is between $10M and $25M.

The applicable General Decision Number is IL080009, dated 07/25/2008.

ELECTRONIC OR FAXED BIDS WILL NOT BE ACCEPTED

AWARD IS PURSUANT TO THE ACQUISITION OF REAL ESTATE.

11. The Contractor shall begin performance within 10 calendar days and complete it within 1145 calendar days after receiving [ ] award, [X] notice to proceed. This performance period is [X] mandatory, [ ] negotiable. *(See* SECTION 00700 *.)*

12 A. THE CONTRACTOR MUST FURNISH ANY REQUIRED PERFORMANCE AND PAYMENT BONDS? *(If "YES," indicate within how many calendar days after award in Item 12B.)* [X] YES [ ] NO	12B. CALENDAR DAYS 10

13. ADDITIONAL SOLICITATION REQUIREMENTS:

A. Sealed offers in original and 1 copies to perform the work required are due at the place specified in Item 8 by 02:00 PM *(hour)* local time 19 Sep 2008 *(date).* If this is a sealed bid solicitation, offers must be publicly opened at that time. Sealed envelopes containing offers shall be marked to show the offeror's name and address, the solicitation number, and the date and time offers are due.

B. An offer guarantee [X] is, [ ] is not required.

C. All offers are subject to the (1) work requirements, and (2) other provisions and clauses incorporated in the solicitation in full text or by reference.

D. Offers providing less than 90 calendar days for Government acceptance after the date offers are due will not be considered and will be rejected.

SOLICITATION, OFFER, AND AWARD (Continued)

(Construction, Alteration, or Repair)

OFFER ***(Must be fully completed by offeror)***

14. NAME AND ADDRESS OF OFFEROR *(Include ZIP Code)*		15. TELEPHONE NO. *(Include area code)*
		16. REMITTANCE ADDRESS *(Include only if different than Item 14)* **See Item 14**
CODE	FACILITY CODE	

17. The offeror agrees to perform the work required at the prices specified below in strict accordance with the terms of this solicitation, if this offer is accepted by the Government in writing within _____ calendar days after the date offers are due. *(Insert any number equal to or greater than the minimum requirements stated in Item 13D. Failure to insert any number means the offeror accepts the minimum in Item 13D.)*

AMOUNTS	SEE SCHEDULE OF PRICES

18. The offeror agrees to furnish any required performance and payment bonds.

19. ACKNOWLEDGMENT OF AMENDMENTS

(The offeror acknowledges receipt of amendments to the solicitation -- give number and date of each)

AMENDMENT NO.										
DATE										

20A. NAME AND TITLE OF PERSON AUTHORIZED TO SIGN OFFER *(Type or print)*	20B. SIGNATURE	20C. OFFER DATE

AWARD ***(To be completed by Government)***

21. ITEMS ACCEPTED:

22. AMOUNT	23. ACCOUNTING AND APPROPRIATION DATA

24. SUBMIT INVOICES TO ADDRESS SHOWN IN *(4 copies unless otherwise specified)*	**ITEM**	25. OTHER THAN FULL AND OPEN COMPETITION PURSUANT TO ☐ 10 U.S.C. 2304(c) ☐ 41 U.S.C. 253(c)
26. ADMINISTERED BY CODE		27. PAYMENT WILL BE MADE BY: CODE

CONTRACTING OFFICER WILL COMPLETE ITEM 28 OR 29 AS APPLICABLE

☐ 28. NEGOTIATED AGREEMENT *(Contractor is required to sign this document and return _ _ copies to issuing office.)* Contractor agrees to furnish and deliver all items or perform all work, requisitions identified on this form and any continuation sheets for the consideration stated in this contract. The rights and obligations of the parties to this contract shall be governed by (a) this contract award, (b) the solicitation, and (c) the clauses, representations, certifications, and specifications or incorporated by reference in or attached to this contract.

☐ 29. AWARD *(Contractor is not required to sign this document.)* Your offer on this solicitation, is hereby accepted as to the items listed. This award consummates the contract, which consists of (a) the Government solicitation and your offer, and (b) this contract award. No further contractual document is necessary.

30A. NAME AND TITLE OF CONTRACTOR OR PERSON AUTHORIZED TO SIGN *(Type or print)*		31A. NAME OF CONTRACTING OFFICER *(Type or print)* TEL: EMAIL:
30B. SIGNATURE	30C. DATE	31B. UNITED STATES OF AMERICA BY
		31C. AWARD DATE

Section 00010 - Solicitation Contract Form

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0001		1	Lump Sum		
	MOBILIZATION & DEMOBILIZATION **Firm Fixed Price (FFP)** PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0002		1	Lump Sum		
	TEMPORARY FIELD OFFICE, PROJECT AND SAFETY SIGNS FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0003		1	Lump Sum		
	CLEARING AND GRUBBING FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES
0004	**I-WALL** FFP THIS IS A PARENT LINE ITEM; THEREFORE, THE BIDDER SHALL SET FORTH ITS PRICING AT THE ASSOCIATED SUB-ITEMS FOR THIS ITEM; REFER TO SUB-ITEMS 0004AA THROUGH 0004AD.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0004AA	**STEEL SHEET PILE AZ-13** FFP PURCHASE REQUEST NUMBER: W81G660550225	91,130	Square Foot		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0004AB	**STEEL SHEET PILE AZ-18** FFP PURCHASE REQUEST NUMBER: W81G660550225	21,380	Square Foot		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0004AC		23,690	Square Foot		
	STEEL SHEET PILE AZ-46 FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0004AD		1	Lump Sum		
	REINFORCED CONCRETE AND MISCELLANEOUS METAL FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES
0005	**EARTHWORK** FFP THIS IS A PARENT LINE ITEM; THEREFORE, THE BIDDER SHALL SET FORTH ITS PRICING AT THE ASSOCIATED SUB-ITEMS FOR THIS ITEM; REFER TO SUB-ITEMS 0005AA THROUGH 0005AE.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0005AA		230	Cubic Yard		
	EARTHERN LEVEE (STA 203+16 TO 208+62) FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	_____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0005AB		2,300	Cubic Yard		
	SATISFACTORY FILL FOR DRIVEWAY No. 1 FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	_____

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0005AC		3,100	Cubic Yard		
	STRIPPING TOPSOIL FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0005AD		3,020	Linear Foot		
	SWALE GRADING FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0005AE		90	Cubic Yard		
	REPTILE CROSSING 1 & 2 FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES
0006	**CLOSURE NO.1** FFP THIS IS A PARENT LINE ITEM; THEREFORE, THE BIDDER SHALL SET FORTH ITS PRICING AT THE ASSOCIATED SUB-ITEMS FOR THIS ITEM; REFER TO SUB-ITEMS 0006AA THROUGH 0006AD.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0006AA	**REINFORCED CONCRETE STRUCTURE AND MISC. METAL** FFP PURCHASE REQUEST NUMBER: W81G660550225	1	Lump Sum		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0006AB	**SLUICE GATE FOR 60"X60"** FFP PURCHASE REQUEST NUMBER: W81G660550225	1	Lump Sum		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0006AC		1	Lump Sum		
	FLAP GATE FOR 60"X60" FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0006AD		1	Lump Sum		
	FLAP GATE FOR 24"X24" FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES
0007	
	PUMP STATION 1 FFP THIS IS A PARENT LINE ITEM; THEREFORE, THE BIDDER SHALL SET FORTH ITS PRICING AT THE ASSOCIATED SUB-ITEMS FOR THIS ITEM; REFER TO SUB-ITEMS 0007AA THROUGH 0007AE.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0007AA		1	Lump Sum		
	REINFORCED CONCRETE STRUCTURE AND MISC. METAL FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0007AB		1	Lump Sum		
	PUMPS, DISCHARGE PIPING AND VALVES FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0007AC		1	Lump Sum		
	METAL WORK FABRICATION, MACHINE WORK AND MISC. METAL FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0007AD		1	Lump Sum		

ELECTRICAL WORK AND PUMP CONTROLLER
FFP
PURCHASE REQUEST NUMBER: W81G660550225

NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0007AE		1	Lump Sum		

PAINTING OF HYDRAULIC STRUCTURE
FFP
PURCHASE REQUEST NUMBER: W81G660550225

NET AMT

ITEM NO SUPPLIES/SERVICES
0008

FOREST PRESERVE DISTRICT DRIVEWAY RAISE NO. 1
FFP

THIS IS A PARENT LINE ITEM; THEREFORE, THE BIDDER SHALL SET FORTH ITS PRICING AT THE ASSOCIATED SUB-ITEMS FOR THIS ITEM; REFER TO SUB-ITEMS 0008AA THROUGH 0008AF.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0008AA		235	Square Yard		
	STRIP AGGREGATE BASE COURSE, BITUMINOUS BINDER AND BITUMINOUS SURFACE FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0008AB		140	Net Ton (2,000 LB)		
	AGGREGATE BASE COURSE FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0008AC		235	Square Yard		
	BITUMINOUS BINDER FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0008AD		235	Square Yard		
	BITUMINOUS SURFACE FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0008AE		235	Square Yard		
	GEOTEXTILE FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0008AF		170	Linear Foot		

CONCRETE CURB AND GUTTER
FFP
PURCHASE REQUEST NUMBER: W81G660550225

NET AMT

ITEM NO	SUPPLIES/SERVICES
0009	

FOREST PRESERVE DISTRICT DRIVEWAY RAISE NO. 2
FFP

THIS IS A PARENT LINE ITEM; THEREFORE, THE BIDDER SHALL SET FORTH ITS PRICING AT THE ASSOCIATED SUB-ITEMS FOR THIS ITEM; REFER TO SUB-ITEMS 0009AA THROUGH 0009AE.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0009AA		850	Square Yard		

STRIP AGGREGATE BASE COURSE, BITUMINOUS BINDER AND BITUMINO
FFP

PURCHASE REQUEST NUMBER: W81G660550225

NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0009AB		560	Net Ton (2,000 LB)		
	AGGREGATE BASE COURSE FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0009AC		950	Square Yard		
	BITUMINOUS BINDER FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0009AD		950	Square Yard		
	BITUMINOUS SURFACE FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0009AE		390	Linear Foot		
	CONCRETE CURB AND GUTTER FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES
0010	
	CLOSURE NO. 2 FFP THIS IS A PARENT LINE ITEM; THEREFORE, THE BIDDER SHALL SET FORTH ITS PRICING AT THE ASSOCIATED SUB-ITEMS FOR THIS ITEM; REFER TO SUB-ITEMS 0010AA THROUGH 0010AC.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0010AA		1	Lump Sum		
	REINFORCED CONCRETE STRUCTURE AND MISC. METAL FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0010AB		1	Lump Sum		
	SLUICE GATE FOR 36"X36" FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0010AC		1	Lump Sum		
	FLAP GATE FOR 36"X36" FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES
0011	**CLOSURE NO. 3** FFP THIS IS A PARENT LINE ITEM; THEREFORE, THE BIDDER SHALL SET FORTH ITS PRICING AT THE ASSOCIATED SUB-ITEMS FOR THIS ITEM; REFER TO SUB-ITEMS 0011AA THROUGH 0011AC.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0011AA		1	Lump Sum		
	REINFORCED CONCRETE STRUCTURE AND MISC. METAL FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0011AB		1	Lump Sum		
	SLUICE GATE FOR 24"X24" FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0011AC		1	Lump Sum		
	FLAP GATE FOR 24"X24" FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES
0012	
	CLOSURE NO. 4 FFP THIS IS A PARENT LINE ITEM; THEREFORE, THE BIDDER SHALL SET FORTH ITS PRICING AT THE ASSOCIATED SUB-ITEMS FOR THIS ITEM; REFER TO SUB-ITEMS 0012AA THROUGH 0012AC.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0012AA		1	Lump Sum		
	REINFORCED CONCRETE STRUCTURE AND MISC. METAL FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0012AB		1	Lump Sum		
	SLUICE GATE FOR 24"X24" FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0012AC		1	Lump Sum		
	FLAP GATE FOR 24"X24" FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES
0013	
	CLOSURE NO.5 FFP THIS IS A PARENT LINE ITEM; THEREFORE, THE BIDDER SHALL SET FORTH ITS PRICING AT THE ASSOCIATED SUB-ITEMS FOR THIS ITEM; REFER TO SUB-ITEMS 0013AA THROUGH 0013AC.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0013AA		1	Lump Sum		
	REINFORCED CONCRETE STRUCTURE AND MISC. METAL FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0013AB		1	Lump Sum		
	SLUICE GATE FOR 30"X30" FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0013AC		1	Lump Sum		
	FLAP GATE FOR 30"X30" FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES
0014	**STRUCTUAL ADDITIONS NO. 1** FFP THIS IS A PARENT LINE ITEM; THEREFORE, THE BIDDER SHALL SET FORTH ITS PRICING AT THE ASSOCIATED SUB-ITEMS FOR THIS ITEM; REFER TO SUB-ITEMS 0014AA THROUGH 0014AB.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0014AA	**REINFORCED CONCRETE STRUCTURE AND MISC. METAL** FFP PURCHASE REQUEST NUMBER: W81G660550225	1	Lump Sum		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0014AB	**SLUICE GATES FOR 54"X54"** FFP PURCHASE REQUEST NUMBER: W81G660550225	1	Lump Sum		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES
0015	**PUMP STATION 2** FFP THIS IS A PARENT LINE ITEM; THEREFORE, THE BIDDER SHALL SET FORTH ITS PRICING AT THE ASSOCIATED SUB-ITEMS FOR THIS ITEM; REFER TO SUB-ITEMS 0015AA THROUGH 0015AF.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0015AA		1	Lump Sum		
	REINFORCED CONCRETE STRUCTURE AND MISC. METAL FFP PURCHASE REQUEST NUMBER: W81G660550225				

NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0015AB		1	Lump Sum		
	METAL WORK FABRICATION, MACHINE WORK AND MISC. METAL FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0015AC		1	Lump Sum		
	PUMPS, DISCHARGE PIPING AND VALVES FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0015AD		1	Lump Sum		
	ELECTRICAL WORK AND PUMP CONTROLLER FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0015AE		1	Lump Sum		
	SLUICE GATES FOR 24"X24" FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0015AF		1	Lump Sum		
	PAINTING OF HYDRAULIC STRUCTURE FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES
0016	
	CLOSURE NO. 6 FFP THIS IS A PARENT LINE ITEM; THEREFORE, THE BIDDER SHALL SET FORTH ITS PRICING AT THE ASSOCIATED SUB-ITEMS FOR THIS ITEM; REFER TO SUB-ITEMS 0016AA THROUGH 0016AB.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0016AA		1	Lump Sum		
	REINFORCED CONCRETE STRUCTURE AND MISC. METAL FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0016AB		1	Lump Sum		
	SLUICE GATE FOR 60"X60" FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES
0017	
	CLOSURE NO. 7 FFP THIS IS A PARENT LINE ITEM; THEREFORE, THE BIDDER SHALL SET FORTH ITS PRICING AT THE ASSOCIATED SUB-ITEMS FOR THIS ITEM; REFER TO SUB-ITEMS 0017AA THROUGH 0017AC.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0017AA		1	Lump Sum		
	REINFORCED CONCRETE STRUCTURE AND MISC. METAL FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0017AB		1	Lump Sum		
	SLUICE GATE FOR 30"X30" FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0017AC		1	Lump Sum		
	FLAP GATE FOR 30"X30" FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES
0018	**CLOSURE NO. 8** FFP THIS IS A PARENT LINE ITEM; THEREFORE, THE BIDDER SHALL SET FORTH ITS PRICING AT THE ASSOCIATED SUB-ITEMS FOR THIS ITEM; REFER TO SUB-ITEMS 0018AA THROUGH 0018AC.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0018AA	**REINFORCED CONCRETE STRUCTURE AND MISC. METAL** FFP PURCHASE REQUEST NUMBER: W81G660550225	1	Lump Sum		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0018AB	**SLUICE GATE FOR 60"X60"** FFP PURCHASE REQUEST NUMBER: W81G660550225	1	Lump Sum		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0018AC		1	Lump Sum		
	FLAP GATE FOR 60"X60" FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0019					
	CLOSURE NO. 9 FFP THIS IS A PARENT LINE ITEM; THEREFORE, THE BIDDER SHALL SET FORTH ITS PRICING AT THE ASSOCIATED SUB-ITEMS FOR THIS ITEM; REFER TO SUB-ITEMS 0019AA THROUGH 0019AC.				

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0019AA		1	Lump Sum		
	REINFORCED CONCRETE STRUCTURE AND MISC. METAL FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0019AB		1	Lump Sum		
	SLUICE GATE FOR 60"X60" FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0019AC		1	Lump Sum		
	FLAP GATE FOR 60"X60" FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES
0020	
	PUMP STATION NO. 3 FFP THIS IS A PARENT LINE ITEM; THEREFORE, THE BIDDER SHALL SET FORTH ITS PRICING AT THE ASSOCIATED SUB-ITEMS FOR THIS ITEM; REFER TO SUB-ITEMS 0020AA THROUGH 0020AE.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0020AA		1	Lump Sum		
	REINFORCED CONCRETE STRUCTURE AND MISC. METAL FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0020AB		1	Lump Sum		
	METAL WORK FABRICATION, MACHINE WORK AND MISC. METAL FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0020AC		1	Lump Sum		
	PUMPS, DISCHARGE PIPING AND VALVES FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0020AD		1	Lump Sum		
	ELECTRICAL WORK AND PUMP CONTROLLER FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0020AE		1	Lump Sum		
	PAINTING OF HYDRAULIC STRUCTURE FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES
0021	
	CLOSURE NO. 10 FFP THIS IS A PARENT LINE ITEM; THEREFORE, THE BIDDER SHALL SET FORTH ITS PRICING AT THE ASSOCIATED SUB-ITEMS FOR THIS ITEM; REFER TO SUB-ITEMS 0021AA THROUGH 0021AD.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0021AA		1	Lump Sum		
	REINFORCED CONCRETE STRUCTURE AND MISC. METAL FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0021AB		1	Lump Sum		
	SLUICE GATE FOR 36"X36" FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0021AC		1	Lump Sum		
	FLAP GATE FOR 36"X36" FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0021AD		1	Lump Sum		
	FLAP GATE FOR 24"X24" FFP PURCHASE REQUEST NUMBER: W81G660550225				

NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT
0022			
	SWING GATE FFP THIS IS A PARENT LINE ITEM; THEREFORE, THE BIDDER SHALL SET FORTH ITS PRICING AT THE ASSOCIATED SUB-ITEMS FOR THIS ITEM; REFER TO SUB-ITEMS 0022AA THROUGH 0022AB.		

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0022AA		1	Lump Sum		
	SWING GATE CLOSURE FFP PURCHASE REQUEST NUMBER: W81G660550225				

NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0022AB		300	Cubic Yard		
	CLAY EMBANKMENT FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES
0023	
	GRAVEL PATH FFP THIS IS A PARENT LINE ITEM; THEREFORE, THE BIDDER SHALL SET FORTH ITS PRICING AT THE ASSOCIATED SUB-ITEMS FOR THIS ITEM; REFER TO SUB-ITEMS 0023AA THROUGH 0023AB.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0023AA		560	Net Ton (2,000 LB)		
	COARSE AGGREGATE CA-6 FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0023AB		2,100	Square Yard		
	GEOTEXTILE FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0024		1,287.50	Linear Foot		
	GUARDRAIL FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES
0025	
	RIPRAP FFP THIS IS A PARENT LINE ITEM; THEREFORE, THE BIDDER SHALL SET FORTH ITS PRICING AT THE ASSOCIATED SUB-ITEMS FOR THIS ITEM; REFER TO SUB-ITEMS 0025AA THROUGH 0025AD.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0025AA		1,520	Net Ton (2,000 LB)		
	IDOT GRADATION NO. 4 FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0025AB		1,230	Net Ton (2,000 LB)		
	IDOT GRADATION NO. 5 FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0025AC		590	Net Ton (2,000 LB)		
	BEDDING FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0025AD		2,000	Square Yard		
	GEOTEXTILE FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0026		1	Lump Sum		
	STORM DRAINAGE STRUCTURES FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0027		2	Acre		
	SEEDING FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0028		290	Linear Foot		
	TREE PROTECTION FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0029		1	Lump Sum		
	COFFERDAMS FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0030		1	Lump Sum		
	DEMOLITION FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0031		1	Lump Sum		
	MAINTENANCE OF TRAFFIC FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0032		1	Lump Sum		
	SITE SECURITY FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0033		3,300	Linear Foot		
	HANDRAIL FFP PURCHASE REQUEST NUMBER: W81G660550225				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0034		1	Lump Sum		

PERFORMANCE AND PAYMENT BONDS

COST REIMBURSABLE ITEM:

The Government will reimburse the Contractor for the actual cost of acceptable performance and payments bonds, upon receiving evidence of payment (paid invoice) from the bonding company or agency, not to exceed the total amount of the contract line item. The Government will not pay more than the total line item amount for the performance and payment bonds. If the actual cost of the bonds is less than the line item amount, the contract will be modified to adjust the line item accordingly. Adjustment(s) to the line item will also be made for any revisions to the actual bond costs associated with contract changes.
PURCHASE REQUEST NUMBER: W81G660550225

_____

NOT TO EXCEED

TOTAL BID AMOUNT (ITEMS 0001 THROUGH 0034) $_____

BID SCHEDULE NOTES:

1. **PRE-BID MEETING AND SITE VISIT:**

   A Pre-Bid Meeting and Site Visit has been scheduled for this acquisition to discuss the bidding process and various aspects of the Project. The meeting will take place on Friday, September 5, 2008 at 10:00 a.m. at the Village of Mount Prospect, Village Hall, 50 S. Emerson Street, Mount Prospect, IL 60056. The site visit will follow immediately thereafter.

2. **BID CONDITIONS:**

   a. The bidder's total price for the work shall be based on the TOTAL of all BID ITEMS included in the above Bid Schedule, with no exceptions. The Government intends to award all BID ITEMS to the successful bidder at the bid prices stated in the Bid Schedule.

   b. Split awards or multiple award contracts will not result from this Solicitation.

   c. Bidders are required to complete the entire Bid Schedule; therefore, any bidder who does not complete the entire Bid Schedule may be considered non-responsive to the Solicitation and ineligible for award.

3. **NOTICE TO PROCEED LETTERS:** The Contractor will be issued two separate Notice to Proceed Letters for this project.

   a. Notice #1 will be issued following the government's approval of the Contractor's Bonds and Insurance. Under this particular Notice, the Contractor will be authorized to initiate work that is considered to be administrative in nature, e.g. the Notice will not authorize any on-site work.

   b. Notice to Proceed Letter #2 will be issued once the Contractor satisfies the permit requirements called out in Section 01100, Sub-Paragraph 1.22 of the Contract Specifications and the IDOT Highway Permit has been obtained by the Government. By way of Letter #2, the Contractor will be authorized to perform the entire work of the contract, prosecute the work diligently, and complete the entire work ready for use not later than 1,145 calendar days following its acknowledgement of the Notice to Proceed Letter #1. The time stated for completion shall include final cleanup of the premises.

4. **SUBMISSION OF BIDS:**

   a. BIDS OR MODIFICATIONS TO BIDS THAT ARE RECEIVED BY FACSIMILE OR TELETYPE WILL NOT BE CONSIDERED. All sealed Bids must be submitted in accordance with the procedures set forth in BLOCK NO. 13 of PAGE 1 of this Solicitation Document.

   b. Bidders are required to acknowledge the receipt of all amendments to the Solicitation on the Standard Form 1442 in the space provided, OR by completing Blocks 8 and 15 of the

Amendment (Standard Form 30), OR by separate letter, OR by telegram prior to opening of bids. Failure to acknowledge all amendments may cause rejection of the bid.

c. SF 1442 BACK (Page 2 of the Solicitation): Bidders shall fully complete all the required areas located under the section designated as **"OFFER"** (refer to Items 14. through 20C.)

d. SECTION 00600 (REPRESENTATIONS AND CERTIFICATIONS): The bidder must fully complete Section 00600 of this Solicitation and submit it along with all other documents required by this Solicitation. Bids received without this Section fully completed may be rejected, considered non-responsive and ineligible for award.

e. BID GUARANTEE: The bidder is required to submit a Bid Guarantee for this procurement. Any bidder failing to submit an authentic Bid Guarantee will be considered non-responsive to the Solicitation and ineligible for award. The Bid Guarantee shall be in the amount of 20% percent of the bidder's bid price or $3,000,000.00, whichever is less.

Section 00100 - Bidding Schedule/Instructions to Bidders

CLAUSES INCORPORATED BY REFERENCE

52.204-6	Data Universal Numbering System (DUNS) Number	APR 2008
52.214-4	False Statements In Bids	APR 1984
52.214-5	Submission Of Bids	MAR 1997
52.214-21	Descriptive Literature	APR 2002
52.214-34	Submission Of Offers In The English Language	APR 1991
52.214-35	Submission Of Offers In U.S. Currency	APR 1991
52.219-18 Alt I	Notification of Competition Limited to Eligible 8(A) Concerns (Jun 2003) - Alternate I	APR 2005
52.225-12	Notice of Buy American Act Requirement - Construction Materials Under Trade Agreements	JAN 2005
52.232-38	Submission of Electronic Funds Transfer Information with Offer	MAY 1999

CLAUSES INCORPORATED BY FULL TEXT

52.211-6 BRAND NAME OR EQUAL (AUG 1999)

(a) If an item in this solicitation is identified as “brand name or equal,” the purchase description reflects the characteristics and level of quality that will satisfy the Government's needs. The salient physical, functional, or performance characteristics that “equal” products must meet are specified in the solicitation.

(b) To be considered for award, offers of “equal” products, including “equal” products of the brand name manufacturer, must--

(1) Meet the salient physical, functional, or performance characteristic specified in this solicitation;

(2) Clearly identify the item by--

(i) Brand name, if any; and

(ii) Make or model number;
(3) Include descriptive literature such as illustrations, drawings, or a clear reference to previously furnished descriptive data or information available to the Contracting Officer; and

(4) Clearly describe any modifications the offeror plans to make in a product to make it conform to the solicitation requirements. Mark any descriptive material to clearly show the modifications.

(c) The Contracting Officer will evaluate “equal” products on the basis of information furnished by the offeror or identified in the offer and reasonably available to the Contracting Officer. The Contracting Officer is not responsible for locating or obtaining any information not identified in the offer.

(d) Unless the offeror clearly indicates in its offer that the product being offered is an “equal” product, the offeror shall provide the brand name product referenced in the solicitation.

(End of provision)

52.214-3 AMENDMENTS TO INVITATIONS FOR BIDS (DEC 1989)

(a) If this solicitation is amended, then all terms and conditions which are not modified remain unchanged.

(b) Bidders shall acknowledge receipt of any amendment to this solicitation (1) by signing and returning the amendment, (2) by identifying the amendment number and date in the space provided for this purpose on the form for submitting a bid, (3) by letter or telegram, or (4) by facsimile, if facsimile bids are authorized in the solicitation. The Government must receive the acknowledgment by the time and at the place specified for receipt of bids.

(End of provision)

52.214-6 EXPLANATION TO PROSPECTIVE BIDDERS (APR 1984)

Any prospective bidder desiring an explanation or interpretation of the solicitation, drawings, specifications, etc., must request it in writing soon enough to allow a reply to reach all prospective bidders before the submission of their bids. Oral explanations or instructions given before the award of a contract will not be binding. Any information given a prospective bidder concerning a solicitation will be furnished promptly to all other prospective bidders as an amendment to the solicitation, if that information is necessary in submitting bids or if the lack of it would be prejudicial to other prospective bidders.

(End of provision)

52.214-7 LATE SUBMISSIONS, MODIFICATIONS, AND WITHDRAWALS OF BIDS (NOV 1999)

(a) Bidders are responsible for submitting bids, and any modifications or withdrawals, so as to reach the Government office designated in the invitation for bids (IFB) by the time specified in the IFB. If no time is specified in the IFB, the time for receipt is 4:30 p.m., local time, for the designated Government office on the date that bids are due.

(b)(1) Any bid, modification, or withdrawal received at the Government office designated in the IFB after the exact time specified for receipt of bids is “late” and will not be considered unless it is received before award is made, the Contracting Officer determines that accepting the late bid would not unduly delay the acquisition; and--

(i) If it was transmitted through an electronic commerce method authorized by the IFB, it was received at the initial point of entry to the Government infrastructure not later than 5:00 p.m. one working day prior to the date specified for receipt of bids; or

(ii) There is acceptable evidence to establish that it was received at the Government installation designated for receipt of bids and was under the Government's control prior to the time set for receipt of bids.

(2) However, a late modification of an otherwise successful bid that makes its terms more favorable to the Government, will be considered at any time it is received and may be accepted.

(c) Acceptable evidence to establish the time of receipt at the Government installation includes the time/date stamp of that installation on the bid wrapper, other documentary evidence of receipt maintained by the installation, or oral testimony or statements of Government personnel.

(d) If an emergency or unanticipated event interrupts normal Government processes so that bids cannot be received at the Government office designated for receipt of bids by the exact time specified in the IFB and urgent

Government requirements preclude amendment of the IFB, the time specified for receipt of bids will be deemed to be extended to the same time of day specified in the solicitation on the first work day on which normal Government processes resume.

(e) Bids may be withdrawn by written notice received at any time before the exact time set for receipt of bids. If the IFB authorizes facsimile bids, bids may be withdrawn via facsimile received at any time before the exact time set for receipt of bids, subject to the conditions specified in the provision at 52.214-31, Facsimile Bids. A bid may be withdrawn in person by a bidder or its authorized representative if, before the exact time set for receipt of bids, the identity of the person requesting withdrawal is established and the person signs a receipt for the bid.

(End of provision)

52.214-18 PREPARATION OF BIDS--CONSTRUCTION (APR 1984)

(a) Bids must be (1) submitted on the forms furnished by the Government or on copies of those forms, and (2) manually signed. The person signing a bid must initial each erasure or change appearing on any bid form.

(b) The bid form may require bidders to submit bid prices for one or more items on various bases, including--

(1) Lump sum bidding;

(2) Alternate prices;

(3) Units of construction; or

(4) Any combination of subparagraphs (1) through (3) above.

(c) If the solicitation requires bidding on all items, failure to do so will disqualify the bid. If bidding on all items is not required, bidders should insert the words "no bid" in the space provided for any item on which no price is submitted.

(d) Alternate bids will not be considered unless this solicitation authorizes their submission.

(End of provision)

52.214-19 CONTRACT AWARD--SEALED BIDDING--CONSTRUCTION (AUG 1996)

(a) The Government will evaluate bids in response to this solicitation without discussions and will award a contract to the responsible bidder whose bid, conforming to the solicitation, will be most advantageous to the Government, considering only price and the price-related factors specified elsewhere in the solicitation.

(b) The Government may reject any or all bids, and waive informalities or minor irregularities in bids received.

(c) The Government may accept any item or combination of items, unless doing so is precluded by a restrictive limitation in the solicitation or the bid.

(d) The Government may reject a bid as nonresponsive if the prices bid are materially unbalanced between line items or subline items. A bid is materially unbalanced when it is based on prices significantly less than cost for some work and prices which are significantly overstated in relation to cost for other work, and if there is a

reasonable doubt that the bid will result in the lowest overall cost to the Government even though it may be the low evaluated bid, or if it is so unbalanced as to be tantamount to allowing an advance payment.

(End of provison)

52.214-5000 APPARENT CLERICAL MISTAKES (MAR 1995)--EFARS

(a) For the purpose of initial evaluations of bids, the following will be utilized in the resolving arithmetic discrepancies found on the face of bidding schedule as submitted by the bidder:

(1) Obviously misplaced decimal points will be corrected;
(2) Discrepancy between unit price and extended price, the unit price will govern;
(3) Apparent errors in extension of unit prices will be corrected;
(4) Apparent errors in addition of lump-sum and extended prices will be corrected.

(b) For the purpose of bid evaluation, the government will proceed on the assumption that the bidder intends his bid to be evaluated on basis of the unit prices, the totals arrived at by resolution of arithmetic discrepancies as provided above and the bid will be so reflected on the abstract of bids.

(c) These correction procedures shall not be used to resolve any ambiguity concerning which bid is low.

(End of statement)

52.216-1 TYPE OF CONTRACT (APR 1984)

The Government contemplates award of a **Firm-Fixed Price Construction** contract resulting from this solicitation.

(End of provision)

52.222-5 DAVIS-BACON ACT--SECONDARY SITE OF THE WORK (JUL 2005)

(a)(1) The offeror shall notify the Government if the offeror intends to perform work at any secondary site of the work, as defined in paragraph (a)(1)(ii) of the FAR clause at 52.222-6, Davis-Bacon Act, of this solicitation.

(2) If the offeror is unsure if a planned work site satisfies the criteria for a secondary site of the work, the offeror shall request a determination from the Contracting Officer.

(b)(1) If the wage determination provided by the Government for work at the primary site of the work is not applicable to the secondary site of the work, the offeror shall request a wage determination from the Contracting Officer.

(2) The due date for receipt of offers will not be extended as a result of an offeror's request for a wage determination for a secondary site of the work.

(End of provision)

52.222-23 NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY FOR CONSTRUCTION (FEB 1999)

(a) The offeror's attention is called to the Equal Opportunity clause and the Affirmative Action Compliance Requirements for Construction clause of this solicitation.

(b) The goals for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

Goals for minority participation for each trade	Goals for female participation for each trade
19.6%	**6.9%**

These goals are applicable to all the Contractor's construction work performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, the Contractor shall apply the goals established for the geographical area where the work is actually performed. Goals are published periodically in the Federal Register in notice form, and these notices may be obtained from any Office of Federal Contract Compliance Programs office.

(c) The Contractor's compliance with Executive Order 11246, as amended, and the regulations in 41 CFR 60-4 shall be based on (1) its implementation of the Equal Opportunity clause, (2) specific affirmative action obligations required by the clause entitled "Affirmative Action Compliance Requirements for Construction," and (3) its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade. The Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor, or from project to project, for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, Executive Order 11246, as amended, and the regulations in 41 CFR 60-4. Compliance with the goals will be measured against the total work hours performed.

(d) The Contractor shall provide written notification to the Deputy Assistant Secretary for Federal Contract Compliance, U.S. Department of Labor, within 10 working days following award of any construction subcontract in excess of $10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the --

(1) Name, address, and telephone number of the subcontractor;

(2) Employer's identification number of the subcontractor;

(3) Estimated dollar amount of the subcontract;

(4) Estimated starting and completion dates of the subcontract; and

(5) Geographical area in which the subcontract is to be performed.

(e) As used in this Notice, and in any contract resulting from this solicitation, the "covered area" is **Illinois, Cook County, Mount Prospect and Prospect Heights.**

(End of provision)

52.228-1 BID GUARANTEE (SEP 1996)

(a) Failure to furnish a bid guarantee in the proper form and amount, by the time set for opening of bids, may be cause for rejection of the bid.

(b) The bidder shall furnish a bid guarantee in the form of a firm commitment, e.g., bid bond supported by good and sufficient surety or sureties acceptable to the Government, postal money order, certified check, cashier's check, irrevocable letter of credit, or, under Treasury Department regulations, certain bonds or notes of the United States. The Contracting Officer will return bid guarantees, other than bid bonds, (1) to unsuccessful bidders as soon as practicable after the opening of bids, and (2) to the successful bidder upon execution of contractual documents and bonds (including any necessary coinsurance or reinsurance agreements), as required by the bid as accepted.-

(c) The amount of the bid guarantee shall be **20%** percent of the bid price or **$3Million**, whichever is less.-

(d) If the successful bidder, upon acceptance of its bid by the Government within the period specified for acceptance, fails to execute all contractual documents or furnish executed bond(s) within 10 days after receipt of the forms by the bidder, the Contracting Officer may terminate the contract for default.-

(e) In the event the contract is terminated for default, the bidder is liable for any cost of acquiring the work that exceeds the amount of its bid, and the bid guarantee is available to offset the difference.

(End of clause)

52.233-2 SERVICE OF PROTEST (SEP 2006)

(a) Protests, as defined in section 33.101 of the Federal Acquisition Regulation, that are filed directly with an agency, and copies of any protests that are filed with the Government Accountability Office (GAO), shall be served on the Contracting Officer (addressed as follows) by obtaining written and dated acknowledgment of receipt from

Regina G. Blair
Chief, Contracting Branch
U.S. Army Corps of Engineers
111 North Canal Street, Suite 600
Chicago, Illinois 60606

(b) The copy of any protest shall be received in the office designated above within one day of filing a protest with the GAO.

(End of provision)

52.236-27 SITE VISIT (CONSTRUCTION) (FEB 1995)

(a) The clauses at 52.236-2, Differing Site Conditions, and 52.236-3, Site Investigations and Conditions Affecting the Work, will be included in any contract awarded as a result of this solicitation. Accordingly, offerors or quoters are urged and expected to inspect the site where the work will be performed.

(b) Site visits may be arranged during normal duty hours by contacting:

Name: **Richard Hurt**
Telephone: **(847) 688-4431 extension 112**

(End of provision)

52.252-1 SOLICITATION PROVISIONS INCORPORATED BY REFERENCE (FEB 1998)

This solicitation incorporates one or more solicitation provisions by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. The offeror is cautioned that the listed provisions may include blocks that must be completed by the offeror and submitted with its quotation or offer. In lieu of submitting the full text of those provisions, the offeror may identify the provision by paragraph identifier and provide the appropriate information with its quotation or offer. Also, the full text of a solicitation provision may be accessed electronically at this/these address(es):

www.arnet.gov/far

(End of provision

Section 00600 - Representations & Certifications

CLAUSES INCORPORATED BY REFERENCE

52.219-8	Utilization of Small Business Concerns	MAY 2004
52.222-38	Compliance With Veterans' Employment Reporting Requirements	DEC 2001
252.209-7001	Disclosure of Ownership or Control by the Government of a Terrorist Country	OCT 2006
252.225-7031	Secondary Arab Boycott Of Israel	JUN 2005

CLAUSES INCORPORATED BY FULL TEXT

52.203-11 CERTIFICATION AND DISCLOSURE REGARDING PAYMENTS TO INFLUENCE CERTAIN FEDERAL TRANSACTIONS (SEP 2007)

(a) Definitions. As used in this provision--``Lobbying contact'' has the meaning provided at 2 U.S.C. 1602(8). The terms ``agency,'' ``influencing or attempting to influence,'' ``officer or employee of an agency,'' ``person,'' ``reasonable compensation,'' and ``regularly employed'' are defined in the FAR clause of this solicitation entitled ``Limitation on Payments to Influence Certain Federal Transactions'' (52.203-12).

(b) Prohibition. The prohibition and exceptions contained in the FAR clause of this solicitation entitled ``Limitation on Payments to Influence Certain Federal Transactions'' (52.203-12) are hereby incorporated by reference in this provision.

(c) Certification. The offeror, by signing its offer, hereby certifies to the best of its knowledge and belief that no Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress on its behalf in connection with the awarding of this contract.

(d) Disclosure. If any registrants under the Lobbying Disclosure Act of 1995 have made a lobbying contact on behalf of the offeror with respect to this contract, the offeror shall complete and submit, with its offer, OMB Standard Form LLL, Disclosure of Lobbying Activities, to provide the name of the registrants. The offeror need not report regularly employed officers or employees of the offeror to whom payments of reasonable compensation were made.

(e) Penalty. Submission of this certification and disclosure is a prerequisite for making or entering into this contract imposed by 31 U.S.C. 1352. Any person who makes an expenditure prohibited under this provision or who fails to file or amend the disclosure required to be filed or amended by this provision, shall be subject to a civil penalty of not less than $10,000, and not more than $100,000, for each such failure.

(End of provision)

52.204-3 TAXPAYER IDENTIFICATION (OCT 1998)

(a) Definitions.

Common parent, as used in this provision, means that corporate entity that owns or controls an affiliated group of corporations that files its Federal income tax returns on a consolidated basis, and of which the offeror is a member.

Taxpayer Identification Number (TIN), as used in this provision, means the number required by the Internal Revenue Service (IRS) to be used by the offeror in reporting income tax and other returns. The TIN may be either a Social Security Number or an Employer Identification Number.

(b) All offerors must submit the information required in paragraphs (d) through (f) of this provision to comply with debt collection requirements of 31 U.S.C. 7701(c) and 3325(d), reporting requirements of 26 U.S.C. 6041, 6041A, and 6050M, and implementing regulations issued by the IRS. If the resulting contract is subject to the payment reporting requirements described in Federal Acquisition Regulation (FAR) 4.904, the failure or refusal by the offeror to furnish the information may result in a 31 percent reduction of payments otherwise due under the contract.

(c) The TIN may be used by the Government to collect and report on any delinquent amounts arising out of the offeror's relationship with the Government (31 U.S.C. 7701(c)(3)). If the resulting contract is subject to the payment reporting requirements described in FAR 4.904, the TIN provided hereunder may be matched with IRS records to verify the accuracy of the offeror's TIN.

(d) Taxpayer Identification Number (TIN).

___ TIN:.----------

___ TIN has been applied for.

___ TIN is not required because:

___ Offeror is a nonresident alien, foreign corporation, or foreign partnership that does not have income effectively connected with the conduct of a trade or business in the United States and does not have an office or place of business or a fiscal paying agent in the United States;

___ Offeror is an agency or instrumentality of a foreign government;

___ Offeror is an agency or instrumentality of the Federal Government.

(e) Type of organization.

___ Sole proprietorship;

___ Partnership;

___ Corporate entity (not tax-exempt);

___ Corporate entity (tax-exempt);

___ Government entity (Federal, State, or local);

___ Foreign government;

___ International organization per 26 CFR 1.6049-4;

___ Other----------

(f) Common parent.

___ Offeror is not owned or controlled by a common parent as defined in paragraph (a) of this provision.

___ Name and TIN of common parent:

Name----------

TIN----------

(End of provision)

52.204-5 WOMEN-OWNED BUSINESS (OTHER THAN SMALL BUSINESS) (MAY 1999)

(a) Definition. Women-owned business concern, as used in this provision, means a concern that is at least 51 percent owned by one or more women; or in the case of any publicly owned business, at least 51 percent of its stock is owned by one or more women; and whose management and daily business operations are controlled by one or more women.

(b) Representation. [Complete only if the offeror is a women-owned business concern and has not represented itself as a small business concern in paragraph (b)(1) of FAR 52.219-1, Small Business Program Representations, of this solicitation.] The offeror represents that it ( ) is a women-owned business concern.

(End of provision)

52.204-8 ANNUAL REPRESENTATIONS AND CERTIFICATIONS (JAN 2006)

(a)(1) The North American Industry Classification System (NAICS) code for this acquisition is **237990.**

(2) The small business size standard is **31 Million Dollars**.

(3) The small business size standard for a concern which submits an offer in its own name, other than on a construction or service contract, but which proposes to furnish a product which it did not itself manufacture, is 500 employees.

(b)(1) If the clause at 52.204-7, Central Contractor Registration, is included in this solicitation, paragraph (c) of this provision applies.

(2) If the clause at 52.204-7 is not included in this solicitation, and the offeror is currently registered in CCR, and has completed the ORCA electronically, the offeror may choose to use paragraph (b) of this provision instead of completing the corresponding individual representations and certifications in the solicitation. The offeror shall indicate which option applies by checking one of the following boxes:

(__) Paragraph (c) applies.

(__) Paragraph (c) does not apply and the offeror has completed the individual representations and certifications in the solicitation.

(c) The offeror has completed the annual representations and certifications electronically via the Online Representations and Certifications Application (ORCA) website at http://orca.bpn.gov. After reviewing the ORCA database information, the offeror verifies by submission of the offer that the representations and certifications currently posted electronically have been entered or updated within the last 12 months, are current, accurate, complete, and applicable to this solicitation (including the business size standard applicable to the NAICS code referenced for this solicitation), as of the date of this offer and are incorporated in this offer by reference (see FAR 4.1201); except for the changes identified below [offeror to insert changes, identifying change by clause number, title, date]. These amended representation(s) and/or certification(s) are also incorporated in this offer and are current, accurate, and complete as of the date of this offer.

FAR Clause	Title	Date	Change

Any changes provided by the offeror are applicable to this solicitation only, and do not result in an update to the representations and certifications posted on ORCA.

(End of Provision)

52.209-5 CERTIFICATION REGARDING RESPONSIBILITY MATTERS (MAY 2008)

(a)(1) The Offeror certifies, to the best of its knowledge and belief, that-

(i) The Offeror and/or any of its Principals-

(A) Are ( ) are not ( ) presently debarred, suspended, proposed for debarment, or declared ineligible for the award of contracts by any Federal agency;

(B) Have ( ) have not ( ), within a three-year period preceding this offer, been convicted of or had a civil judgment rendered against them for: commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, state, or local) contract or subcontract; violation of Federal or state antitrust statutes relating to the submission of offers; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, tax evasion, violating Federal criminal tax laws, or receiving stolen property; and

(C) Are ( ) are not ( ) presently indicted for, or otherwise criminally or civilly charged by a governmental entity with, commission of any of the offenses enumerated in paragraph (a)(1)(i)(B) of this provision.; and

(D) Have [ballot], have not [ballot], within a three-year period preceding this offer, been notified of any delinquent Federal taxes in an amount that exceeds $3,000 for which the liability remains unsatisfied.

(1) Federal taxes are considered delinquent if both of the following criteria apply:

(i) The tax liability is finally determined. The liability is finally determined if it has been assessed. A liability is not finally determined if there is a pending administrative or judicial challenge. In the case of a judicial challenge to the liability, the liability is not finally determined until all judicial appeal rights have been exhausted.

(ii) The taxpayer is delinquent in making payment. A taxpayer is delinquent if the taxpayer has failed to pay the tax liability when full payment was due and required. A taxpayer is not delinquent in cases where enforced collection action is precluded.

(2) Examples. (i) The taxpayer has received a statutory notice of deficiency, under I.R.C. Sec. 6212, which entitles the taxpayer to seek Tax Court review of a proposed tax deficiency. This is not a delinquent tax because it is not a final tax liability. Should the taxpayer seek Tax Court review, this will not be a final tax liability until the taxpayer has exercised all judicial appeal rights.

(ii) The IRS has filed a notice of Federal tax lien with respect to an assessed tax liability, and the taxpayer has been issued a notice under I.R.C. Sec. 6320 entitling the taxpayer to request a hearing with the IRS Office of Appeals contesting the lien filing, and to further appeal to the Tax Court if the IRS determines to sustain the lien filing. In the course of the hearing, the taxpayer is entitled to contest the underlying tax liability because the taxpayer has had no prior opportunity to contest the liability. This is not a delinquent tax because it is not a final tax liability. Should the taxpayer seek tax court review, this will not be a final tax liability until the taxpayer has exercised all judicial appeal rights.

(iii) The taxpayer has entered into an installment agreement pursuant to I.R.C. Sec. 6159. The taxpayer is making timely payments and is in full compliance with the agreement terms. The taxpayer is not delinquent because the taxpayer is not currently required to make full payment.

(iv) The taxpayer has filed for bankruptcy protection. The taxpayer is not delinquent because enforced collection action is stayed under 11 U.S.C. 362 (the Bankruptcy Code).

(ii) The Offeror has ( ) has not ( ), within a three-year period preceding this offer, had one or more contracts terminated for default by any Federal agency.

(2) "Principals," for the purposes of this certification, means officers; directors; owners; partners; and, persons having primary management or supervisory responsibilities within a business entity (e.g., general manager; plant manager; head of a subsidiary, division, or business segment, and similar positions).

This Certification Concerns a Matter Within the Jurisdiction of an Agency of the United States and the Making of a False, Fictitious, or Fraudulent Certification May Render the Maker Subject to Prosecution Under Section 1001, Title 18, United States Code.

(b) The Offeror shall provide immediate written notice to the Contracting Officer if, at any time prior to contract award, the Offeror learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

(c) A certification that any of the items in paragraph (a) of this provision exists will not necessarily result in withholding of an award under this solicitation. However, the certification will be considered in connection with a determination of the Offeror's responsibility. Failure of the Offeror to furnish a certification or provide such additional information as requested by the Contracting Officer may render the Offeror nonresponsible.

(d) Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by paragraph (a) of this provision. The knowledge and information of an Offeror is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

(e) The certification in paragraph (a) of this provision is a material representation of fact upon which reliance was placed when making award. If it is later determined that the Offeror knowingly rendered an erroneous certification, in addition to other remedies available to the Government, the Contracting Officer may terminate the contract resulting from this solicitation for default.

(End of provision)

52.219-1 SMALL BUSINESS PROGRAM REPRESENTATIONS (MAY 2004)

(a)(1) The North American Industry Classification System (NAICS) code for this acquisition is **237990**.

(2) The small business size standard is **31 Million Dollars.**.

(3) The small business size standard for a concern which submits an offer in its own name, other than on a construction or service contract, but which proposes to furnish a product which it did not itself manufacture, is 500 employees.

(b) Representations. (1) The offeror represents as part of its offer that it ( ) is, ( ) is not a small business concern.

(2) (Complete only if the offeror represented itself as a small business concern in paragraph (b)(1) of this provision.) The offeror represents, for general statistical purposes, that it ( ) is, ( ) is not a small disadvantaged business concern as defined in 13 CFR 124.1002.

(3) (Complete only if the offeror represented itself as a small business concern in paragraph (b)(1) of this provision.) The offeror represents as part of its offer that it ( ) is, ( ) is not a women-owned small business concern.

(4) (Complete only if the offeror represented itself as a small business concern in paragraph (b)(1) of this provision.) The offeror represents as part of its offer that it ( ) is, ( ) is not a veteran-owned small business concern.

(5) (Complete only if the offeror represented itself as a veteran-owned small business concern in paragraph (b)(4) of this provision.) The offeror represents as part of its offer that it ( ) is, ( ) is not a service-disabled veteran-owned small business concern.

(6) (Complete only if the offeror represented itself as a small business concern in paragraph (b)(1) of this provision.) The offeror represents, as part of its offer, that--

(i) It ( ) is, ( ) is not a HUBZone small business concern listed, on the date of this representation, on the List of Qualified HUBZone Small Business Concerns maintained by the Small Business Administration, and no material change in ownership and control, principal office, or HUBZone employee percentage has occurred since it was certified by the Small Business Administration in accordance with 13 CFR part 126; and

(ii) It ( ) is, ( ) is not a joint venture that complies with the requirements of 13 CFR part 126, and the representation in paragraph (b)(6)(i) of this provision is accurate for the HUBZone small business concern or concerns that are participating in the joint venture. (The offeror shall enter the name or names of the HUBZone small business concern or concerns that are participating in the joint venture:_____.) Each HUBZone small business concern participating in the joint venture shall submit a separate signed copy of the HUBZone representation.

(c) Definitions. As used in this provision--

Service-disabled veteran-owned small business concern--

(1) Means a small business concern--

(i) Not less than 51 percent of which is owned by one or more service-disabled veterans or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more service-disabled veterans; and

(ii) The management and daily business operations of which are controlled by one or more service-disabled veterans or, in the case of a service-disabled veteran with permanent and severe disability, the spouse or permanent caregiver of such veteran.

(2) Service-disabled veteran means a veteran, as defined in 38 U.S.C. 101(2), with a disability that is service-connected, as defined in 38 U.S.C. 101(16).

"Small business concern," means a concern, including its affiliates, that is independently owned and operated, not dominant in the field of operation in which it is bidding on Government contracts, and qualified as a small business under the criteria in 13 CFR Part 121 and the size standard in paragraph (a) of this provision.

Veteran-owned small business concern means a small business concern--

(1) Not less than 51 percent of which is owned by one or more veterans (as defined at 38 U.S.C. 101(2)) or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more veterans; and

(2) The management and daily business operations of which are controlled by one or more veterans.

"Women-owned small business concern," means a small business concern --

(1) That is at least 51 percent owned by one or more women; in the case of any publicly owned business, at least 51 percent of the stock of which is owned by one or more women; and

(2) Whose management and daily business operations are controlled by one or more women.

(d) Notice.

(1) If this solicitation is for supplies and has been set aside, in whole or in part, for small business concerns, then the clause in this solicitation providing notice of the set-aside contains restrictions on the source of the end items to be furnished.

(2) Under 15 U.S.C. 645(d), any person who misrepresents a firm's status as a small, HUBZone small, small disadvantaged, or women-owned small business concern in order to obtain a contract to be awarded under the preference programs established pursuant to section 8(a), 8(d), 9, or 15 of the Small Business Act or any other provision of Federal law that specifically references section 8(d) for a definition of program eligibility, shall--

(i) Be punished by imposition of fine, imprisonment, or both;

(ii) Be subject to administrative remedies, including suspension and debarment; and

(iii) Be ineligible for participation in programs conducted under the authority of the Act.

(End of provision)

52.219-19 SMALL BUSINESS CONCERN REPRESENTATION FOR THE SMALL BUSINESS COMPETITIVENESS DEMONSTRATION PROGRAM (OCT 2000)

(a) Definition.

"Emerging small business" as used in this solicitation, means a small business concern whose size is no greater than 50 percent of the numerical size standard applicable to the North American Industry Classification System (NAICS) code assigned to a contracting opportunity.

(b) [Complete only if the Offeror has represented itself under the provision at 52.219-1 as a small business concern under the size standards of this solicitation.] The Offeror [ ] is, [ ] is not an emerging small business.

(c) (Complete only if the Offeror is a small business or an emerging small business, indicating its size range.)

Offeror's number of employees for the past 12 months (check this column if size standard stated in solicitation is expressed in terms of number of employees) or Offeror's average annual gross revenue for the last 3 fiscal years (check this column if size standard stated in solicitation is expressed in terms of annual receipts). (Check one of the following.)

No. of Employees	Avg. Annual Gross Revenues
____ 50 or fewer	____ $1 million or less
____ 51 - 100	____ $1,000,001 - $2 million
____ 101 - 250	____ $2,000,001 - $3.5 million
____ 251 - 500	____ $3,500,001 - $5 million
____ 501 - 750	____ $5,000,001 - $10 million
____ 751 - 1,000	____ $10,000,001 - $17 million
____ Over 1,000	____ Over $17 million

(End of provision)

52.219-21 SMALL BUSINESS SIZE REPRESENTATION FOR TARGETED INDUSTRY CATEGORIES UNDER THE SMALL BUSINESS COMPETITIVENESS DEMONSTRATION PROGRAM (MAY 1999)

(Complete only if the Offeror has represented itself under the provision at 52.219-1 as a small business concern under the size standards of this solicitation.)

Offeror's number of employees for the past 12 months (check this column if size standard stated in solicitation is expressed in terms of number of employees) or Offeror's average annual gross revenue for the last 3 fiscal years (check this column if size standard stated in solicitation is expressed in terms of annual receipts). (Check one of the following.)

No. of Employees	Avg. Annual Gross Revenues
____ 50 or fewer	____ $1 million or less
____ 51 - 100	____ $1,000,001 - $2 million
____ 101 - 250	____ $2,000,001 - $3.5 million
____ 251 - 500	____ $3,500,001 - $5 million

____ 501 - 750 ____ $5,000,001 - $10 million

____ 751 - 1,000 ____ $10,000,001 - $17 million

____ Over 1,000 ____ Over $17 million

(End of provision)

52.219-22 SMALL DISADVANTAGED BUSINESS STATUS (OCT 1999)

(a) General. This provision is used to assess an offeror's small disadvantaged business status for the purpose of obtaining a benefit on this solicitation. Status as a small business and status as a small disadvantaged business for general statistical purposes is covered by the provision at FAR 52.219-1, Small Business Program Representation.

(b) Representations.

(1) General. The offeror represents, as part of its offer, that it is a small business under the size standard applicable to this acquisition; and either--

___ (i) It has received certification by the Small Business Administration as a small disadvantaged business concern consistent with 13 CFR 124, Subpart B; and

(A) No material change in disadvantaged ownership and control has occurred since its certification;

(B) Where the concern is owned by one or more disadvantaged individuals, the net worth of each individual upon whom the certification is based does not exceed $750,000 after taking into account the applicable exclusions set forth at 13 CFR 124.104(c)(2); and

(C) It is identified, on the date of this representation, as a certified small disadvantaged business concern in the database maintained by the Small Business Administration(PRO0Net); or

___ (ii) It has submitted a completed application to the Small Business Administration or a Private Certifier to be certified as a small disadvantaged business concern in accordance with 13 CFR 124, Subpart B, and a decision on that application is pending, and that no material change in disadvantaged ownership and control has occurred since its application was submitted.

(2)___ For Joint Ventures. The offeror represents, as part of its offer, that it is a joint venture that complies with the requirements at 13 CFR 124.1002(f) and that the representation in paragraph (b)(1) of this provision is accurate for the small disadvantaged business concern that is participating in the joint venture. [The offeror shall enter the name of the small disadvantaged business concern that is participating in the joint venture: _____.]

(c) Penalties and Remedies. Anyone who misrepresents any aspects of the disadvantaged status of a concern for the purposes of securing a contract or subcontract shall:

(1) Be punished by imposition of a fine, imprisonment, or both;

(2) Be subject to administrative remedies, including suspension and debarment; and

(3) Be ineligible for participation in programs conducted under the authority of the Small Business Act.

(End of provision)

52.222-22 PREVIOUS CONTRACTS AND COMPLIANCE REPORTS (FEB 1999)

The offeror represents that --

(a) ( ) It has, ( ) has not participated in a previous contract or subcontract subject to the Equal Opportunity clause of this solicitation;

(b) ( ) It has, ( ) has not, filed all required compliance reports; and

(c) Representations indicating submission of required compliance reports, signed by proposed subcontractors, will be obtained before subcontract awards.

(End of provision)

52.223-13 CERTIFICATION OF TOXIC CHEMICAL RELEASE REPORTING (AUG 2003)

(a) Executive Order 13148, of April 21, 2000, Greening the Government through Leadership in Environmental Management, requires submission of this certification as a prerequisite for contract award.

(b) By signing this offer, the offeror certifies that--

(1) As the owner or operator of facilities that will be used in the performance of this contract that are subject to the filing and reporting requirements described in section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) (42 U.S.C. 11023) and section 6607 of the Pollution Prevention Act of 1990 (PPA) (42 U.S.C. 13106), the offeror will file and continue to file for such facilities for the life of the contract the Toxic Chemical Release Inventory Form (Form R) as described in sections 313(a) and (g) of EPCRA and section 6607 of PPA; or

(2) None of its owned or operated facilities to be used in the performance of this contract is subject to the Form R filing and reporting requirements because each such facility is exempt for at least one of the following reasons: (Check each block that is applicable.)

( ) (i) The facility does not manufacture, process, or otherwise use any toxic chemicals listed in 40 CFR 372.65;

( ) (ii) The facility does not have 10 or more full-time employees as specified in section 313.(b)(1)(A) of EPCRA 42 U.S.C. 11023(b)(1)(A);

( ) (iii) The facility does not meet the reporting thresholds of toxic chemicals established under section 313(f) of EPCRA, 42 U.S.C. 11023(f) (including the alternate thresholds at 40 CFR 372.27, provided an appropriate certification form has been filed with EPA);

( ) (iv) The facility does not fall within the following Standard Industrial Classification (SIC) codes or their corresponding North American Industry Classification System sectors:

(A) Major group code 10 (except 1011, 1081, and 1094.

(B) Major group code 12 (except 1241).

(C) Major group codes 20 through 39.

(D) Industry code 4911, 4931, or 4939 (limited to facilities that combust coal and/or oil for the purpose of generating power for distribution in commerce).

(E) Industry code 4953 (limited to facilities regulated under the Resource Conservation and Recovery Act, Subtitle C (42 U.S.C. 6921, et seq.), 5169, 5171, or 7389 (limited to facilities primarily engaged in solvent recovery services on a contract or fee basis); or

( ) (v) The facility is not located within the United States or its outlying areas.

(End of clause)

252.247-7022 REPRESENTATION OF EXTENT OF TRANSPORTATION BY SEA (AUG 1992)

(a) The Offeror shall indicate by checking the appropriate blank in paragraph (b) of this provision whether transportation of supplies by sea is anticipated under the resultant contract. The term supplies is defined in the Transportation of Supplies by Sea clause of this solicitation.

(b) Representation. The Offeror represents that it:

____ (1) Does anticipate that supplies will be transported by sea in the performance of any contract or subcontract resulting from this solicitation.

____ (2) Does not anticipate that supplies will be transported by sea in the performance of any contract or subcontract resulting from this solicitation.

(c) Any contract resulting from this solicitation will include the Transportation of Supplies by Sea clause. If the Offeror represents that it will not use ocean transportation, the resulting contract will also include the Defense FAR Supplement clause at 252.247-7024, Notification of Transportation of Supplies by Sea.

(End of provision)

CLAUSES INCORPORATED BY REFERENCE

52.202-1	Definitions	JUL 2004
52.203-3	Gratuities	APR 1984
52.203-5	Covenant Against Contingent Fees	APR 1984
52.203-7	Anti-Kickback Procedures	JUL 1995
52.203-8	Cancellation, Rescission, and Recovery of Funds for Illegal or Improper Activity	JAN 1997
52.203-10	Price Or Fee Adjustment For Illegal Or Improper Activity	JAN 1997
52.203-12	Limitation On Payments To Influence Certain Federal Transactions	SEP 2007
52.204-4	Printed or Copied Double-Sided on Recycled Paper	AUG 2000
52.208-9	Contractor Use of Mandatory Sources of Supply	JUN 2006
52.209-6	Protecting the Government's Interest When Subcontracting With Contractors Debarred, Suspended, or Proposed for Debarment	SEP 2006
52.214-26	Audit and Records--Sealed Bidding	OCT 1997
52.214-27	Price Reduction for Defective Cost or Pricing Data - Modifications - Sealed Bidding	OCT 1997
52.214-28	Subcontracting Cost Or Pricing Data--Modifications--Sealed Bidding	OCT 1997
52.214-29	Order Of Precedence--Sealed Bidding	JAN 1986
52.219-8	Utilization of Small Business Concerns	MAY 2004
52.219-14	Limitations On Subcontracting	DEC 1996
52.219-18 Alt I	Notification of Competition Limited to Eligible 8(A) Concerns (Jun 2003) - Alternate I	APR 2005
52.222-1	Notice To The Government Of Labor Disputes	FEB 1997
52.222-3	Convict Labor	JUN 2003
52.222-6	Davis Bacon Act	JUL 2005
52.222-7	Withholding of Funds	FEB 1988
52.222-8	Payrolls and Basic Records	FEB 1988
52.222-9	Apprentices and Trainees	JUL 2005
52.222-10	Compliance with Copeland Act Requirements	FEB 1988
52.222-11	Subcontracts (Labor Standards)	JUL 2005
52.222-12	Contract Termination-Debarment	FEB 1988
52.222-13	Compliance with Davis-Bacon and Related Act Regulations.	FEB 1988
52.222-14	Disputes Concerning Labor Standards	FEB 1988
52.222-15	Certification of Eligibility	FEB 1988
52.222-21	Prohibition Of Segregated Facilities	FEB 1999
52.222-26	Equal Opportunity	MAR 2007
52.222-27	Affirmative Action Compliance Requirements for Construction	FEB 1999
52.222-35	Equal Opportunity For Special Disabled Veterans, Veterans of the Vietnam Era, and Other Eligible Veterans	SEP 2006
52.222-36	Affirmative Action For Workers With Disabilities	JUN 1998
52.222-37	Employment Reports On Special Disabled Veterans, Veterans Of The Vietnam Era, and Other Eligible Veterans	SEP 2006
52.222-39	Notification of Employee Rights Concerning Payment of Union Dues or Fees	DEC 2004
52.223-14	Toxic Chemical Release Reporting	AUG 2003

52.225-11	Buy American Act--Construction Materials Under Trade Agreements	AUG 2007
52.225-13	Restrictions on Certain Foreign Purchases	JUN 2008
52.227-1	Authorization and Consent	DEC 2007
52.227-2	Notice And Assistance Regarding Patent And Copyright Infringement	DEC 2007
52.228-2	Additional Bond Security	OCT 1997
52.228-5	Insurance - Work On A Government Installation	JAN 1997
52.228-11	Pledges Of Assets	FEB 1992
52.228-12	Prospective Subcontractor Requests for Bonds	OCT 1995
52.228-14	Irrevocable Letter of Credit	DEC 1999
52.228-15	Performance and Payment Bonds--Construction	NOV 2006
52.229-3	Federal, State And Local Taxes	APR 2003
52.232-5	Payments under Fixed-Price Construction Contracts	SEP 2002
52.232-23 Alt I	Assignment of Claims (Jan 1986) - Alternate I	APR 1984
52.232-25	Prompt Payment	OCT 2003
52.232-27	Prompt Payment for Construction Contracts	SEP 2005
52.232-33	Payment by Electronic Funds Transfer--Central Contractor Registration	OCT 2003
52.233-1	Disputes	JUL 2002
52.233-3	Protest After Award	AUG 1996
52.236-2	Differing Site Conditions	APR 1984
52.236-3	Site Investigation and Conditions Affecting the Work	APR 1984
52.236-5	Material and Workmanship	APR 1984
52.236-6	Superintendence by the Contractor	APR 1984
52.236-7	Permits and Responsibilities	NOV 1991
52.236-8	Other Contracts	APR 1984
52.236-9	Protection of Existing Vegetation, Structures, Equipment, Utilities, and Improvements	APR 1984
52.236-10	Operations and Storage Areas	APR 1984
52.236-11	Use and Possession Prior to Completion	APR 1984
52.236-12	Cleaning Up	APR 1984
52.236-13 Alt I	Accident Prevention (Nov 1991) - Alternate I	NOV 1991
52.236-15	Schedules for Construction Contracts	APR 1984
52.236-17	Layout of Work	APR 1984
52.236-26	Preconstruction Conference	FEB 1995
52.239-1	Privacy or Security Safeguards	AUG 1996
52.242-13	Bankruptcy	JUL 1995
52.242-14	Suspension of Work	APR 1984
52.243-4	Changes	JUN 2007
52.244-2	Subcontracts	JUN 2007
52.244-5	Competition In Subcontracting	DEC 1996
52.244-6	Subcontracts for Commercial Items	MAR 2007
52.246-1	Contractor Inspection Requirements	APR 1984
52.246-12	Inspection of Construction	AUG 1996
52.246-21	Warranty of Construction	MAR 1994
52.248-3	Value Engineering-Construction	SEP 2006
52.249-2 Alt I	Termination for Convenience of the Government (Fixed-Price) (May 2004) - Alternate I	SEP 1996
52.249-10	Default (Fixed-Price Construction)	APR 1984
52.250-1	Indemnification Under Public Law 85-804	APR 1984
52.253-1	Computer Generated Forms	JAN 1991
252.201-7000	Contracting Officer's Representative	DEC 1991

252.203-7001	Prohibition On Persons Convicted of Fraud or Other Defense-Contract-Related Felonies	DEC 2004
252.203-7002	Display Of DOD Hotline Poster	DEC 1991
252.204-7000	Disclosure Of Information	DEC 1991
252.204-7003	Control Of Government Personnel Work Product	APR 1992
252.204-7004 Alt A	Central Contractor Registration (52.204-7) Alternate A	SEP 2007
252.205-7000	Provision Of Information To Cooperative Agreement Holders	DEC 1991
252.209-7004	Subcontracting With Firms That Are Owned or Controlled By The Government of a Terrorist Country	DEC 2006
252.225-7012	Preference For Certain Domestic Commodities	MAR 2008
252.227-7033	Rights in Shop Drawings	APR 1966
252.232-7003	Electronic Submission of Payment Requests and Receiving Reports	MAR 2008
252.232-7010	Levies on Contract Payments	DEC 2006
252.236-7000	Modification Proposals-Price Breakdown	DEC 1991
252.236-7002	Obstruction of Navigable Waterways	DEC 1991
252.236-7006	Cost Limitation	JAN 1997
252.236-7008	Contract Prices-Bidding Schedules	DEC 1991
252.243-7001	Pricing Of Contract Modifications	DEC 1991
252.243-7002	Requests for Equitable Adjustment	MAR 1998
252.244-7000	Subcontracts for Commercial Items and Commercial Components (DoD Contracts)	JAN 2007
252.247-7023	Transportation of Supplies by Sea	MAY 2002
252.247-7024	Notification Of Transportation Of Supplies By Sea	MAR 2000

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52.211-10 COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK (APR 1984)

The Contractor shall be required to commence work under this contract within **10 calendar days following its acknowledgement of the first Notice to Proceed letter** and execute the work as stipulated in the following paragraph. Upon the Contractor's acknowledgement of the second Notice to Proceed letter, the Contractor shall be required to proceed with the entire contract work, prosecute prosecute the work diligently, and complete the entire work ready for use not later than **1,145 CALENDAR DAYS following the Contractor's acknowledgement of the first Notice to Proceed Letter,** which shall include final cleanup of the premises.

1. **The Contractor will be issued two separate Notice to Proceed Letters for this project.**

   a. **Notice #1 will be issued following the government's approval of the Contractor's Bonds and Insurance. Under this particular Notice, the Contractor will be authorized to initiate work that is considered to be administrative in nature, e.g. the Notice will not authorize any on-site work.**

   b. **Notice to Proceed Letter #2 will be issued once the Contractor satisfies the permit requirements called out in Section 01100, Sub-Paragraph 1.22 of the Contract Specifications and the IDOT Highway Permit has been obtained by the Government. By way of Letter #2, the Contractor will be authorized to perform the entire work of the contract, prosecute the work diligently, and complete the entire work ready for use not later than 1,145 calendar days following its acknowledgement of the Notice to**

Proceed Letter #1. The time stated for completion shall include final cleanup of the premises.

(End of clause)

52.211-12 LIQUIDATED DAMAGES--CONSTRUCTION (SEP 2000)

(a) If the Contractor fails to complete the work within the time specified in the contract, the Contractor shall pay liquidated damages to the Government in the amount of **$2100.00** for each calendar day of delay until the work is completed or accepted.

(b) If the Government terminates the Contractor's right to proceed, liquidated damages will continue to accrue until the work is completed. These liquidated damages are in addition to excess costs of repurchase under the Termination clause.

(End of clause)

52.211-18 VARIATION IN ESTIMATED QUANTITY (APR 1984)

If the quantity of a unit-priced item in this contract is an estimated quantity and the actual quantity of the unit-priced item varies more than 15 percent above or below the estimated quantity, an equitable adjustment in the contract price shall be made upon demand of either party. The equitable adjustment shall be based upon any increase or decrease in costs due solely to the variation above 115 percent or below 85 percent of the estimated quantity. If the quantity variation is such as to cause an increase in the time necessary for completion, the Contractor may request, in writing, an extension of time, to be received by the Contracting Officer within 10 days from the beginning of the delay, or within such further period as may be granted by the Contracting Officer before the date of final settlement of the contract. Upon the receipt of a written request for an extension, the Contracting Officer shall ascertain the facts and make an adjustment for extending the completion date as, in the judgement of the Contracting Officer, is justified.

52.222-4 CONTRACT WORK HOURS AND SAFETY STANDARDS ACT - OVERTIME COMPENSATION. (JUL 2005)

(a) Overtime requirements. No Contractor or subcontractor employing laborers or mechanics (see Federal Acquisition Regulation 22.300) shall require or permit them to work over 40 hours in any workweek unless they are paid at least 1 and 1/2 times the basic rate of pay for each hour worked over 40 hours.

(b) Violation; liability for unpaid wages; liquidated damages. The responsible Contractor and subcontractor are liable for unpaid wages if they violate the terms in paragraph (a) of this clause. In addition, the Contractor and subcontractor are liable for liquidated damages payable to the Government. The Contracting Officer will assess liquidated damages at the rate of $10 per affected employee for each calendar day on which the employer required or permitted the employee to work in excess of the standard workweek of 40 hours without paying overtime wages required by the Contract Work Hours and Safety Standards Act.

(c) Withholding for unpaid wages and liquidated damages. The Contracting Officer will withhold from payments due under the contract sufficient funds required to satisfy any Contractor or subcontractor liabilities for unpaid

wages and liquidated damages. If amounts withheld under the contract are insufficient to satisfy Contractor or subcontractor liabilities, the Contracting Officer will withhold payments from other Federal or Federally assisted contracts held by the same Contractor that are subject to the Contract Work Hours and Safety Standards Act.

(d) Payrolls and basic records.

(1) The Contractor and its subcontractors shall maintain payrolls and basic payroll records for all laborers and mechanics working on the contract during the contract and shall make them available to the Government until 3 years after contract completion. The records shall contain the name and address of each employee, social security number, labor classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid. The records need not duplicate those required for construction work by Department of Labor regulations at 29 CFR 5.5(a)(3) implementing the Davis-Bacon Act.

(2) The Contractor and its subcontractors shall allow authorized representatives of the Contracting Officer or the Department of Labor to inspect, copy, or transcribe records maintained under paragraph (d)(1) of this clause. The Contractor or subcontractor also shall allow authorized representatives of the Contracting Officer or Department of Labor to interview employees in the workplace during working hours.

(e) Subcontracts. The Contractor shall insert the provisions set forth in paragraphs (a) through (d) of this clause in subcontracts that may require or involve the employment of laborers and mechanics and require subcontractors to include these provisions in any such lower tier subcontracts. The Contractor shall be responsible for compliance by any subcontractor or lower-tier subcontractor with the provisions set forth in paragraphs (a) through (d) of this clause.

(End of clause)

52.233-4 APPLICABLE LAW FOR BREACH OF CONTRACT CLAIM (OCT 2004)

United States law will apply to resolve any claim of breach of this contract.

(End of clause)

52.252-2 CLAUSES INCORPORATED BY REFERENCE (FEB 1998)

This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. Also, the full text of a clause may be accessed electronically at this/these address(es):

www.arnet.gov/far

(End of clause)

252.204-7006 BILLING INSTRUCTIONS (OCT 2005)

When submitting a request for payment, the Contractor shall--

(a) Identify the contract line item(s) on the payment request that reasonably reflect contract work performance; and

(b) Separately identify a payment amount for each contract line item included in the payment request.

(End of clause)

252.236-7001 CONTRACT DRAWINGS AND SPECIFICATIONS (AUG 2000)

(a) The Government will provide to the Contractor, without charge, one set of contract drawings and specifications, except publications incorporated into the technical provisions by reference, in electronic or paper media as chosen by the Contracting Officer.

(b) The Contractor shall--

(1) Check all drawings furnished immediately upon receipt;

(2) Compare all drawings and verify the figures before laying out the work;

(3) Promptly notify the Contracting Officer of any discrepancies;

(4) Be responsible for any errors that might have been avoided by complying with this paragraph (b); and

(5) Reproduce and print contract drawings and specifications as needed.

(c) In general--

(1) Large-scale drawings shall govern small-scale drawings; and

(2) The Contractor shall follow figures marked on drawings in preference to scale measurements.

(d) Omissions from the drawings or specifications or the misdescription of details of work that are manifestly necessary to carry out the intent of the drawings and specifications, or that are customarily performed, shall not relieve the Contractor from performing such omitted or misdescribed details of the work. The Contractor shall perform such details as if fully and correctly set forth and described in the drawings and specifications.

(e) The work shall conform to the specifications and the contract drawings identified on the following index of drawings:

File	Drawing No.	Title
1	G-01	LOCALITY, PROJECT & VICINITY MAPS
2	G-02	SHEET INDEX
3	G-03	STANDARD SYMBOLS, LEGEND, ABBREVIATIONS AND GENERAL NOTES
4	B-01	BORING LOG STA. 202+00 TO 248+20

5 B-02	BORING LOG STA. 248+20 TO 282+54
6 C-01	SURVEY CONTROL POINTS AND BENCHMARKS STA. 202+00 TO 245+00
7 C-02	SURVEY CONTROL POINTS AND BENCHMARKS STA. 245+00 TO 282+54
8 C-03	SURVEY CONTROL POINTS DETAILS
9 C-04	SURVEY OF EXISTING UTILITIES STA. 202+00 TO 221+00
10 C-05	SURVEY OF EXISTING UTILITIES STA. 221+00 TO 241+00
11 C-06	SURVEY OF EXISTING UTILITIES STA. 241+00 TO 265+00
12 C-07	SURVEY OF EXISTING UTILITIES STA. 265+00 TO 282+54
13 C-08	ULITITY TAG INFORMATION: ST 1 TO ST 143
14 C-09	ULITITY TAG INFORMATION: ST 144 TO ST 283
15 C-10	ULITITY TAG INFORMATION: ST 284 TO ST 306, SAN 1 TO SAN 23 AND WAT 1 TO WAT 13
16 C-11	WORK LIMITS AND WORK POINTS SHEET REFERENCE
17 C-12	WORK LIMITS AND WORK POINTS DATA STA. 203+16 TO 210+00
18 C-13	WORK LIMITS AND WORK POINTS DATA STA. 210+00 TO 221+00
19 C-14	WORK LIMITS AND WORK POINTS DATA STA. 221+00 TO 232+00
20 C-15	WORK LIMITS AND WORK POINTS DATA STA. 232+00 TO 243+00
21 C-16	WORK LIMITS AND WORK POINTS DATA STA. 243+00 TO 252+00
22 C-17	WORK LIMITS AND WORK POINTS DATA STA. 252+00 TO 263+00
23 C-18	WORK LIMITS AND WORK POINTS DATA STA. 263+00 TO 272+00
24 C-19	WORK LIMITS AND WORK POINTS DATA STA. 272+00 TO 282+54
25 C-19A	MILWAUKEE AVENUE FLOOD GATE CLOSURE STRUCTURE WORK LIMITS
26 C-20	UNIFIED TABLE OF CONTROL POINTS
27 C-21	SITE PLAN AND PROFILE SHEET REFERENCE
28 C-22	SITE PLAN AND PROFILE STA. 202+00 TO 205+00
29 C-23	SITE PLAN AND PROFILE STA. 205+00 TO 210+00
30 C-24	SITE PLAN STA. 210+00 TO 215+00
31 C-24A	PROFILE STA. 210+00 TO 215+00
32 C-25	SITE PLAN AND PROFILE STA. 215+00 TO 220+00
33 C-26	SITE PLAN AND PROFILE STA. 220+00 TO 225+00
34 C-27	SITE PLAN AND PROFILE STA. 225+00 TO 230+00
35 C-28	SITE PLAN AND PROFILE STA. 230+00 TO 235+50
36 C-29	SITE PLAN AND PROFILE STA. 235+50 TO 241+00
37 C-30	SITE PLAN AND PROFILE STA. 241+00 TO 245+50
38 C-31	SITE PLAN AND PROFILE STA. 245+50 TO 249+88
39 C-32	SITE PLAN AND PROFILE STA. 249+88 TO 254+76
40 C-33	SITE PLAN AND PROFILE STA. 254+75 TO 260+47
41 C-34	SITE PLAN AND PROFILE STA. 260+46 TO 266+32
42 C-35	SITE PLAN AND PROFILE STA. 266+25 TO 271+34
43 C-36	SITE PLAN AND PROFILE STA. 271+34 TO 275+35
44 C-37	SITE PLAN STA. 275+34 TO 282+54
45 C-37A	PROFILE STA. 275+34 TO 282+54
46 C-38	MILWAUKEE AVENUE FLOOD GATE CLOSURE STRUCTURE DEMOLITION/PROPOSED SITE PLAN
47 C-38A	MILWAUKEE AVENUE FLOOD GATE CLOSURE STRUCTURE UTILITY RELOCATION PLAN
48 C-38B	MILWAUKEE AVENUE FLOOD GATE CLOSURE STRUCTURE EXISTING/ PROPOSED CONDITIONS

49 C-39	DRIVEWAY # 1 PLAN, CROSS-SECTION AND DETAIL
50 C-40	DRIVEWAY # 2 DEMOLITION AND TURN AROUND DETAIL
51 C-41	DETAILS AND TYPICAL CROSS SECTION
52 C-42	GRAVEL PATH SECTION, TREE PROTECTION AND GUARDRAIL DETAIL
53 C-43	CROSS-SECTION STA. 204+00 TO 212+00
54 C-44	CROSS-SECTION STA. 213+00 TO 221+00
55 C-45	CROSS-SECTION STA. 222+00 TO 230+00
56 C-46	CROSS-SECTION STA. 231+00 TO 239+00
57 C-47	CROSS-SECTION STA. 240+00 TO 247+10
58 C-48	CROSS-SECTION STA. 247+29 TO 256+00
59 C-49	CROSS-SECTION STA. 265+00 TO 272+00
60 C-50	CROSS-SECTION STA. 273+00 TO 282+00
61 C-51	STANDARD DETAIL OF 72" DIA. MANHOLE & CATCH BASIN
62 C-52	MAINTENANCE OF TRAFFIC
63 C-52A	MILWAUKEE AVENUE FLOOD GATE MAINTENANCE OF TRAFFIC STANDARD AND NOTES
64 S-01	STATION 208+52.25 TO STATION 213+63.70
65 S-02	STATION 213+63.70 TO STATION 218+70.11
66 S-03	STATION 218+70.11 TO STATION 223+77.86
67 S-04	STATION 223+77.86 TO STATION 229+25.00
68 S-04A	STATION 229+25.00 TO STATION 234+32.15
69 S-04B	STATION 234+35.15 TO STATION 239+32.15
70 S-04C	STATION 239+32.15 TO STATION 244+38.80
71 S-04D	STATION 244+38.80 TO STATION 249+55.21
72 S-04E	STATION 249+55.21 TO STATION 254+48.66
73 S-04F	STATION 254+48.66 TO STATION 266+32.74
74 S-04G	STATION 266+32.74 TO STATION 271+24.48
75 S-04H	STATION 271+24.48 TO STATION 276+20.24
76 S-04I	STATION 276+20.24 TO STATION 281+20.24
77 S-04J	STATION 281+20.24 TO STATION 282+53.57
78 S-05	SHEET PILE I-WALLS TYPICAL SECTIONS
79 S-06	SHEET PILE I-WALLS TYPICAL SECTIONS
80 S-07	DETAILS
81 S-08	PUMP STATION #1 AND CLOSURE #1 PLAN AND ELEVATIONS
82 S-09	PUMP STATION #1 AND CLOSURE #1 SECTIONS SHEET 1
83 S-10	PUMP STATION #1 AND CLOSURE #1 SECTION SHEET 2
84 S-11	CLOSURE #2 PLAN AND ELEVATIONS
85 S-12	CLOSURE #2 SECTIONS
86 S-13	CLOSURE #3 AND #4 PLAN, ELEVATIONS AND SECTIONS
87 S-14	CLOSURE #5 PLAN, ELEVATIONS AND SECTIONS
88 S-15	BACKFLOW STRUCTURE NO. 1, STRUCTURAL ADDITIONS, PLAN, ELEVATIONS AND SECTIONS
89 S-15A	EXISTING BACKFLOW STRUCTURES NO. 1 AND NO. 2 PLAN AND SECTIONS
90 S-16	PUMP STATION #2 PLAN AND ELEVATIONS
91 S-17	PUMP STATION #2 SECTIONS
92 S-18	CLOSURES #6 AND #7 PLAN AND ELEVATIONS
93 S-19	CLOSURES #6 AND #7 SECTIONS
94 S-20	CLOSURE #8 ELEVATIONS AND SECTIONS

95	S-20A	DEMOLITION PLAN FOR EXISTING SERVICE VAULT & CLOSURE #8 DETAILS
96	S-21	CLOSURE #9 PLAN, ELEVATIONS AND SECTIONS
97	S-22	PUMP STATION #3 & CLOSURE #10 PLAN AND ELEVATIONS
98	S-23	PUMP STATION #3 & CLOSURE #10 BOX SECTIONS
99	S-24	PUMP STATION #3 & CLOSURE #10 PUMP STATION SECTIONS
100	S-25	INDOT PUMP STATION PIPE PASSING
101	S-26	NOT USED
102	S-27	MISCELLANEOUS DETAILS
103	S-28	STANDARD DETAILS
104	SG-01	MILWAUKEE AVENUE FLOOD GATE CLOSURE STRUCTURE GENERAL PLAN
105	SG-02	MILWAUKEE AVENUE FLOOD GATE CLOSURE STRUCTURE FOUNDATIONS, PLANS AND ELEVATIONS
106	SG-03	MILWAUKEE AVENUE FLOOD GATE CLOSURE STRUCTURE ELEVATION AND SECTIONS
107	SG-04	MILWAUKEE AVENUE FLOOD GATE CLOSURE STRUCTURE PLAN, ELEVATION AND SECTION
108	SG-05	MILWAUKEE AVENUE FLOOD GATE CLOSURE STRUCTURE PLAN, ELEVATION AND SECTION
109	SG-06	MILWAUKEE AVENUE FLOOD GATE CLOSURE STRUCTURE MISC. SECTIONS AND DETAILS
110	SG-07	MILWAUKEE AVENUE FLOOD GATE CLOSURE STRUCTURE MISC. SECTIONS AND DETAILS
111	SG-08	MILWAUKEE AVENUE FLOOD GATE CLOSURE STRUCTURE MISC. SECTIONS AND DETAILS
112	SG-09	MILWAUKEE AVENUE FLOOD GATE CLOSURE STRUCTURE MISC. SECTIONS AND DETAILS
113	SG-10	MILWAUKEE AVENUE FLOOD GATE CLOSURE STRUCTURE MISC. SECTIONS AND DETAILS
114	M-01	PUMP STATION #1 PLAN & SECTIONS
115	M-02	PUMP STATION #2 PLAN & SECTIONS
116	M-03	PUMP STATION #3 PLAN & SECTIONS
117	M-04	DETAILS & SCHEDULES
118	M-05	DETAILS & SCHEDULES
119	M-06	TRASH RACK AND RAKE DETAILS
120	E-01	ELECTRICAL SYSTEM PUMP STATION NO. 1 & 3 MCC, ONE-LINE DIAGRAM & CONTROLLER DIAGRAM
121	E-02	ELECTRICAL SYSTEM PUMP STATION NO.2 MCC, ONE-LINE DIAGRAM & CONTROLLER DIAGRAM
122	E-03	ELECTRICAL SYSTEM PUMP STATION #1 PLAN, SECTIONS & DETAILS
123	E-04	ELECTRICAL SYSTEM PUMP STATION #2 PLAN, SECTIONS & DETAILS
124	E-05	ELECTRICAL SYSTEM PUMP STATION #3 PLAN, SECTIONS & DETAILS
125	CH-01	RIPRAP SITE PLAN
126	CH-02	RIPRAP CROSS-SECTIONS

(End of clause)

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52.231-5000 EQUIPMENT OWNERSHIP AND OPERATING EXPENSE SCHEDULE
MAR 1995)--EFARS

(a) This clause does not apply to terminations. See 52.249-5000, Basis for Settlement of Proposals and FAR Part 49.

(b) Allowable cost for construction and marine plant and equipment in sound workable condition owned or controlled and furnished by a contractor or subcontractor at any tier shall be based on actual cost data for each piece of equipment or groups of similar serial and series for which the Government can determine both ownership and operating costs from the contractor's accounting records. When both ownership and operating costs cannot be determined for any piece of equipment or groups of similar serial or series equipment from the contractor's accounting records, costs for that equipment shall be based upon the applicable provisions of EP 1110-1-8, Construction Equipment Ownership and Operating Expense Schedule, Region **_II___**. Working conditions shall be considered to be average for determining equipment rates using the schedule unless specified otherwise by the contracting officer. For equipment not included in the schedule, rates for comparable pieces of equipment may be used or a rate may be developed using the formula provided in the schedule. For forward pricing, the schedule in effect at the time of negotiations shall apply. For retroactive pricing, the schedule in effect at the time the work was performed shall apply.

(c) Equipment rental costs are allowable, subject to the provisions of FAR 31.105(d)(ii) and FAR 31.205-36. Rates for equipment rented from an organization under common control, lease-purchase arrangements, and sale-leaseback arrangements, will be determined using the schedule, except that actual rates will be used for equipment leased from an organization under common control that has an established practice of leasing the same or similar equipment to unaffiliated lessees.

(d) When actual equipment costs are proposed and the total amount of the pricing action exceeds the small purchase threshold, the contracting officer shall request the contractor to submit either certified cost or pricing data, or partial/limited data, as appropriate. The data shall be submitted on Standard Form 1411, Contract Pricing Proposal Cover Sheet.

(End of clause)

52.232-5004 Incremental Funding Clause

(a) Funds are not available at the inception of this contract to cover the entire contract price. The liability of the Government is limited by this clause notwithstanding any contrary provision of the "Payments to Contractor" clause or any other clause of this contract. The sum of **$9 Million** has been reserved for this contract and is available for payment to the contractor during the current fiscal year. It is expected that Congress will make appropriations for future fiscal years from which additional funds, together with funds provided by one or more non-federal project sponsors, will be reserved for this contract.

(b) Failure to make payments in excess of the amount currently reserved, or that may be reserved from time to time, shall not be considered a breach of this contract, and shall not entitle the contractor to a price adjustment under the terms of this contract.

(c) The Government may at any time reserve additional funds for payments under the contract if there are funds available for such purpose. The contracting officer w ill promptly notify the contractor of any additional funds reserved for the contract by issuing an administrative modification to the contract.

(d) If earnings will be such that funds reserved for the contract will be exhausted before the end of any fiscal year, the contractor shall give written notice to the contracting officer of the estimated date of exhaustion and the amount of additional funds which will be needed to meet payments due or to become due under this contract during that fiscal year. This notice shall be given not less than 120 days prior to the estimated date of exhaustion. Unless informed in writing by the contracting officer that additional funds have been reserved for payments under the contract, the contractor shall stop work upon to the exhaustion of funds.

(e) No payments will be made after exhaustion of funds except to the extent that additional funds are reserved for the contract.

(f) Any suspension, delay, or interruption of work arising from exhaustion or anticipated exhaustion of funds shall not constitute a breach of this contract and shall not entitle the contractor to any price adjustment under a "Suspension of Work" or similar clause or in any other manner under this contract.

(g) An equitable adjustment in performance time shall be made for any increase in the time required for performance of any part of the work arising from exhaustion of funds or the reasonable anticipation of exhaustion of funds.

(h) If, upon the expiration of one-hundred (100) days after the beginning of the fiscal year following an exhaustion of funds, the Government has failed to reserve additional funds for this contract sufficient to cover the Government's estimate of funding required for the first quarter of that fiscal year, the contractor, by written notice delivered to the contracting officer at any time before such additional funds are reserved, may elect to treat his right to proceed with the work as having been terminated. The Government will not be obligated in any event to reimburse the contractor for any costs incurred after the exhaustion of funds regardless of anything to the contrary in the clause entitled "Termination for Convenience of the Government."

(i) If at any time it becomes apparent that the funds reserved for any fiscal year are in excess of the funds required to meet all payments due or to become due the contractor because of work performed and to be performed under this contract during the fiscal year, the Government reserves the right, after notice to the contractor, to reduce said reservation by the amount of such excess.

(j) The term "Reservation" means monies that have been set aside and made available for payments under this contract. Reservations of funds shall be made in writing via an administrative modification issued by the contracting officer.

(End of clause)

52.249-5000 BASIS FOR SETTLEMENT OF PROPOSALS

Actual costs will be used to determine equipment costs for a settlement proposal submitted on the total cost basis under FAR 49.206-2(b). In evaluating a terminations settlement proposal using the total cost basis, the following principles will be applied to determine allowable equipment costs:

(1) Actual costs for each piece of equipment, or groups of similar serial or series equipment, need not be available in the contractor's accounting records to determine total actual equipment costs.

(2) If equipment costs have been allocated to a contract using predetermined rates, those charges will be adjusted to actual costs.

(3) Recorded job costs adjusted for unallowable expenses will be used to determine equipment operating expenses.

(4) Ownership costs (depreciation) will be determined using the contractor's depreciation schedule (subject to the provisions of FAR 31.205-11).

(5) License, taxes, storage and insurance costs are normally recovered as an indirect expense and unless the contractor charges these costs directly to contracts, they will be recovered through the indirect expense rate.

(End of Clause)

252.236-7004 PAYMENT FOR MOBILIZATION AND DEMOBILIZATION (DEC 1991)

(a) The Government will pay all costs for the mobilization and demobilization of all of the Contractor's plant and equipment at the contract lump sum price for this item.

(1) **60** percent of the lump sum price upon completion of the contractor's mobilization at the work site.

(2) The remaining **40** percent upon completion of demobilization.

(b) The Contracting Officer may require the Contractor to furnish cost data to justify this portion of the bid if the Contracting Officer believes that the percentages in paragraphs (a) (1) and (2) of this clause do not bear a reasonable relation to the cost of the work in this contract.

(1) Failure to justify such price to the satisfaction of the Contracting Officer will result in payment, as determined by the Contracting Officer, of --

(i) Actual mobilization costs at completion of mobilization;

(ii) Actual demobilization costs at completion of demobilization; and

(iii) The remainder of this item in the final payment under this contract.

(2) The Contracting Officer's determination of the actual costs in paragraph (b)(1) of this clause is not subject to appeal.

General Decision Number: IL080009 07/25/2008 IL9

Superseded General Decision Number: IL20070009

State: Illinois

Construction Types: Building, Heavy, Highway and Residential

County: Cook County in Illinois.

BUILDING, RESIDENTIAL, HEAVY, AND HIGHWAY PROJECTS (does not include landscape projects).

Modification Number	Publication Date
0	02/08/2008
1	02/22/2008
2	03/21/2008
3	04/25/2008
4	06/06/2008
5	07/04/2008
6	07/25/2008

ASBE0017-001 06/01/2007

	Rates	Fringes
HAZARDOUS MATERIAL HANDLER includes preparation, wetting, stripping removal scrapping, vacuuming, bagging and disposal of all insulation materials, whether they contain asbestos or not, from mechanical systems	$ 26.00	15.48
Insulator/asbestos worker Includes the application of all insulating materials, protective coverings, coatings, and finishes to all types of mechanical systems	$ 37.15	19.18

BOIL0001-001 07/01/2004

	Rates	Fringes
BOILERMAKER	$ 35.07	16.26

BRIL0021-001 06/01/2007

	Rates	Fringes
BRICKLAYER	$ 36.43	16.72

BRIL0021-004 06/01/2007

	Rates	Fringes
Marble Mason	$ 36.43	16.72

BRIL0052-001 06/01/2007

	Rates	Fringes
Pointer, cleaner and caulker	$ 36.90	14.66

CARP0555-001 06/01/2004

	Rates	Fringes
CARPENTER		
CARPENTERS, LATHERS, MLLWRIGHTS, PILEDRIVER, & SOFT FLOOR LAYERS	$ 34.32	10.93

CARP0555-002 10/01/2004

	Rates	Fringes
CARPENTER (Excluding structures with elevators and structures over 3 1/2 stories)	$ 34.32	10.91

ELEC0009-003 05/26/2008

	Rates	Fringes
Line Construction		
Groundman	$ 30.11	40.66%
Lineman and Equipment Operator	$ 38.60	40.66%

ELEC0134-001 06/04/2007

	Rates	Fringes
ELECTRICIAN		
Building	$ 37.80	18.63
Residential	$ 37.80	18.23

ELEC0134-002 04/01/1998

	Rates	Fringes
ELECTRICIAN ((CLASS B) (Install magnetic or electronic replacement ballasts either singly or in groups including necessary wiring within fixture; Install replacement lamp		

holders and/or sockets
including necessary wiring
within fixture including
relocating sockets within
fixture; Install replacement
lighting circuit breakers
where necessary; Install
replacement lighting switches
where necessary; Repair
lighting fixtures other than
ballast or socket
replacements; Rewire
chandeliers or incandescent
fixtures only within fixtures
themselves.).....$ 20.71 2.975+a+b

FOOTNOTES:

a-Paid Vacation- Employees who have been employed for one year but less than three years receive 1 week of paid vacation; employees who have been employed three years but less than ten years receive 2 weeks of paid vacation; Employees who have been employed ten years but less than twenty years receive 3 weeks of paid vacation; and employees who have worked twenty or more years receive 4 weeks of paid vacation.

b-Funeral Leave-In the instance of the death of a mother, other-in-law-; father, father-in-law, sister, brother, husband, wife, or a child of an employee shall receive up to three days of paid funeral leave.

ELEC0134-003 06/07/2004

	Rates	Fringes
ELECTRICIAN		
ELECTRICAL TECHNICIAN.....	$ 30.89	12.59

The work shall consist of the installation, operation, inspection, maintenance, repair and service of radio, television, recording, voice sound vision production and reproduction, telephone and telephone interconnect, facsimile, data appatatus, coaxial, fibre optic and wireless equipment, appliances and systems used for the transmission and reception of signals of any nature, business, domestic, commercial, education, entertainment and residential purposes, including but not limited to communication and telephone, electronic and sound equipment, fibre optic and data communication systems, and the performance of any task directly related to such installation or service whether at new or existing sites, such tasks to include the placing of wire and cable and electrical power conduit or other raceway work within the equipment room and pulling wire and/or cable through conduit and the installation of any incidential conduit.

ELEV0002-003 01/01/2008

	Rates	Fringes
ELEVATOR MECHANIC	$ 43.93	16.285+A+B

FOOTNOTES:

A. Eight paid holidays: New Year's Day; Memorial Day; Independence Day; Labor Day; Thanksgiving Day; Day after Thanksgiving; Veterans' Day and Christmas Day.

B. Employer contributes 8% of regular basic hourly rate as vacation pay credit for employees with more than 5 years of service; and 6% for 6 months to 5 years of service.

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* ENGI0150-006 06/01/2006

	Rates	Fringes
Power equipment operators:		
GROUP 1	$ 41.55	15.05
GROUP 2	$ 40.25	15.05
GROUP 3	$ 37.70	15.05
GROUP 4	$ 35.95	15.05

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Mechanic; Asphalt Plant*; Asphalt Spreader; Autograde*; Backhoes with Caisson attachment*:Batch Plant*; Benoto(Requires two Engineers); Boiler and Throttle Valve; Caisson Rigs*; Central Redi-Mix Plant*; Combination Backhoe Front Endloader Machine; Compressor and Throttle Valve; Concrete Breaker (Truck Mounted)*; Concrete Conveyor; Concrete Conveyor, Truck Mounted; Concrete Paver over 27E cu. ft.*; Concrete Paver 27E cu ft and Under*; Concrete Placer*; Concrete Placing Boom; Concrete Pump (Truck Mounted); Concrete Tower; Cranes*; Cranes, Hammerhead*; Cranes, (GCI and similar type Requires two operators only); Creter Crane; Crusher, Stone, etc; Derricks; Derricks, Traveling*; Formless Curb and Gutter Machine*; Grader, Elevating; Grouting Machines; Highlift Shovels or Front Endloader 2 1/4 yd. and over; Hoists, Elevators, Outside Type Rack and pinion and similar Machines; Hoists, One, Two, and Three Drum; Hoists, Two Tugger One Floor; Hydraulic Backhoes*; Hydraulic Boom Trucks; Hydraulic Vac (and similar equipment);Locomotives; Motor Patrol*; Pile Drivers amd Skid Rig*; Post Hole Digger; Pre- Stress Machine; Pump Cretes Dual Ram(Requiring frequent Lubrication and Water); Pump Cretes; Squeeze Cretes-Screw Type Pumps Gypsum Bulker and Pump; Raised and Blind Hole Drill*; Roto Mill Grinder (36" and Over)*; Roto Mill Grinder (Less Than 36")*; Scoops-Tractor Drawn; Slip-Form Paver*; Straddle Buggies; Tournapull; Tractor with Boom, and Side Boom; and Trenching Machines*.

GROUP 2: Bobcat (over 3/4 cu yd); Boilers; Broom, Power

Propelled; Bulldozers; Concrete Mixer (Two Bag and over); Conveyor, Portable; Forklift Trucks; Greaser Engineer; Highlift Shovels or Front End loaders under 2 1/4 cu yd; Aotomatic Hoists, Hoists, Inside Elevators; Hoists, Sewer Dragging Machine; Hoists, Tugger Single Drum; Laser Screed; Rock Drill (Self-Propelled); Rock Drill (Truck Mounted)*; Rollers; Steam Generators; Tractors; Tractor Drawn Vibratory Roller (Receives an additional $.50 per hour); Winch Trucks with "A" Frame.

GROUP 3: Air Compressor-Small 250 and Under (1 to 5 not to exceed a total of 300 ft); Air Compressor-Large over 250; Combination-Small Equipment Operator; Generator- Small 50 kw and under; Generator-Large over 50 kw; Heaters, Mechanical; Hoists, Inside Elevators (Remodeling or Renovatin work); Hydrualic Power Units (Pile Driving, Extracting, and Drilling); Low Boys; Pumps Over 3" (1 To 3 not to exceed a total of 300 ft); Pumps, Well Points; Welding Machines (2 through 5); Winches, 4 Small Electric Drill Winches; Bobcat (up to and including 3/4 cu yd)

GROUP 4 - Bobcats and/or other Skid Steer Loaders; Brick Forklifts; Oilers

*-Requires Oiler

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* ENGI0150-025 06/01/2008

	Rates	Fringes
Power equipment operators:		
GROUP 1	$ 42.00	20.30
GROUP 2	$ 41.45	20.30
GROUP 3	$ 39.40	20.30
GROUP 4	$ 38.00	20.30
GROUP 5	$ 36.80	20.30

POWER EQUIPMENT OPERATOR CLASSIFICATIONS

GROUP 1: Asphalt Plant*; Asphalt Heater and Planer combination; Asphalt Heater Scarfire*, Asphalt Spreader; Autograder/ GOMACO or similar; ABG Paver*, Backhoes with Caisson attachment*, Ballast Regulator, Belt Loader*; Caisson Rigs*Car Dumper, Central Redi-Mix Plant*, Combination Backhoe; Front End Loader Machine (1 cu yd or over Backhoe bucket or with attachments); Concrete Breaker (truck mounted); Concrete Conveyor; Concrete Paver over 27E cu ft*; Concrete Placer*; Concrete Tube Float; Cranes, all attachments*; Cranes, Hammerhead, Linden, Peco and machines of a like nature*; Creter Crane; Crusher, stone; All Derricks; Derrick Boats; Derricks, traveling*; Dowell Machine with Air Compressor ($1.00 above Class 1); Dredges*; Field Mechanic Welder; Formless Curb and Gutter Machine*; Gradall and machines of a like nature*; Grader, Elevating; Grader, Motor Grader, Motor Patrol, Auto Patrol, Form Grader, Pull Grader, Subgrader; Guard Rail Post Driver mounted*; Hoists, one, two, and three Drum; Hydraulic

Backhoes*; Backhoes with Shear attachments*; Mucking Machine; Pile Drivers and Skid Rig*; Pre-Stress Machine; Pump Cretes Dual Ram (requires frequent lubrication and water)*; Rock Drill- Crawler or Skid Rig*; Rock Drill truck mounted*; Rock/ Track Tamper; Roto Mill Grinder, (36" and over)*; Slip-Form Paver*; Soil Test Drill Rig, truck mounted*; Straddle Buggies; Hydraulic Telescoping Form (tunnel); Tractor Drawn Belt Loader*; Tractor Drawn Belt Loader with attached Pusher (two engineers); Tractor with boom; Tractaire with attachment; Traffic Barrier Transfer Machine*; Trenching Machine; Truck Mounted Concrete Pump with boom*; Underground Boring and/or Mining Machines 5 ft in diameter and over tunnel, etc.*; Wheel Excavator* & Widener (Apsco); Raised or Blind Hoe Drill, Tunnel & Shaft*

GROUP 2: Batch Plant*; Bituminous Mixer; Boiler and Throttle Valve; Bulldozer; Car Loader Trailing Conveyors; Combination Backkhoe Front End Loader Machine, (less than 1 cu yd Backhoe Bucket with attachments); Compressor and Throttle Valve; Compressor, common receiver (3); Concrete Breaker or Hydro Hammer; Concrete Grinding Machine; Concrete Mixer or Paver 7S series to and including 27 cu ft; Concrete Spreader; Concrete Curing Machine; Burlap Machine; Belting Machine and Sealing Machine; Concrete Wheel Saw; Conveyor Muck Cars (Haglund or similar type); Drills (all); Finishing Machine-Concrete; Greaser Engineer; Highlift Shovels or Front End Loader; Hoist- Sewer Dragging Machine; Hydraulic Boom Trucks, all attachments; Hydro-Blaster (requires two operators); Laser Screed*; Locomotives, Dinky; Off-Road Hauling Units (including articulating); Pump Cretes; Squeeze Cretes-Screw Type pumps, Gypsum Bulker and Pump; Roller Asphalt; Rotary Snow Plows; Rototiller, Seaman, self-Propelled; Scoops-Tractor Drawn; Self- propelled Compactor; Spreader-Chip-Stone; Scraper; Scraper-Prime Mover in Tandem regardless of size (add $1.00 to Group 2 hourly rate for each hour and for each machine attached thereto add $1.00 to Group 2 hourly rate for each hour); Tank Car Heater; Tractors, Push, pulling Sheeps Foot, Disc, or Compactor, etc; Tug Boats

GROUP 3: Boilers; Brooms, all power propelled; Cement Supply Tender; Compressor, Common Receiver (2); Concrete Mixer, two bag and over; Conveyor, Portable; Farm type Tractors used for mowing, seeding, etc; Fireman on Boilers; Forklift Trucks; Grouting Machines; Hoists, Automatic; Hoists, all Elevators; Hoists, Tugger single Drum; Jeep Diggers; Low Boys; Pipe Jacking Machines; Post-hole Digger; Power Saw, Concrete, Power Driven; Pug Mills; Rollers, other than asphalt; Seed and Straw Blower; Steam Generators; Stump Machine; Winch Trucks with A-Frame; Work Boats; Tamper-Form motor driven

GROUP 4: Air compressor - Small 250 and under (1 to 5 not to exceed a total of 300 ft); Air Compressor - Large over 250; Combination - Small Equipment Operator; Directional Boring Machine; Generators - Small 50 kw and under; Generators - Large , over 50 kw; Heaters, Mechanical; Hydraulic power

unit (Pile Driving, Extracting or Drilling); Light Plants (1 to 5); Pumps, over 3" (1 to 3, not to exceed a total of 300 ft); Pumps, Well Points; Tractaire; Welding Machines (2 through 5); Winches, 4 small electric drill winches;

GROUP 5: Bobcats (All); Brick Forklifts; Oilers; Directional Boring

*Requires Oiler

IRON0001-026 06/01/2008

	Rates	Fringes
IRONWORKER (Structural and Reinforcing)	$ 40.25	24.99

IRON0063-001 06/01/2008

	Rates	Fringes
IRONWORKER, ORNAMENTAL	$ 39.05	19.64

IRON0063-002 06/01/2007

	Rates	Fringes
IRONWORKER		
Fence Erector	$ 28.64	12.75
Metal Fence Erector	$ 22.54	12.04

IRON0136-001 07/01/2006

	Rates	Fringes
IRONWORKER		
Machinery Movers & Riggers	$ 30.24	19.87
Master Riggers	$ 32.74	19.87

LABO0002-006 06/01/2007

	Rates	Fringes
Laborers:		
GROUP 1	$ 33.15	13.87
GROUP 2	$ 33.15	13.87
GROUP 3	$ 33.225	13.87
GROUP 4	$ 33.25	13.87
GROUP 5	$ 33.30	13.87
GROUP 6	$ 33.35	13.87
GROUP 7	$ 33.375	13.87
GROUP 8	$ 33.375	13.87
GROUP 9	$ 33.475	13.87
GROUP 10	$ 33.60	13.87
GROUP 11	$ 33.425	13.87
GROUP 12	$ 34.15	13.87

LABORER CLASSIFICATIONS

GROUP 1: Building Laborers; Plasterer Tenders; Pumps for Dewatering; and other unclassified laborers.

GROUP 2: Fireproofing and Fire Shop laborers.

GROUP 3: Cement Gun.

GROUP 4: Chimney over 40 ft.; Scaffold Laborers.

GROUP 5: Cement Gun Nozzle Laborers (Gunite); Windlass and capstan person.

GROUP 6: Stone Derrickmen & Handlers.

GROUP 7: Jackhammermen; Power driven concrete saws; and other power tools.

GROUP 8: Firebrick & Boiler Laborers.

GROUP 9: Chimney on fire brick; Caisson diggers; & Well Point System men.

GROUP 10: Boiler Setter Plastic Laborers.

GROUP 11: Jackhammermen on fire brick work only.

GROUP 12: Dosimeter use (any device) monitoring nuclear exposure); Asbestos Abatement Laborer; Toxic and Hazardous Waste Removal Laborers.

LABO0002-007 06/01/2007

	Rates	Fringes
Laborers:		
GROUP 1	$ 33.15	13.87
GROUP 2	$ 33.425	13.87
GROUP 3	$ 33.30	13.87
GROUP 4	$ 33.425	13.87
GROUP 5	$ 34.15	13.87

LABORER CLASSIFICATIONS

GROUP 1: Common laborer; Tenders; Material expeditor (asphalt plant); Street paving, Grade separation, sidewalk, curb & gutter, strippers & All laborers not otherwise mentioned

GROUP 2: Ashpalt tampers & smoothers; Cement gun laborers

GROUP 3: Cement Gun Nozzle (laborers), Gunite

GROUP 4: Rakers, Lutemen; Machine-Screwmen; Kettlemen; Mixermen; Drun-men; Jackhammermen (asphalt); Paintmen; Mitre box spreaders; Laborers on birch, overman and similar

spreader equipment; Laborers on APSCO; Laborers on air compressor; Paving Form Setter; Jackhammermen (concrete); Power drive concrete saws; other power tools.

GROUP 5: Asbestos Abatement Laborers; Toxic and Hazardous Waste Removal Laborers, Dosimeter (any device) monitoring nuclear exposure

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LABO0002-008 06/01/2007

	Rates	Fringes
Laborers: (Compressed Air)		
0 - 15 POUNDS	$ 34.15	13.87
16 - 20 POUNDS	$ 34.65	13.87
21 - 26 POUNDS	$ 35.15	13.87
27 - 33 POUNDS	$ 36.15	13.87
34 - AND OVER	$ 37.15	13.87
Laborers: (Tunnel and Sewer)		
GROUP 1	$ 33.15	13.87
GROUP 2	$ 33.275	13.87
GROUP 3	$ 33.375	13.87
GROUP 4	$ 33.50	13.87
GROUP 5	$ 34.15	13.87

LABORER CLASSIFICATIONS (TUNNEL)

GROUP 1: Cage tenders; Dumpmen; Flagmen; Signalmen; Top laborers

GROUP 2: Air hoist operator; Key board operator; concrete laborer; Grout; Lock tenders (Free Air Side); Steel setters; Tuggers; Switchmen; Car pusher

GROUP 3: Concrete repairmen; Lock tenders (pressure side); Mortar men; Muckers; Grout machine operators; Track layers

GROUP 4: Air trac drill operator; Miner; Bricklayer tenders; Concrete blower operator; Drillers; Dynamiters; Erector operator; Form men; Jackhammermen; Powerpac; Mining machine operators; Mucking machine operator; Laser beam operator; Liner plate and ring setters; Shield drivers; Power knife operator; Welder- burners; Pipe jacking machine operator; skinners; Maintenance technician

GROUP 5: Asbestos abatement laborer; Toxic and hazardous waste removal laborer; Dosimeter (any device) monitoring nuclear exposure

LABORER CLASSIFICATIONS (SEWER)

GROUP 1: Signalmen; Top laborers and All other laborers

GROUP 2: Concrete laborers and Steel setters

GROUP 3: Cement carriers; Cement mixers; Concrete repairmen; Mortar men; Scaffold men; Second Bottom men

GROUP 4: Air trac drill operator; Bottom men; Bracers-bracing; Bricklayer tenders; Catch basin diggers; Drainlayers; dynamiters; Form men; Jackhammermen; Powerpac; Pipelayers; Rodders; Welder-burners; Well point systems men

GROUP 5: Asbestos abatement laborer, Toxic and hazardous waste removal laborer; Dosimeter (any device) monitoring nuclear exposure

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LABO0225-001 06/01/2007

	Rates	Fringes
Laborers:		
(DEMOLITION/WRECKING)		
Group 1	$ 26.85	13.87
Group 2	$ 32.40	13.87
Group 3	$ 33.15	13.87

LABORER CLASSIFICATIONS

GROUP 1 - Complete Demolition

GROUP 2 - Interior Wrecking and Strip Out Work

GROUP 3 - Asbestos Work with Complete Demolition/Wrecking or Strip Out Work

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MARB0067-001 06/01/2007

	Rates	Fringes
TERRAZZO WORKER/SETTER	$ 35.39	16.02
TILE FINISHER	$ 30.15	12.55
TILE SETTER	$ 36.63	13.88

MARB0087-001 06/01/2006

	Rates	Fringes
MARBLE FINISHER	$ 26.73	14.86

PAIN0014-001 06/01/2008

	Rates	Fringes
PAINTER		
Including Taper	$ 36.90	16.32

PAIN0027-001 06/01/2008

	Rates	Fringes
GLAZIER	$ 37.00	20.13

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* PLAS0005-002 07/01/2008

	Rates	Fringes
PLASTERER	$ 38.10	16.35

PLAS0502-001 06/01/2008

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER	$ 41.85	15.43

PLUM0130-001 06/01/2007

	Rates	Fringes
PLUMBER	$ 41.00	16.93

PLUM0597-002 06/01/2007

	Rates	Fringes
PIPEFITTER	$ 40.00	17.33

ROOF0011-001 12/01/2007

	Rates	Fringes
ROOFER	$ 35.00	11.00

SFIL0281-001 01/01/2008

	Rates	Fringes
SPRINKLER FITTER	$ 40.50	16.00

SHEE0073-001 01/01/2007

	Rates	Fringes
Sheet Metal Worker	$ 36.96	17.42

SHEE0073-002 01/01/2007

	Rates	Fringes
Sheet Metal Worker		
ALUMINUM GUTTER WORK	$ 24.03	17.42

TEAM0731-001 06/01/2008

	Rates	Fringes
TRUCK DRIVER		
2 & 3 Axles	$ 30.70	12.20
4 Axles	$ 30.95	12.20
5 Axles	$ 31.15	12.20
6 Axles	$ 31.35	12.20

FOOTNOTES FOR TRUCK DRIVERS:

A. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day.

B. 900 straight time hours or more in 1 calendar year for the same employer shall receive 1 week paid vacation; 3 years - 2 weeks paid vacation; 10 years - 3 weeks paid vacation; 20 years - 4 weeks paid vacation.

TEAM0731-002 06/01/2008

	Rates	Fringes
TRUCK DRIVER (DEMOLITION)		
2 OR 3 Axles	$ 30.70	12.20
4 Axles	$ 30.95	12.20
5 Axles	$ 31.15	12.20
6 Axles	$ 31.35	12.20

TEAM0731-003 05/01/1997

	Rates	Fringes
Traffic Control Device Monitor TRAFFIC SAFETY WORKERS: Traffic Safety Worker primary duties include but are not limited to the delivery, maintenance and pick-up of traffic control devices, the set-up and installation of traffic signs, pavement markings, barricades, crash barrels and glare screens, and traffic control surveillance, the repair and maintenance of the company's trucks, cars, arrow boards, message signs, barricade and sign fabrication equipment	$ 16.15	108.75/wk+a

FOOTNOTE a:

1. The following paid holidays: New Year's Day; Memorial Day; Independence Day; Labor Day; Thanksgiving Day; and Christmas Day provided the employee has earned a vacation the previous year or have worked thirty-one days in the current year before the holiday, or have seniority as stated herein; work the scheduled work day before and the scheduled day after the holiday; work one day in the holiday week; and work one scheduled work day after the holiday.

2. Paid vacation is earned the first year of employment, but may not be taken until after their first anniversary date. One and two years of employment receive 40 hours of paid vacation; Three thru nine years of employment receive 80 hours of paid vacation; Ten thru nineteen years of employment receive 120 hours of paid vacation; and Twenty years and over receive 160 hours of paid vacation.

3. Personal time (floating holidays) will be earned on a per hour worked basis. New employees will earn personal time during the first year of employment, but may not be take personal time until after their first anniversary date. Personal time is earned in the following way: One and two years receive 8 hours of personal time; Three thru nine years receive sixteen hours of personal time; and ten years and over receive twenty-four hours of personal time.

TEAM0786-001 06/01/2004

	Rates	Fringes
TRUCK DRIVER		
2 & 3 Axles	$ 27.625	d,e,f
4 Axles	$ 27.875	d,e,f
5 Axles	$ 28.075	d,e,f
6 Axles	$ 28.625	d,e,f

FOOTNOTES FOR TRUCK DRIVERS (BUILDING & RESIDENTIAL):

d. $327.00 per week.

e. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day.

f. 900 straight time hours or more in 1 calendar year for the same employer shall receive 1 week paid vacation; 3 years - 2 weeks paid vacation; 10 years - 3 weeks paid vacation; 20 years - 4 weeks paid vacation.

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

In the listing above, the "SU" designation means that rates listed under the identifier do not reflect collectively bargained wage and fringe benefit rates. Other designations indicate unions whose rates have been determined to be

prevailing.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION

DOCUMENT TABLE OF CONTENTS

DOCUMENTS 00 - INTRODUCTORY, BIDDING, AND CONTRACT REQUIREMENTS

SECTION 00800A

GEOTECHNICAL DATA

PART 1 GENERAL

1.1 SUBSURFACE CONDITIONS
1.2 SITE SPECIFIC DATA
1.3 ADDITIONAL INFORMATION ON SUBSURFACE CONDITIONS

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

-- End of Document Table of Contents --

SECTION 00800A

GEOTECHNICAL DATA

PART 1 GENERAL

1.1 SUBSURFACE CONDITIONS

Subsurface exploratory borings have been obtained by the Government to determine the general character of the subsurface materials within the project area. Locations of the borings are shown, and the logs of those borings are included for the convenience of the Contractor. The Government assumes no responsibility for any interpretation or deductions made by the Contractor from the logs and data. While the borings are generally representative of subsurface conditions at their respective locations and for their respective vertical reaches, localized variations of characteristics of the subsurface materials of this region should be anticipated. Groundwater elevations, shown on the boring logs, are those encountered at the time when the borings were taken and will fluctuate due to factors such as rainfall, lake and/or river stages.

1.2 SITE SPECIFIC DATA

Boring logs are provided at the end of this section as Appendix 00800-A1 and as shown.

1.3 ADDITIONAL INFORMATION ON SUBSURFACE CONDITIONS

Additional information on subsurface conditions at the project site including complete laboratory results is contained in the following reports:

a. U.S. Army Corps of Engineergs, Chicago District, (June 1999). Upper Des Plaines River Flood Damage Reduction Study. Appendix D -- Geotechnical Engineering. Attachment D-9 Levee Sites -- Subsurface Investigation Boring Logs and Soil Testing Laboratory Data.

b. STS Consultants, Ltd., (6 Sep 2000) Upper Des Plaines River Flood Damage Reduction Project, Prospect Heights, Illinois - STS Project No. 31130, prepared for U.S. Army Corps of Engineers, Chicago District.

These reports may be reviewed by contacting the U.S. Army Corps of Engineers, Chicago District at 111 North Canal Street, Chicago, Illinois 60606-7206 (Attn: Joe Schulenberg, 312-846-5454).

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

APPENDIX A

-- End of Section --

HOLE NO. L37-1-00

DRILLING LOG

DIVISION	
INSTALLATION	
SHEET	1 OF 1 SHEETS
1. PROJECT	Des Plaines River Project
JOB NUMBER	31130
2. LOCATION (Coordinates or Station)	Cook Co., IL N3000,1975003.968 E1104120.565
3. DRILLING AGENCY	Fox Exploration
4. HOLE NO. (As shown on drawing title and file number)	L37-1-00
5. NAME OF DRILLER	Gary Yockey
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	25
8. DEPTH DRILLED INTO ROCK	
9. TOTAL DEPTH OF HOLE	25.0
10. SIZE AND TYPE OF BIT	3-3/4" HSA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
12. MANUFACTURER'S DESIGNATION OF DRILL	Diedrich D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 9; UNDISTURBED 1
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	633.4 WD, 633.4 AD, 633.9 @ 24 hrs
16. DATE HOLE	STARTED 7-12-00; COMPLETED 7-12-00
17. ELEVATION TOP OF HOLE	641.89
18. TOTAL CORE RECOVERY FOR BORING	%
19. SIGNATURE OF INSPECTOR	[signature]

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Silty clay, little to trace sand, trace gravel - brown - stiff (CL) WC=11.1%	10"	S-1	2-3-3 Qp=1.75 tsf
639.4	2.5					
			Silty clay, trace sand and gravel - very stiff - brown (CL) WC=22.2% LL=42% PL=17% PI=25%	12"	S-2	3-5-5 Qp=3.0 tsf
636.9	5.0					
			Fine to coarse sand, trace gravel and silt - brown - moist - medium dense (SP) WC=7.0%	15"	S-3	4-6-10
			Sample 4 is wet. Gravel=31.8%, Sand=54.8%, Silt & Clay=13.4%	8"	S-4	7-14-14
			Sample 4A is gray.	5"	S-4A	
630.9	11.0					
			Silty clay, trace fine to coarse sand and gravel - gray - very stiff (CL) WC=17.3%	4"	S-5	4-6-7 Qp=2.25 tsf
628.4	13.5					
			Silty clay, trace fine to coarse sand, gravel and shale - gray - hard (CL) WC=13.5% LL=21% PL=14% PI=7%	7"	S-6	Qp=4.5+ tsf Tv=7.0 tsf
			WC=12%	13"	S-7	8-8-10 Qp=4.5+ tsf
623.4	18.5					
			Silty clay, trace fine to coarse sand, gravel and shale - gray - stiff (CL) WC=13.4%	16"	S-8	3-6-9 Qp=1.5 tsf
			WC=11.4% LL=24% PL=13% PI=11%	4"	S-9	8-13-22 Qp=3.0 tsf
619.4	22.5					
			Silty clay, trace fine to coarse sand, gravel and shale - gray - hard (CL) WC=15.6% LL=31% PL=25% PI=16%	14"	S-10	4-8-14 Qp=4.5+ tsf
616.9	25.0					
			End of Boring			

HOLE NO. L37-2-00

DRILLING LOG

DIVISION	
INSTALLATION	
SHEET	1 OF 1 SHEETS
1. PROJECT	Des Plaines River Project
JOB NUMBER	31130
2. LOCATION (Coordinates or Station)	Cook Co., IL N4000,1975524.654 E1104165.271
3. DRILLING AGENCY	Fox Exploration
4. HOLE NO. (As shown on drawing title and file number)	L37-2-00
5. NAME OF DRILLER	Gary Yockey
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	23.5
8. DEPTH DRILLED INTO ROCK	
9. TOTAL DEPTH OF HOLE	23.5
10. SIZE AND TYPE OF BIT	3-3/4" HSA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
12. MANUFACTURER'S DESIGNATION OF DRILL	Diedrich D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 9 / UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	Dry WD, Dry AD, 634.57 @ 24 hrs.
16. DATE HOLE	STARTED 7-12-00 / COMPLETED 7-12-00
17. ELEVATION TOP OF HOLE	640.07
18. TOTAL CORE RECOVERY FOR BORING	%
19. SIGNATURE OF INSPECTOR	Brian Reinsher

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Brown to black silty clay with trace fine to coarse sand and gravel, little topsoil - very stiff (CL) WC=13%	12"	S-1	3-6-8 Qp=2.25 tsf
636.6	3.5		Fine to coarse sand, trace gravel, clay and silt - grayish brown - moist to wet - medium dense (SP) Gravel=20.4%, Sand=66.0%, Silt & Clay=13.6%	8"	S-2	4-9-9
634.1	6.0		Silty clay, trace fine to coarse sand, gravel and shale - gray - very stiff to hard (CL) Layer of siltier clay noted in Sample 3. WC=14.2%	13"	S-3	5-5-7 Qp=3.25 tsf
			WC=13.9% LL=37% PL=17% PI=20%	8"	S-4	3-8-9 Qp=4.0 tsf
629.1	11.0		Clayey silt with trace gravel and shale, fine to medium sand - gray - moist - medium dense (ML) WC=12.8%	14"	S-5	7-9-10 Qp=4.5 tsf
626.6	13.5		Very silty clay with trace fine to coarse sand, gravel and shale - gray - very stiff (CL) WC=12.9% LL=23% PL=13% PI=10%	11"	S-6	3-6-7 Qp=3.5 tsf
			WC=13.9%	17"	S-7	3-6-10 Qp=1.75 tsf
621.6	18.5		Silty clay, trace fine to coarse sand, gravel and shale - gray - hard (CL) WC=13.4% LL=27% PL=13% PI=14%	13"	S-8	4-9-11 Qp=4.5+ tsf
			WC=12.9% Boulder or rock at 22'; drilled 6 in. through rock.	12"	S-9	5-12-79/3" Qp=4.5+ tsf
616.6	23.5		End of Boring			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE (modified by GCA 1/94)

PROJECT Des Plaines River Project HOLE NO. L37-2-00

HOLE NO. L37-3-00

DRILLING LOG

DIVISION	
INSTALLATION	
SHEET 1 OF 1 SHEETS	
1. PROJECT: Des Plaines River Project	JOB NUMBER: 31130
2. LOCATION (Coordinates or Station): Cook Co., IL N4001,1976004.239 E1104226.345	
3. DRILLING AGENCY: Fox Exploration	
4. HOLE NO. (As shown on drawing title and file number): L37-3-00	
5. NAME OF DRILLER: Gary Yockey	
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.	
7. THICKNESS OF OVERBURDEN: 25	
8. DEPTH DRILLED INTO ROCK	
9. TOTAL DEPTH OF HOLE: 25.0	
10. SIZE AND TYPE OF BIT: 3-3/4" HSA	
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
12. MANUFACTURER'S DESIGNATION OF DRILL: Diedrich D-50	
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED: 10; UNDISTURBED: 0
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER: Dry WD, 615.93 AD, 624.93 @ 24 hrs.	
16. DATE HOLE	STARTED: 7-12-00; COMPLETED: 7-12-00
17. ELEVATION TOP OF HOLE: 634.43	
18. TOTAL CORE RECOVERY FOR BORING: %	
19. SIGNATURE OF INSPECTOR: Brian Reinsher	

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Silty clay, trace sand, gravel - brown and gray - very stiff (CL) WC=22.6% Occasional topsoil.	9"	S-1	3-5-7 Qp=2.5 tsf
			WC=16.9% LL=32% PL=16% PI=16%	11"	S-2	4-11-17 Qp=3.75 tsf
			1.5" layer of sand WC=14.6%	14"	S-3	7-10-14 Qp=4.5+ tsf
625.9	8.5		Sandy silt, trace gravel and clay - gray - moist - medium dense (SM) Gravel=1.8%, Sand=53.8%, Silt & Clay=44.4%	12"	S-4	13-15-9
623.4	11.0		Silty clay, trace sand, gravel and shale - gray - very stiff to hard (CL) WC=14%	15"	S-5	4-7-9 Qp=2.5 tsf
			WC=13.8% LL=29% PL=14% PI=15%	11"	S-6	5-13-19 Qp=3.5 tsf
			WC=13.4%	15"	S-7	9-13-27 Qp=4.5+ tsf
			Seam of gravelly saturated sand. WC=10.9%	14"	S-8	4-11-15 Qp=4.5+ tsf
			WC=11.8% LL=26% PL=14% PI=12%	14"	S-9	14-20-26 Qp=4.5+ tsf
609.4	25.0		WC=12.6%	11"	S-10	4-14-23 Qp=4.5+ tsf
			End of Boring			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE (modified by GCA 1/94) PROJECT: Des Plaines River Project HOLE NO. L37-3-00

HOLE NO. L37-4-00

DRILLING LOG

DIVISION	
INSTALLATION	
SHEET	1 OF 1 SHEETS
1. PROJECT	Des Plaines River Project
JOB NUMBER	31130
2. LOCATION (Coordinates or Station)	Cook Co., IL N4002,1976474.042 E1104277.846
3. DRILLING AGENCY	Fox Exploration
4. HOLE NO. (As shown on drawing title and file number)	L37-4-00
5. NAME OF DRILLER	Gary Yockey
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	25
8. DEPTH DRILLED INTO ROCK	
9. TOTAL DEPTH OF HOLE	25.0
10. SIZE AND TYPE OF BIT	3-3/4" HSA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
12. MANUFACTURER'S DESIGNATION OF DRILL	Diedrich D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 10; UNDISTURBED 9
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	Dry WD, 618.65 AD, 631.15 @ 24 hrs.
16. DATE HOLE	STARTED 7-12-00; COMPLETED 7-12-00
17. ELEVATION TOP OF HOLE	635.65
18. TOTAL CORE RECOVERY FOR BORING	%
19. SIGNATURE OF INSPECTOR	Brian Reinke

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Silty clay, trace sand, gravel and topsoil - brown to black - stiff (CL) WC=23.4%	10"	S-1	3-4-6 Qp=1.5 tsf
			Layer of clayey silt WC=16.9% LL=30% PL=16% PI=14%	13"	S-2	2-6-8 Qp=2.0 tsf
629.6	6.0		Silty clay with trace sand, gravel and shale - brown - hard (CL) WC=21.6%	13"	S-3	9-11-15 Qp=4.5+ tsf
627.1	8.5		Clayey silt, trace sand, gravel and shale - gray - moist - dense (ML) WC=14.6%	12"	S-4	9-18-19 Qp=4.5+ tsf
			Seam of sand - wet - medium dense WC=16.3% LL=20% PL=14% PI=6%	17"	S-5	5-7-8 Qp=4.5+ tsf
622.1	13.5		Silty clay with trace sand, gravel and shale - gray - very stiff - wet (CL) Seam of silt WC=11.6%	13"	S-6	1-7-12 Qp=3.0 tsf
			WC=13.1%	19"	S-7	7-11-19 Qp=4.5+ tsf
			WC=12.7% LL=27% PL=14% PI=13%	17"	S-8	8-11-20 Qp=4.5+ tsf
613.1	22.5		WC=13.7%	14"	S-9	4-12-16 Qp=4.5+ tsf
			Clayey silt, trace sand - gray - moist - extremely dense (ML) WC=12.2%	10"	S-10	38-50/4" Qp=4.5+ tsf
610.6	25.0		End of Boring			

HOLE NO. L37-5-00

DRILLING LOG

DIVISION	
INSTALLATION	
SHEET	1 OF 1 SHEETS
1. PROJECT	Des Plaines River Project
JOB NUMBER	31130
2. LOCATION (Coordinates or Station)	Cook Co., IL N3069,1982749.196 E1102349.942
3. DRILLING AGENCY	Fox Exploration
4. HOLE NO. (As shown on drawing title and file number)	L37-5-00
5. NAME OF DRILLER	Gary Yockey
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	25
8. DEPTH DRILLED INTO ROCK	
9. TOTAL DEPTH OF HOLE	25.0
10. SIZE AND TYPE OF BIT	3-3/4" HSA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
12. MANUFACTURER'S DESIGNATION OF DRILL	Diedrich D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 9; UNDISTURBED 1
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	Dry WD, Dry AD, 633.13 @ 24 hrs.
16. DATE HOLE	STARTED 7-17-00; COMPLETED 7-19-00
17. ELEVATION TOP OF HOLE	642.13
18. TOTAL CORE RECOVERY FOR BORING	%
19. SIGNATURE OF INSPECTOR	Brian Reinke

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Silty clay, little topsoil, trace sand and gravel - brown to black to hard (CL) WC=8.6%	4"	S-1	6-11-13 Qp=4.5+ tsf
			WC=27.1%	11"	S-2	5-12-16 Qp=4.5+ tsf
636.1	6.0		Drill broke - drilled blind to 6 ft.			
			Silty clay, little sand, trace gravel and shale - brown to black - very stiff (CL) Brick noted. WC=20.5% LL=29% PL=15% PI=14%	8"	S-3	7-6-7 Qp=2.25 tsf
633.6	8.5					
			Silty clay, trace sand, gravel and shale - gray - hard (CL) Silty fine wet sand at tip. WC=21.8%, Gravel=2.6%, Sand=4.6%, Silt & Clay=92.8%	7"	S-4	5-17-13 Qp=4.5+ tsf
632.1	10.0		Silty fine to medium sand, little clay, trace gravel - wet (SM) Brick noted.	4"	S-5	
628.6	13.5					
			Silty clay, trace sand, gravel and shale - very stiff at top (SM) Sandy silt, little clay - gray - moist at bottom (SM) WC=12.6% Dry wt=129.0 pcf LL=19% PL=13% PI=16%	7"	S-6	Tv=2.5 tsf Qp=3.5 tsf
626.1	16.0		Bounced down to 17.5 ft.; pushed rock Silty clay, trace sand, gravel and shale - gray - stiff to very stiff (CL) WC=14.4%	1"	S-7	15-17-13 Qp=1.25 tsf (disturbed)
			Limestone fragments noted (CL) WC=13.4% LL=24% PL=13% PI=11%	9"	S-8	7-6-8 Qp=3.5 tsf
621.1	21.0		Silty clay, trace sand, gravel and shale - gray - hard (CL) Limestone fragments noted WC=13.1%	8"	S-9	9-12-14 Qp=4.0 tsf
			WC=12.8%	9"	S-10	44-11-12 Qp=4.5+ tsf
617.1	25.0		End of Boring			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE (modified by GCA 1/94)

PROJECT Des Plaines River Project | HOLE NO. L37-5-00

HOLE NO. L37-6-00

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 2 SHEETS

1. PROJECT: Des Plaines River Project	JOB NUMBER: 31130
2. LOCATION (Coordinates or Station): Cook Co., IL N4003,1975766.970 E1104309.906	
3. DRILLING AGENCY: Fox Exploration	
4. HOLE NO. (As shown on drawing title and file number): L37-6-00	
5. NAME OF DRILLER: Gary Yockey	
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.	
7. THICKNESS OF OVERBURDEN: 40	
8. DEPTH DRILLED INTO ROCK	
9. TOTAL DEPTH OF HOLE: 40.0	
10. SIZE AND TYPE OF BIT: 3-3/4" HSA	
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
12. MANUFACTURER'S DESIGNATION OF DRILL: Diedrich D-50	
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED: 16; UNDISTURBED: 0
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER: Dry WD, Dry AD, 627.79 @ 24 hrs.	
16. DATE HOLE	STARTED: 7-13-00; COMPLETED: 7-13-00
17. ELEVATION TOP OF HOLE: 636.29	
18. TOTAL CORE RECOVERY FOR BORING: %	
19. SIGNATURE OF INSPECTOR: Brian Reinke	

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Silty clay, trace topsoil, sand, gravel and brick - brown - very stiff (CL) WC=24.3%	10"	S-1	3-4-6 Qp=3.0 tsf
633.8	2.5					
			Silty clay, trace sand, gravel and brick - grayish brown - very stiff (CL) WC=20.9% LL=33% PL=16% PI=17%	8"	S-2	3-5-8 Qp=3.0 tsf
630.3	6.0					
			Silty clay, trace sand, gravel and shale - - brown - very stiff (CL) Seam of softer clay. WC=19.9%	16"	S-3	5-10-16 Qp=3.25 tsf
627.8	8.5					
			Clayey silt, trace sand - gray - moist - dense (ML) WC=13.2%	15"	S-4	6-18-27 Qp=4.5+ tsf
625.3	11.0					
			Silty clay, trace sand, gravel and shale - gray - hard (CL) WC=14.6% LL=27% PL=15% PI=12%	15"	S-5	6-8-9 Qp=4.5+ tsf
622.8	13.5					
			Very silty clay, trace sand, gravel and shale - gray - very stiff (CL-ML) WC=15.6%	15"	S-6	6-8-9 Qp=4.5+ tsf
620.3	16.0					
			Silty clay, trace sand, gravel and shale - gray - hard (CL) WC=10.5%	14"	S-7	3-4-7 Qp=2.0 tsf
			WC=14.4%	12"	S-8	7-9-9 Qp=4.5 tsf
			Layer of softer clay (Qp=2.25) WC=14.6%	14"	S-9	4-8-9 Qp=4.5+ tsf
612.8	23.5					
			Clayey silt, trace sand - gray - saturated - dense (ML) WC=21.3%	15"	S-10	12-20-23 Qp=4.5+ tsf

HOLE NO. L37-6-00

DRILLING LOG

DIVISION	
INSTALLATION	
SHEET	2 OF 2 SHEETS
1. PROJECT	Des Plaines River Project
JOB NUMBER	31130
2. LOCATION (Coordinates or Station)	Cook Co., IL N4003,1975766.970 E1104309.906
3. DRILLING AGENCY	Fox Exploration
4. HOLE NO. (As shown on drawing title and file number)	L37-6-00
5. NAME OF DRILLER	Gary Yockey
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	40
8. DEPTH DRILLED INTO ROCK	
9. TOTAL DEPTH OF HOLE	40.0
10. SIZE AND TYPE OF BIT	3-3/4" HSA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
12. MANUFACTURER'S DESIGNATION OF DRILL	Diedrich D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 16 / UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	Dry WD, Dry AD, 627.79 @ 24 hrs.
16. DATE HOLE	STARTED 7-13-00 / COMPLETED 7-13-00
17. ELEVATION TOP OF HOLE	636.29
18. TOTAL CORE RECOVERY FOR BORING	%
19. SIGNATURE OF INSPECTOR	Brian Reinke

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Clayey silt, trace sand - gray - saturated - dense (ML) WC=21.3%	18"	S-11	24-31-37 Qp=4.5+ tsf
607.8	28.5		Very dense - moist WC=17.5%			
			Silty clay, trace sand, gravel and shale - gray - hard (CL) WC=17.0%	14"	S-12	8-10-13 Qp=4.5 tsf
			Layer of silty sand.			
			Seam of silt. WC=16.5%	17"	S-13	8-12-14 Qp=4.5+ tsf
			WC=10.3%	14"	S-14	12-20-24 Qp=4.5+ tsf
			WC=15.1%	14"	S-15	10-15-18 Qp=4.5+ tsf
596.3	40.0		WC=14.3% LL=30% PL=15% PI=15%	12"	S-16	10-15-27 Qp=4.5+ tsf
			End of Boring			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (modified by GCA 1/94)

PROJECT Des Plaines River Project | HOLE NO. L37-6-00

HOLE NO. L37-7-00

DRILLING LOG

DIVISION	
INSTALLATION	
SHEET	1 OF 1 SHEETS
1. PROJECT	Des Plaines River Project
JOB NUMBER	31130
2. LOCATION (Coordinates or Station)	Cook Co., IL N4006,1977214.594 E1104364.680
3. DRILLING AGENCY	Fox Exploration
4. HOLE NO. (As shown on drawing title and file number)	L37-7-00
5. NAME OF DRILLER	Gary Yockey
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	25
8. DEPTH DRILLED INTO ROCK	
9. TOTAL DEPTH OF HOLE	25.0
10. SIZE AND TYPE OF BIT	3-3/4" HSA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
12. MANUFACTURER'S DESIGNATION OF DRILL	Diedrich D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 8; UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	616.84 WD, 621.64 AD, 631.64 @ 24 hrs.
16. DATE HOLE	STARTED 7-13-00; COMPLETED 7-13-00
17. ELEVATION TOP OF HOLE	635.64
18. TOTAL CORE RECOVERY FOR BORING	%
19. SIGNATURE OF INSPECTOR	Brian Reinke

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Silty clay, trace sand, gravel and topsoil - brown - very stiff (CL) Note: Brown to black WC=24.9%	10"	S-1	2-4-6 Qp=2.25 tsf
			WC=18.6%	11"	S-2	4-6-11 Qp=4.5 tsf
			WC=21.5% LL=50% PL=19% PI=31% Roots noted - grayish brown	16"	S-3	5-12-16 Qp=4.5+ tsf
627.1	8.5		Clayey silt, trace sand - gray - moist - medium dense to dense (ML) WC=16.7%	15"	S-4	13-24-14 Qp=4.5+ tsf
			Wet WC=21.2%	17"	S-5	4-8-10 Qp=4.0 tsf
622.1	13.5		Very silty clay, trace sand, gravel and shale - gray - hard (CL-ML) WC=15.3%	14"	S-6	3-5-11 Qp=4.5 tsf
			Seam of silty sand. WC=15.3% LL=25% PL=14% PI=11%	15"	S-7	5-9-20 Qp=4.5 tsf
618.1	17.5		Silty clay, trace sand, gravel and shale - gray - hard to very stiff (CL) WC=17.1%	6"	S-8	50/5" Qp=2.25 tsf
			Hit rock at 19 ft.; drilled through to 21 ft.			
			WC=15.3%	13"	S-9	12-14-19 Qp=4.5+ tsf
612.1	23.5		Clayey silt, trace sand - gray - very dense - wet to saturated (ML) WC=19.8%	15"	S-10	19-27-35 Qp=4.5+ tsf
610.6	25.0		End of Boring			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (modified by GCA 1/94)

PROJECT Des Plaines River Project HOLE NO. L37-7-00

HOLE NO. L37-8-00

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: Des Plaines River Project	JOB NUMBER: 31130
2. LOCATION (Coordinates or Station): Cook Co., IL N4005,1977750.661 E1104418.762	
3. DRILLING AGENCY: Fox Exploration	
4. HOLE NO. (As shown on drawing title and file number): L37-8-00	
5. NAME OF DRILLER: Gary Yockey	
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.	
7. THICKNESS OF OVERBURDEN: 25	
8. DEPTH DRILLED INTO ROCK:	
9. TOTAL DEPTH OF HOLE: 25.0	
10. SIZE AND TYPE OF BIT: 3-3/4" HSA	
11. DATUM FOR ELEVATION SHOWN (TBM or MSL):	
12. MANUFACTURER'S DESIGNATION OF DRILL: Diedrich D-50	
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED: 9 / UNDISTURBED: 1
14. TOTAL NUMBER CORE BOXES:	
15. ELEVATION GROUND WATER: 617.28 WD, 631.78 AD, 632.28 @ 24 hrs.	
16. DATE HOLE	STARTED: 7-13-00 / COMPLETED: 7-13-00
17. ELEVATION TOP OF HOLE: 636.28	
18. TOTAL CORE RECOVERY FOR BORING: %	
19. SIGNATURE OF INSPECTOR: Brian Reicher	

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Silty clay, trace gravel and sand - brown to grayish brown - hard (CL) WC=25.3%	9"	S-1	3-3-5 Qp=4.5 tsf
			Very stiff; seam of wet sand WC=20.1% LL=26% PL=15% PI-11%	9"	S-2	1-4-4 Qp=2.25 tsf
			WC=22.6%	10"	S-3	3-5-6 Qp=4.5+ tsf
627.8	8.5		Clayey silt, trace sand - gray - moist - medium dense (ML) WC=19.9%	13"	S-4	4-7-11 Qp=4.5+ tsf
625.3	11.0		Silty clay, little sand, trace gravel and shale - gray - very stiff to hard (CL) WC=9.9%	13"	S-5	9-11-12 Qp=4.5+ tsf
			LL=24% PL=13% PI=11% WC=14.5% Dry Wt=123.2 pcf c=0.8 kg/cm^2 Phi=0	26"	S-6	Qp=4.5+ tsf Tv=10+ tsf
			WC=12.1%	12"	S-7	4-7-11 Qp=3.5 tsf
			Seam of wet sand WC=13.8%	11"	S-8	4-5-6 Qp=4.5+ tsf
			Seam of wet sand. WC=15.4% LL=27% PL=14% PI=13%	10"	S-9	7-11-12 Qp=4.5+ tsf
611.3	25.0		Silt at tip. WC=2.5%	10"	S-10	19-21-33 Qp=3.75 tsf
			End of Boring			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (modified by GCA 1/94)

PROJECT: Des Plaines River Project

HOLE NO. L37-8-00

HOLE NO. L37-9-00

DRILLING LOG

DIVISION	
INSTALLATION	
SHEET 1 OF 1 SHEETS	
1. PROJECT	Des Plaines River Project
JOB NUMBER	31130
2. LOCATION (Coordinates or Station)	Cook Co., IL N4004,1978233.763 E1104474.268
3. DRILLING AGENCY	Fox Exploration
4. HOLE NO. (As shown on drawing title and file number)	L37-9-00
5. NAME OF DRILLER	Kris Norwick
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	25
8. DEPTH DRILLED INTO ROCK	
9. TOTAL DEPTH OF HOLE	25.0
10. SIZE AND TYPE OF BIT	3-3/4" HSA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
12. MANUFACTURER'S DESIGNATION OF DRILL	Diedrich D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 11 / UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	Dry WD, Dry AD, 630.42 @ 24 hrs.
16. DATE HOLE	STARTED 7-14-00 / COMPLETED 7-14-00
17. ELEVATION TOP OF HOLE	634.92
18. TOTAL CORE RECOVERY FOR BORING	%
19. SIGNATURE OF INSPECTOR	Brian Rich

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Silty clay, trace sand, fine gravel and shale - brown to grayish brown - very stiff (CL) WC=22.6%	7"	S-1	3-5-5 Qp=2.25 tsf
			Stiff WC=15.7%	12"	S-2	3-5-5 Qp=1.5 tsf
			WC=15.6% LL=25% PL=15% PI=10%	16"	S-3	5-5-8 Qp=2.0 tsf
626.4	8.5					
625.8	9.2		Clayey silt, trace sand, gravel and shale - gray - moist - medium dense (ML)	8"	S-4	4-6-7 Qp=4.5+ tsf
			WC=14.4%	7"	S-4A	Qp=3.5 tsf
			Silty clay, trace sand, gravel and shale - gray - very stiff (CL) WC=12.9%			
			WC=15.5%	15"	S-5	2-5-8 Qp=2.0 tsf
			WC=14.4%	18"	S-6	3-5-9 Qp=2.25 tsf
			Seam of silt WC=13.9%	12"	S-7	5-10-13 Qp=3.25 tsf
616.4	18.5					
			Silty clay, trace sand, gravel and shale - gray - hard (CL) WC=15.8%	15"	S-8	8-11-13 Qp=4.5+ tsf
			WC=17.4% LL=32% PL=15% PI=17%	15"	S-9	5-10-20 Qp=4.5+ tsf
			WC=12.8%	14"	S-10	5-15-19 Qp=4.5+ tsf
609.9	25.0		End of Boring			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE (modified by GCA 1/94) PROJECT Des Plaines River Project HOLE NO. L37-9-00

HOLE NO. L37-10-00

DRILLING LOG

DIVISION	
INSTALLATION	
SHEET 1 OF 1 SHEETS	
1. PROJECT: Des Plaines River Project	JOB NUMBER: 31130
2. LOCATION (Coordinates or Station): Cook Co., IL N4007,1979904.629 E1104805.012	
3. DRILLING AGENCY: Fox Exploration	
4. HOLE NO. (As shown on drawing title and file number): L37-10-00	
5. NAME OF DRILLER: Kris Norwick	
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.	
7. THICKNESS OF OVERBURDEN: 25	
8. DEPTH DRILLED INTO ROCK	
9. TOTAL DEPTH OF HOLE: 25.0	
10. SIZE AND TYPE OF BIT: 3-3/4" HSA	
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
12. MANUFACTURER'S DESIGNATION OF DRILL: Diedrich D-50	
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED: 11; UNDISTURBED: 0
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER: 620.55 WD, 627.05 AD, 629.55 @ 24 hrs.	
16. DATE HOLE	STARTED: 7-14-00; COMPLETED: 7-14-00
17. ELEVATION TOP OF HOLE: 634.05	
18. TOTAL CORE RECOVERY FOR BORING: %	
19. SIGNATURE OF INSPECTOR: Brian Reinke	

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Fine to coarse sand, trace gravel, silt and topsoil - brown - moist - medium dense (SP)			
632.3	1.8			9"	S-1	5-6-8
			Silty clay, trace sand, gravel and shale - brown with seam of silt - very stiff (CL) WC=21.1%	9"	S-1A	Qp=3.75 tsf
630.6	3.5					
			Silty clay, trace sand, gravel and shale - gray - very stiff to hard (CL) WC=20.8% LL=29% PL=15% PI=14%	17"	S-2	5-6-7 Qp=3.25 tsf
			Layer of gravel and silt - saturated WC=23.8%	12"	S-3	12-11-10 Qp=4.0 tsf
			WC=10.8%	8"	S-4	3-6-10 Qp=2.5 tsf
623.1	11.0					
			Silty clay, trace sand, gravel and shale - gray - stiff (CL) WC=17.9%	9"	S-5	3-6-10 Qp=1.25 tsf
620.6	13.5					
			Silty clay, trace sand, gravel and shale - gray -very stiff to hard (CL) WC=11.5%	14"	S-6	2-6-9 Qp=3.0 tsf
			WC=15.1% LL=26% PL=13% PI=13%	12"	S-7	6-11-14 Qp=3.75 tsf
			WC=15.1%	13"	S-8	5-7-12 Qp=4.5+ tsf
613.1	21.0					
			Clayey silt, trace sand, gravel and shale - gray - very dense (ML) Layer of gravel. WC=14.1%	14"	S-9	16-27-36 Qp=4.5+ tsf
			WC=15.0%	16"	S-10	13-26-26 Qp=4.5+ tsf
609.1	25.0					
			End of Boring			

HOLE NO. L37-11-00

DRILLING LOG

DIVISION	
INSTALLATION	
SHEET 1 OF 1 SHEETS	
1. PROJECT	Des Plaines River Project
JOB NUMBER	31130
2. LOCATION (Coordinates or Station)	Cook Co., IL N4008,1980199.356 E1105034.281
3. DRILLING AGENCY	Fox Exploration
4. HOLE NO. (As shown on drawing title and file number)	L37-11-00
5. NAME OF DRILLER	Kris Norwick
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	25
8. DEPTH DRILLED INTO ROCK	
9. TOTAL DEPTH OF HOLE	25.0
10. SIZE AND TYPE OF BIT	3-3/4" HSA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
12. MANUFACTURER'S DESIGNATION OF DRILL	Diedrich D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 9 / UNDISTURBED 1
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	626.71 WD, 1627.21 AD, 629.71 @ 24 hrs.
16. DATE HOLE	STARTED 7-14-00 / COMPLETED 7-14-00
17. ELEVATION TOP OF HOLE	637.71
18. TOTAL CORE RECOVERY FOR BORING	%
19. SIGNATURE OF INSPECTOR	Brian Reinstra

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Silty clay, trace sand and gravel, little topsoil - black - very stiff (CL) Wood noted. WC=21.6%	4"	S-1	3-3-4 Qp=2.75 tsf
634.2	3.5		Fine to coarse sand, trace gravel and silt - brown - moist - loose (SP)	12"	S-2	3-4-5
631.7	6.0		Silty clay, trace sand, gravel and shale - grayish brown - very stiff to hard (CL) WC=25.8%	12"	S-3	3-6-8 Qp=4.0 tsf
			Gray below 8.5 ft. WC=14.3% LL=24% PL=13% PI=11% Layer of gravelly sand. WC=13.3%	20"	S-4	Tv=8.0 tsf Qp=3.5 tsf
			WC=14.5%	9"	S-5	2-6-9 Qp=3.0 tsf
			WC=14.2%	14"	S-6	4-5-8 Qp=2.25 tsf
			WC=14.7%	17"	S-7	4-7-8 Qp=2.0 tsf
			WC=14.0%	15"	S-8	4-6-11 Qp=3.75 tsf
616.7	21.0		Silty clay, trace sand, gravel and shale - gray - hard (CL) WC=14.2% LL=29% PL=14% PI=15%	11"	S-9	7-11-12 Qp=4.5+ tsf
614.2	23.5		Clayey silt, trace sand, gravel and shale - gray - dense (ML) WC=13.0%	13"	S-10	18-28-21 Qp=4.5+ tsf
612.7	25.0		End of Boring			

HOLE NO. L37-12-00

DRILLING LOG

DIVISION	
INSTALLATION	
SHEET 1 OF 1 SHEETS	
1. PROJECT	Des Plaines River Project
JOB NUMBER	31130
2. LOCATION (Coordinates or Station)	Cook Co., IL N4013,1980665.370 E1105235.281
3. DRILLING AGENCY	Fox Exploration
4. HOLE NO. (As shown on drawing title and file number)	L37-12-00
5. NAME OF DRILLER	Kris Norwick
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	25
8. DEPTH DRILLED INTO ROCK	
9. TOTAL DEPTH OF HOLE	25.0
10. SIZE AND TYPE OF BIT	3-3/4" HSA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
12. MANUFACTURER'S DESIGNATION OF DRILL	Diedrich D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 10 / UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	616.97 WD, 629.97 AD, 630.97 @ 24 hrs.
16. DATE HOLE	STARTED 7-14-00 / COMPLETED 7-14-00
17. ELEVATION TOP OF HOLE	636.97
18. TOTAL CORE RECOVERY FOR BORING	%
19. SIGNATURE OF INSPECTOR	Brian Reichen

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Silty clay, little topsoil, trace sand, gravel and shale - brown to black - hard (CL) WC=18.6%	8"	S-1	5-6-9 Qp=4.5+ tsf
634.5	2.5		Silty clay, little sand, trace gravel and shale - brown - hard (CL) WC=12.8% LL=30% PL=14% PI=16%	9"	S-2	3-5-7 Qp=4.5+ tsf
			Trace sand WC=11.4%	8"	S-3	6-9-10 Qp=4.5+ tsf
630.3	6.7		Fine to coarse sand, little silt and gravel - brown - wet (SP) WC=12.8%, Gravel=10.2%, Sand=79.2%, Silt & Clay=10.6%	3"	S-3A	
628.5	8.5		Silty clay, trace sand, gravel and shale - gray - hard (CL) WC=20.3%	11"	S-4	8-11-14 Qp=4.5+ tsf
			WC=16.8% LL=33% PL=16% PI=17%	10"	S-5	5-8-10 Qp=4.5+ tsf
623.5	13.5		Clayey silt, trace sand - gray - medium dense - wet (ML) Sand at tip. WC=19.0%	12"	S-6	3-7-9 Qp=3.0 tsf
621.0	16.0		Silty clay, trace sand, gravel and shale - gray - very stiff to hard (CL) WC=13.8% With layers of wet silty sand.	4"	S-7	4-5-7 Qp=3.5 tsf
			WC=13.5%	11"	S-8	5-10-22 Qp=4.5+ tsf
			No Recovery	0"	S-9	6-11-14
			WC=14.7%	16"	S-10	8-12-15 Qp=4.5+ tsf
612.0	25.0		End of Boring			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (modified by GCA 1/94)

PROJECT Des Plaines River Project

HOLE NO. L37-12-00

HOLE NO. L37-13-00

DRILLING LOG

DIVISION	
INSTALLATION	
SHEET 1 OF 1 SHEETS	
1. PROJECT	Des Plaines River Project
JOB NUMBER	31130
2. LOCATION (Coordinates or Station)	Cook Co., IL N4011,1981618.791 E1105005.524
3. DRILLING AGENCY	Fox Exploration
4. HOLE NO. (As shown on drawing title and file number)	L37-13-00
5. NAME OF DRILLER	Gary Yockey
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	25
8. DEPTH DRILLED INTO ROCK	
9. TOTAL DEPTH OF HOLE	25.0
10. SIZE AND TYPE OF BIT	3-3/4" HSA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
12. MANUFACTURER'S DESIGNATION OF DRILL	Diedrich D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 11 / UNDISTURBED 1
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	Dry WD, 617.18 AD, 629.68 @ 24 hrs.
16. DATE HOLE	STARTED 7-17-00 / COMPLETED 7-17-00
17. ELEVATION TOP OF HOLE	638.68
18. TOTAL CORE RECOVERY FOR BORING	%
19. SIGNATURE OF INSPECTOR	Brian Rinehart

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Silty clay, little topsoil, trace sand and gravel - black - very stiff (CL) WC=16.2%	4"	S-1	5-9-9 Qp=2.0 tsf
			WC=18.2% LL=37% PL=18% PI=19%	8"	S-2	2-2-3 Qp=2.0 tsf
			Trace topsoil - brown to black WC=22.7%	8"	S-3	2-3-4 Qp=2.25 tsf
629.9	8.8		WC=18.9%	4"	S-4	3-4-11 Qp=2.25 tsf
628.7	10.0		Sandy clay, little silt, trace gravel and topsoil - brown to black - soft (SC) WC=13.9%	6"	S-4A	Qp=0.25 tsf
			Silty clay, trace sand, gravel and shale - gray - very stiff (CL) WC=14.2%	15"	S-5	3-7-10 Qp=2.75 tsf
625.2	13.5					
623.2	15.5		Silty clay, little sand, trace gravel - gray - very stiff (CL) WC=13.3% LL=23% PL=14% PI=9% Dry Wt=129.1 pcf Qu=2.54 tsf	26"	S-6	Qp=3.5 tsf Tv=4.0 tsf
621.8	16.9		Silty fine to coarse sand, trace gravel, shale and clay - gray - saturated (SM)	11"	S-7	13-17-18
620.2	18.5		Clayey silt, trace sand - gray - saturated (ML) WC=15.9%	5"	S-7A	Qp=4.5 tsf
			Silty clay, trace sand, gravel and shale - gray - very stiff to hard (CL) Rock at tip. WC=11.6%	2"	S-8	6-12-15 Qp=3.0 tsf
			WC=14.2%	13"	S-9	4-12-17 Qp=4.5+ tsf
615.2	23.5		No recovery	0"	S-10	34-50/5"
613.7	25.0		End of Boring			

HOLE NO. L37-14-00

DRILLING LOG

DIVISION	
INSTALLATION	
SHEET 1 OF 1 SHEETS	
1. PROJECT	Des Plaines River Project
JOB NUMBER	31130
2. LOCATION (Coordinates or Station)	Cook Co., IL N4010,1981922.998 E1104888.383
3. DRILLING AGENCY	Fox Exploration
4. HOLE NO. (As shown on drawing title and file number)	L37-14-00
5. NAME OF DRILLER	Gary Yockey
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	25
8. DEPTH DRILLED INTO ROCK	
9. TOTAL DEPTH OF HOLE	25.0
10. SIZE AND TYPE OF BIT	3-3/4" HSA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
12. MANUFACTURER'S DESIGNATION OF DRILL	Diedrich D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 12 / UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	623.11 WD, 624.11 AB, 630.11 @ 24 hrs.
16. DATE HOLE	STARTED 7-17-00 / COMPLETED 7-17-00
17. ELEVATION TOP OF HOLE	640.11
18. TOTAL CORE RECOVERY FOR BORING	%
19. SIGNATURE OF INSPECTOR	Brian Reinke

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Silty clay, little topsoil, trace sand and gravel - black - hard (CL) Roots noted. WC=15.9%	12"	S-1	4-7-7 Qp=4.5 tsf
			Wood noted. WC=23.6%	12"	S-2	9-9-9 Qp=4.0 tsf
634.1	6.0					
633.5	6.6		Clayey silt, trace sand - gray - very stiff (ML) WC=15.6%	7"	S-3	4-16-14 Qp=2.75 tsf
			Fine to coarse silty sand, little gravel, trace clay - brown - wet - medium dense to dense (SM) WC=8.3%, Gravel=35.8%, Sand=44.3%, Silt & Clay=19.9%	7"	S-3A	
630.0	10.1			7"	S-4	3-7-14
			Silty clay, trace sand, gravel and shale - gray - hard (CL) Seams of sandy silt. WC=13.8%	5"	S-4A	Qp=4.5+ tsf
			WC=17.9%	11"	S-5	3-7-9 Qp=4.5+ tsf
626.6	13.5					
			Clay in tip of layers of fine to medium sand - wet (ML) WC=11.2%	13"	S-6	6-17-12 Qp=4.5+ tsf
624.1	16.0					
			Silty clay, trace sand, gravel and shale - gray - very stiff to hard (CL) WC=14.1%	15"	S-7	3-5-7 Qp=3.25 tsf
			WC=14.6%	12"	S-8	2-3-6 Qp=3.75 tsf
			WC=14.8%	17"	S-9	5-8-9 Qp=3.25 tsf
			WC=12.1% LL=28% PL=13% PI=15%	11"	S-10	39-12-27 Qp=4.5+ tsf
615.1	25.0		End of Boring			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE (modified by GCA 1/94) PROJECT Des Plaines River Project HOLE NO. L37-14-00

HOLE NO. L37-15-00

DRILLING LOG

DIVISION	
INSTALLATION	
SHEET 1 OF 1 SHEETS	
1. PROJECT	Des Plaines River Project
JOB NUMBER	31130
2. LOCATION (Coordinates or Station)	Cook Co., IL N4009,1982252.934 E1104750.844
3. DRILLING AGENCY	Fox Exploration
4. HOLE NO. (As shown on drawing title and file number)	L37-15-00
5. NAME OF DRILLER	Gary Yockey
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	25
8. DEPTH DRILLED INTO ROCK	
9. TOTAL DEPTH OF HOLE	25.0
10. SIZE AND TYPE OF BIT	3-3/4" HSA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
12. MANUFACTURER'S DESIGNATION OF DRILL	Diedrich D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 10 / UNDISTURBED 1
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	628.43 WD, 629.42 AD, 629.93 @ 24 hrs.
16. DATE HOLE	STARTED 7-17-00 / COMPLETED 7-17-00
17. ELEVATION TOP OF HOLE	639.43
18. TOTAL CORE RECOVERY FOR BORING	%
19. SIGNATURE OF INSPECTOR	Brian Reinke

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Silty clay, trace sand, gravel and topsoil - black to brown - hard (CL) WC=22.0% LL=38% PL=18% PI=20%	14"	S-1	7-6-4 Qp=4.5+ tsf
			WC=14.8%	10"	S-2	4-5-8 Qp=4.5+ tsf
634.4	5.0		Fine to coarse sand, trace silt, gravel and clay - brown - moist - medium dense (SP)	5"	S-3	6-7-8
633.0	6.4		Clayey silt, trace sand - brown - moist (ML) WC=15.2%	9"	S-3A	Qp=4.5+ tsf
630.9	8.5		Fine to coarse sand, trace silt, gravel and clay - brown and gray - wet - medium dense (SP) Layer of gravelly sand.	10"	S-4	7-10-12
628.4	11.0		Silty clay, trace sand - gray - wet (CL) WC=14.5% LL=33% PL=15% PI=18% Dry Wt=120.8 pcf c=1.6 kg/cm^2 Phi=0	19"	S-5	Qp=1.5 tsf Tv=1.5 tsf
625.9	13.5		Silty fine to medium sand, trace clay - gray - saturated dense (SM)	16"	S-6	6-17-16
623.4	16.0		Clayey silt, little sand, trace gravel and shale - gray - medium dense (ML) WC=20.3%	15"	S-7	8-12-10 Qp=4.5+ tsf
620.9	18.5		Silty clay, trace sand, gravel and shale - gray - very stiff to hard (CL) WC=15.3% LL=24% PL=13% PI=11%	16"	S-8	3-4-6 Qp=2.5 tsf
			WC=14.5%	16"	S-9	8-12-17 Qp=3.75 tsf
			WC=15.8%	15"	S-10	5-9-14 Qp=4.0 tsf
614.4	25.0		End of Boring			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (modified by GCA 1/94)

PROJECT Des Plaines River Project | HOLE NO. L37-15-00

HOLE NO. L37-16-00

DRILLING LOG

DIVISION	
INSTALLATION	
SHEET 1 OF 1 SHEETS	
1. PROJECT	Des Plaines River Project
JOB NUMBER	31130
2. LOCATION (Coordinates or Station)	Cook Co., IL N3972,1982583.843 E1102934.743
3. DRILLING AGENCY	Fox Exploration
4. HOLE NO. (As shown on drawing title and file number)	L37-16-00
5. NAME OF DRILLER	Gary Yockey
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	25
8. DEPTH DRILLED INTO ROCK	
9. TOTAL DEPTH OF HOLE	25.0
10. SIZE AND TYPE OF BIT	3-3/4" HSA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
12. MANUFACTURER'S DESIGNATION OF DRILL	Diedrich D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 10 / UNDISTURBED 1
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	Dry WD, 625.37 AD, 630.87 @ 24 hrs.
16. DATE HOLE	STARTED 7-18-00 / COMPLETED 7-18-00
17. ELEVATION TOP OF HOLE	636.37
18. TOTAL CORE RECOVERY FOR BORING	%
19. SIGNATURE OF INSPECTOR	Brian Pitcher

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Silty clay, trace gravel and shale - brown to brownish gray - hard (CL) WC=13.9%	10"	S-1	3-5-5 Qp=4.5+ tsf
			WC=20.2% LL=41% PL=18% PI=23%	8"	S-2	18-18-11 Qp=4.5+ tsf
630.4	6.0		Fine to coarse sand, little silt, trace gravel - brown to gray - saturated - medium dense (SM) Gray clay in tip. WC=24.9%, Gravel=1.0%, Sand=84.4%, Silt & Clay=14.6%	12"	S-3	7-7-8
627.9	8.5		Silty clay, trace sand, gravel and shale - gray - stiff to very stiff (CL) WC=15.8%	12"	S-4	2-4-4 Qp-1.75 tsf
			WC=16.0% LL=24% PL=13% PI=11% Dry Wt=120.5 pcf c=0.5 kg/cm^2 Phi=0	27"	S-5	Qp=2.0 tsf Tv=4.5 tsf
			WC=15.2%	12"	S-6	2-3-5 Qp=1.75 tsf
620.4	16.0		Silty clay, trace sand, gravel and shale - gray - hard (CL) WC=14.0%	15"	S-7	4-6-9 Qp=4.25 tsf
			WC=11.2%	12"	S-8	5-11-11 Qp=4.5+ tsf
614.8	21.6		WC=16.1% LL=28% PL=15% PI=13%	7"	S-9	5-22-38 Qp=4.5+ tsf
			Clayey silt, trace sand, gravel and shale - gray - very dense (ML) WC=15.2%	10"	S-9A	Qp=4.5+ tsf
612.9	23.5		Silty clay, trace sand, gravel and shale - gray - hard (CL) WC=12.6%	16"	S-10	10-14-16 Qp=4.5+ tsf
611.4	25.0		End of Boring			

HOLE NO. L37-17-00

DRILLING LOG

DIVISION	
INSTALLATION	
SHEET 1 OF 2 SHEETS	
1. PROJECT	Des Plaines River Project
JOB NUMBER	31130
2. LOCATION (Coordinates or Station)	Cook Co., IL N3071,1982627.876 E1102731.920
3. DRILLING AGENCY	Fox Exploration
4. HOLE NO. (As shown on drawing title and file number)	L37-17-00
5. NAME OF DRILLER	Gary Yockey
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	40
8. DEPTH DRILLED INTO ROCK	
9. TOTAL DEPTH OF HOLE	40.0
10. SIZE AND TYPE OF BIT	3-3/4" HSA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
12. MANUFACTURER'S DESIGNATION OF DRILL	Diedrich D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 19 / UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	628.29 WD, 629.29 AD, 631.29 @ 24 hrs.
16. DATE HOLE	STARTED 7-18-00 / COMPLETED 7-18-00
17. ELEVATION TOP OF HOLE	640.29
18. TOTAL CORE RECOVERY FOR BORING	%
19. SIGNATURE OF INSPECTOR	Brian Reicher

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Silty clay, trace sand, gravel, shale and topsoil - brown to black - hard (CL) Limestone noted. WC=11.6%	11"	S-1	5-6-11 Qp=4.5+ tsf
637.8	2.5		Silty clay, trace sand, gravel and shale - brown - very stiff to hard (CL) WC=15.5% LL=29% PL=14% PI=15%	12"	S-2	4-5-8 Qp=3.25 tsf
			WC=19%	14"	S-3	4-8-10 Qp=4.5+ tsf
			Seams of fine to coarse sand - brown - moist WC=13.6%	14"	S-4	5-8-9 Qp=4.5+ tsf
629.3	11.0		Fine to coarse silty sand - gray - saturated - medium dense (SM) WC=22.9%, Sand=92.8%, Silt & Clay=7.2%	12"	S-5	5-7-7
626.8	13.5		Silty clay, trace sand, gravel and shale - gray - medium to stiff (CL) WC=13.7% LL=26% PL=13% PI=13%	13"	S-6	2-2-4 Qp=.75 tsf
			WC=15.3%	15"	S-7	2-4-4 Qp=1.5 tsf
621.8	18.5		Silty clay, trace sand, gravel and shale - gray - hard (CL) WC=14.5%	15"	S-8	4-7-9 Qp=4.0 tsf
			WC=15.4%	4"	S-9	11-12-11 Qp=4.5 tsf
619.0	21.3		Silty fine to medium sand, trace clay and gravel - gray - moist to wet - medium dense (SM)	13"	S-9A	
616.8	23.5					
616.3	24.0		Silty clay, trace sand, gravel and shale - gray - very stiff (CL) WC=14.5%	6"	S-10	2-13-16 Qp=3.5 tsf
615.3	25.0		Clayey silt - medium dense - moist (ML) WC=15.5%	6"	S-10A	Qp=4.5+ tsf

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (modified by GCA 1/94)

PROJECT Des Plaines River Project | HOLE NO. L37-17-00

HOLE NO. L37-17-00

DRILLING LOG

DIVISION	
INSTALLATION	
SHEET 2 OF 2 SHEETS	
1. PROJECT	Des Plaines River Project
JOB NUMBER	31130
2. LOCATION (Coordinates or Station)	Cook Co., IL N3071,1982627.876 E1102731.920
3. DRILLING AGENCY	Fox Exploration
4. HOLE NO. (As shown on drawing title and file number)	L37-17-00
5. NAME OF DRILLER	Gary Yockey
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	40
8. DEPTH DRILLED INTO ROCK	
9. TOTAL DEPTH OF HOLE	40.0
10. SIZE AND TYPE OF BIT	3-3/4" HSA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
12. MANUFACTURER'S DESIGNATION OF DRILL	Diedrich D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 19 / UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	628.29 WD, 629.29 AD, 631.29 @ 24 hrs.
16. DATE HOLE	STARTED 7-18-00 / COMPLETED 7-18-00
17. ELEVATION TOP OF HOLE	640.29
18. TOTAL CORE RECOVERY FOR BORING	%
19. SIGNATURE OF INSPECTOR	Brian Reinsch

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Silty clay, trace sand, gravel and shale - gray - hard (CL) WC=12.6%	13"	S-11	6-11-13 Qp=4.5+ tsf
			WC=12.7% LL=26% PL=13% PI=13%	15"	S-12	6-10-14 Qp=4.5+ tsf
			WC=14.3%	13"	S-13	12-18-24 Qp=4.5+ tsf
606.3	34.0		WC=18.7%	6"	S-14	10-41-31 Qp=4.5+ tsf
			Clayey silt, trace fine sand - very dense to extremely dense (ML) WC=19.0%	8"	S-14A	Qp=4.5+ tsf
			WC=15.3%	16"	S-15	21-35-62 Qp=4.5+ tsf
601.8	38.5					
600.3	40.0		Silty clay, trace sand, gravel and shale - gray - hard (CL) WC=12.3% LL=27% PL=14% PI=13%	13"	S-16	11-15-21 Qp=4.5+ tsf
			End of Boring			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (modified by GCA 1/94)

PROJECT Des Plaines River Project HOLE NO. L37-17-00

HOLE NO. L37-18-00

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: Des Plaines River Project	JOB NUMBER: 31130
2. LOCATION (Coordinates or Station): Cook Co., IL N3070,1982714.473 E1102471.585	
3. DRILLING AGENCY: Fox Exploration	
4. HOLE NO. (As shown on drawing title and file number): L37-18-00	
5. NAME OF DRILLER: Gary Yockey	
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.	
7. THICKNESS OF OVERBURDEN: 23.5	
8. DEPTH DRILLED INTO ROCK:	
9. TOTAL DEPTH OF HOLE: 23.5	
10. SIZE AND TYPE OF BIT: 3-3/4" HSA	
11. DATUM FOR ELEVATION SHOWN (TBM or MSL):	
12. MANUFACTURER'S DESIGNATION OF DRILL: Diedrich D-50	
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 9 / UNDISTURBED 1	
14. TOTAL NUMBER CORE BOXES:	
15. ELEVATION GROUND WATER: 628.71 WD, 630.21 AD, 632.21 @ 24 hrs.	
16. DATE HOLE: STARTED 7-19-00 / COMPLETED 7-19-00	
17. ELEVATION TOP OF HOLE: 639.21	
18. TOTAL CORE RECOVERY FOR BORING: %	
19. SIGNATURE OF INSPECTOR: Brian Reinecke	

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Silty clay, little topsoil, trace sand and gravel - brown - very stiff to hard (CL) WC=8.2%	5"	S-1	6-10-6 Qp=4.5+ tsf
634.2	5.0		WC=21.9%	6"	S-2	4-5-7 Qp=2.5 tsf
			Silty clay, trace sand, gravel and shale - brown - hard (CL) WC=22.6% LL=44% PL=22% PI=22%	12"	S-3	5-8-13 Qp=4.5+ tsf
630.7	8.5		Fine to coarse silty sand, trace gravel and clay - gray - wet - medium dense (SM) LL-15% PL=13% PI=2& Gravel=5.9%, Sand=75,2%, Silt & Clay=18.9%	10"	S-4	7-11-13
628.2	11.0		Silty clay, trace sand, gravel and shale - gray - stiff to very stiff (CL) WC=16.0% LL=22% PL=13% PI=9% Dry wt=158.4 pcf, Qu=2.04	22"	S-5	Qp=2.0 tsf Tv=6.0 tsf
			WC=13.2%	12"	S-6	4-5-7 Qp=1.75 tsf
			WC=14.1%	15"	S-7	3-4-8 Qp=1.5 tsf
			WC=17.4% LL=31% PL=14% PI=17%	12"	S-8	3-6-11 Qp=3.25 tsf
618.2	21.0		Silty clay, trace sand, gravel and shale - gray - hard (CL) WC=16.6% LL=28% PL=14% PI=14%	15"	S-9	7-11-15 Qp=4.5+ tsf
615.7	23.5		Limestone fragments WC=21.0%	2"	S-10	50/3"
			End of Boring			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE (modified by GCA 1/94)

PROJECT: Des Plaines River Project

HOLE NO. L37-18-00

HOLE NO. L37-19-00

DRILLING LOG

DIVISION	
INSTALLATION	
SHEET	1 OF 1 SHEETS
1. PROJECT	Des Plaines River Project
JOB NUMBER	31130
2. LOCATION (Coordinates or Station)	Cook Co., IL N4012,1981179.698 E1105073.829
3. DRILLING AGENCY	Fox Exploration
4. HOLE NO. (As shown on drawing title and file number)	L37-19-00
5. NAME OF DRILLER	Gary Yockey
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	
8. DEPTH DRILLED INTO ROCK	
9. TOTAL DEPTH OF HOLE	10.0
10. SIZE AND TYPE OF BIT	
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
12. MANUFACTURER'S DESIGNATION OF DRILL	Hand Auger
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 6 / UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	631.07 WD, 631.57 AD, 631.57 @ 24 hrs.
16. DATE HOLE	STARTED 7-19-00 / COMPLETED 7-19-00
17. ELEVATION TOP OF HOLE	638.57
18. TOTAL CORE RECOVERY FOR BORING	%
19. SIGNATURE OF INSPECTOR	Brian Reinhart

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Sandy clay, little silt, trace gravel - brown (SC) Clayey sand in tip. WC=11.8%	13"	S-1	Qp=3.0 tsf in clay
635.1	3.5					
634.7	3.9		Fine to coarse sand, trace clay - brown - moist (SP)	5"	S-2	
			Sandy clay, trace silt and gravel - brown - medium (SC) LL=25% PL=15% PI=10% WC=17.3% (Sample 2A)	3"	S-2A	Qp=0.5 tsf
632.3	6.3		Layer of fine to coarse sand - brown WC=14.5%	3"	S-3	Qp=1.25 tsf
			Fine to coarse silty sand, little clay, trace gravel (SM-SC) WC=23.2%	3"	S-3A	Qp=2.75 tsf
			Clayey material and rock fragments in tip. WC=15.8%, PL=19% PI=NP%	10"	S-4	
628.6	10.0		End of Boring			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE (modified by GCA 1/94) PROJECT Des Plaines River Project HOLE NO. L37-19-00

DRILLING LOG

HOLE NO. L-37-20-05

DIVISION	
INSTALLATION	
SHEET 1 OF 3 SHEETS	
1. PROJECT: Des Plaines River, IL Floodwall 37	JOB NUMBER: 31130-A
2. LOCATION (Coordinates or Station): Cook County, IL N 1975893.559 E 620262.373	
3. DRILLING AGENCY: Subsurface Exploration, Inc.	
4. HOLE NO. (As shown on drawing title and file number): L-37-20-05	
5. NAME OF DRILLER: Dan Malouf	
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.	
7. THICKNESS OF OVERBURDEN: 41.5 ft.	
8. DEPTH DRILLED INTO ROCK	
9. TOTAL DEPTH OF HOLE: 41.5	
10. SIZE AND TYPE OF BIT: 4-1/2" PA to 10 ft.; 3-7/8" RB to 40 ft.	
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL	
12. MANUFACTURER'S DESIGNATION OF DRILL: D-50	
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 17	UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER: 626.030 WS; 629.030 BCR	
16. DATE HOLE: STARTED 6/14/05	COMPLETED 6/14/05
17. ELEVATION TOP OF HOLE: 636.030	
18. TOTAL CORE RECOVERY FOR BORING: %	
19. SIGNATURE OF INSPECTOR	

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Silty clay, little roots, trace fine to medium sand - brown - hard (CL)	15"	S-1	2-2-3-5 WC = 18.3 Qp = 4.5+
633.53	2.5					
			Silty clay, trace fine gravel and fine to medium sand - brown and gray - very stiff (CL)	8"	S-2	2-2-3 WC = 15.4 Qp = 2.75 tsf
			LL=32% PL=16% PI=16%	11"	S-3	2-3-4 WC = 18.8 Qp = 3.5 tsf
630.13	5.9					
629.83	6.2		Fine to medium sand, trace silt, clay and fine gravel - brown - loose - moist (SP)	4"	S-3A	WC = 19.0
				1"	S-3B	WC = 16.5
			Silty clay, trace fine to medium sand and shale - brown - hard (CL) LL=31% PL=15% PI=16%			Qp = 4.5 tsf
628.53	7.5					
			Fine to medium sand, little silt and shale - gray - medium dense - moist to wet (SM) Gravel=1.0%, Sand=82.7%, Silt & Clay=16.3%	11"	S-4	6-7-11 WC = 19.8
627.53	8.5					
			Silty clay, trace fine sand and shale - brown -hard (CL) LL=38% PL=18% PI=20%	6"	S-4A	WC = 17.0 Qp = 4.5+ tsf
626.03	10.0					
			Sandy silt, trace clay, fine gravel and shale - gray - medium dense - saturated (ML-SM)	12"	S-5	11-12-14 WC = 14.9
			Gravel = 1.7%, Sand = 39.8%, Silt & Clay = 58.5%	12"	S-6	6-7-8 WC = 18.2

HOLE NO. L-37-20-05

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE 636.0

Hole No. L-37-20-05

PROJECT: Des Plaines River, IL Floodwall 37

INSTALLATION:

SHEET 2 OF 3 SHEETS

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Sandy silt, trace clay, fine gravel and shale - gray - medium dense - saturated (ML-SM)	12"	S-7	7-9-10 WC = 18.6
618.53	17.5					
			Silty clay, trace fine gravel, fine to medium sand and shale - gray - hard to very stiff (CL)	16"	S-8	5-6-9 WC = 13.4 Qp = 4.0 tsf
			LL=28% PL=14% PI=14%	15"	S-9	4-8-13 WC = 15.1 Qp = 3.5 tsf
613.53	22.5					
			Fine to coarse sand, little silt, trace clay, fine gravel and shale - gray - medium dense - moist to wet (SP)	6"	S-10	11-15-18 WC = 11.8
612.78	23.3		Silt, trace clay - gray - dense - wet (ML)	9"	S-10A	WC = 15.3
611.03	25.0					
			Silty clay, trace fine gravel, fine to coarse sand and shale - gray - hard (CL)	13"	S-11	10-12-16 WC = 11.0 Qp = 4.5+ tsf
			LL=25% PL=14% PI=11%	15	S-12	8-10-15 WC = 13.4 Qp = 4.5+ tsf
				13"	S-13	10-11-16 WC = 13.4 Qp = 4.5+ tsf
				17"	S-14	10-13-18 WC = 14.2 Qp = 4.5+ tsf

HOLE NO. L-37-20-05

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE 636.0

Hole No. L-37-20-05

PROJECT: Des Plaines River, IL Floodwall 37

INSTALLATION:

SHEET 3 OF 3 SHEETS

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Silty clay, trace fine gravel, fine to coarse sand and shale - gray - hard (CL)			
				15"	S-15	8-15-18 WC = 7.3 Qp = 4.5+ tsf
				16"	S-16	7-10-14 WC = 16.0 Qp = 4.5+ tsf
				16"	S-17	5-11-14 WC = 16.2 Qp = 4.5+ tsf
594.53	41.5		End of Boring Borehole backfilled upon completion. Casing used: 10 ft. of 4 in. Automatic-Diedrich hammer used for Standard Penetration Tests.			

HOLE NO. L-37-21-05

DRILLING LOG

DIVISION	
INSTALLATION	
SHEET 1 OF 3 SHEETS	
1. PROJECT: Des Plaines River, IL Floodwall 37	JOB NUMBER: 31130-A
2. LOCATION (Coordinates or Station): Cook County, IL N 1979142.887 E 620345.437	
3. DRILLING AGENCY: Subsurface Exploration, Inc.	
4. HOLE NO. (As shown on drawing title and file number): L-37-21-05	
5. NAME OF DRILLER: Jack Lehtinen	
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.	
7. THICKNESS OF OVERBURDEN: 41.5	
8. DEPTH DRILLED INTO ROCK	
9. TOTAL DEPTH OF HOLE: 41.5	
10. SIZE AND TYPE OF BIT: 4-1/2" PA to 10 ft.; 3-7/8" RB to 40 ft.	
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL	
12. MANUFACTURER'S DESIGNATION OF DRILL: B-57	
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED: 17 / UNDISTURBED: 0
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER: 623.243 WS; 629.243 BCR, ACR	
16. DATE HOLE	STARTED: 6/10/05 / COMPLETED: 6/10/05
17. ELEVATION TOP OF HOLE: 635.243	
18. TOTAL CORE RECOVERY FOR BORING: %	
19. SIGNATURE OF INSPECTOR: [signature]	

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Fill: Silty clay, trace fine to medium sand and roots - brown - hard (CL)	5"	S-1	9-10-10 WC = 10.8 Qp = 4.5+ tsf
632.74	2.5					
			Fill: Silty clay, trace fine to coarse sand and wood - brown and black - hard (CL)	12"	S-2	2-4-4 WC = 14.9 Qp = 4.5+ tsf
			Sample 3: Plastic noted	1"	S-3	3-2-3 WC = 14.1 Qp = 4.5+ tsf
628.74	6.5					
			Silty clay, little fine to coarse sand, trace fine gravel and shale - gray - medium (CL)			
			LL=30% PL=11% PI=19%	18"	S-4	1-1-3 WC = 21.2 Qp = 0.5 tsf
625.24	10.0					
			Silty clay, little fine to coarse sand, trace fine gravel and shale - gray - very stiff to hard (CL)	12"	S-5	4-7-9 WC = 12.9 Qp = 2.0 tsf
			LL=21% PL=12% PI=9%	12"	S-6	2-4-6 WC = 12.3 Qp = 2.0 tsf

HOLE NO. L-37-21-05

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE 635.2

Hole No. L-37-21-05

PROJECT: Des Plaines River, IL Floodwall 37

INSTALLATION:

SHEET 2 OF 3 SHEETS

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Silty clay, little fine to coarse sand, trace fine gravel and shale - gray - very stiff to hard (CL)	12"	S-7	3-4-7 WC = 14.7 Qp = 2.75 tsf
				12"	S-8	2-4-6 WC = 14.3 Qp = 2.0 tsf
				12"	S-9	4-6-8 WC = 14.6 Qp = 4.5 tsf
612.74	22.5		Silt, little clay, trace fine to coarse sand - gray - very dense to dense - moist (ML)	18"	S-10	14-28-31 WC = 13.8
610.24	25.0		Silty clay, trace fine to coarse sand - gray (CL) LL=23% PL=14% PI=9%	18"	S-11	18-15-17 WC = 14.0 Qp = N/A
607.74	27.5		Silty clay, trace fine gravel, fine to coarse sand and shale - gray - very stiff to hard (CL)	12"	S-12	6-11-13 WC =13.7 Qp = 3.5 tsf
				12"	S-13	6-9-13 WC = 14.0 Qp = 4.5+ tsf
				12"	S-14	8-13-17 WC = 13.4 Qp = 4.5+ tsf

HOLE NO. L-37-21-05

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE 635.2

Hole No. L-37-21-05

PROJECT: Des Plaines River, IL Floodwall 37

INSTALLATION:

SHEET 3 OF 3 SHEETS

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Silty clay, trace fine gravel, fine to coarse sand and shale - gray - very stiff to hard (CL)			
			LL=31% PL=15% PI=16%	18"	S-15	8-14-17 WC = 14.2 Qp = 4.5+ tsf
				18"	S-16	6-13 WC = 15.0 Qp = 4.5+ tsf
				18"	S-17	9-13-21 WC = 10.2 Qp = 4.5+ tsf
593.74	41.5		End of Boring Borehole backfilled upon completion. Casing used: 11 ft. of 4 in. Automatic-Mobile hammer used for Standard Penetration Tests.			

HOLE NO. L-37-22-05

DRILLING LOG

DIVISION	
INSTALLATION	
SHEET	1 OF 3 SHEETS
1. PROJECT	Des Plaines River, IL Floodwall 37
JOB NUMBER	31130-A
2. LOCATION (Coordinates or Station)	Cook County, IL N 1982077.602 E 620600.273
3. DRILLING AGENCY	Subsurface Exploration, Inc.
4. HOLE NO. (As shown on drawing title and file number)	L-37-22-05
5. NAME OF DRILLER	Jack Lehtinen
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	41.5 ft.
8. DEPTH DRILLED INTO ROCK	
9. TOTAL DEPTH OF HOLE	41.5
10. SIZE AND TYPE OF BIT	4-1/2" PA to 7.5 ft.; 3-7/8" RB to 40.0'
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	MSL
12. MANUFACTURER'S DESIGNATION OF DRILL	B-57
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 17; UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	628.722 WS, BCR, ACR
16. DATE HOLE	STARTED 6/10/05; COMPLETED 6/10/05
17. ELEVATION TOP OF HOLE	637.722
18. TOTAL CORE RECOVERY FOR BORING	%
19. SIGNATURE OF INSPECTOR	

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
635.22	2.5		Fill: Clayey topsoil, little fine to coarse sand, trace roots - brown (CL-OL)	10"	S-1	3-5-5 WC = 15.6
632.72	5.0		Sandy clay, little silt - brown - hard (CL-SC)	7"	S-2	3-5-5 WC = 19.1 Qp = 4.5+
631.72	6.0		Fine to coarse sand, trace silt, clay and fine gravel - brown - medium dense - moist (SW) Gravel = 5.8%, Sand = 85.7%, Silt & Clay = 8.5%	12"	S-3	5-5-7 WC = 5.5
630.22	7.5		Clayey silt, trace fine to coarse sand - brown and gray - very stiff (CL-ML)	6"	S-3A	WC = 17.8 Qp = 2.0 tsf
629.22	8.5		Silty clay, trace fine gravel, fine to coarse sand and shale - grayish brown - hard (CL)	6"	S-4	6-5-10 WC = 13.1 Qp = 4.5 tsf
627.72	10.0		Fine to coarse sand, little fine gravel, trace shale - gray - loose - wet (SP) Sample 4A: Clay seam noted.	2"	S-4A	WC = 13.6
625.22	12.5		Silty clay, trace fine gravel, fine to coarse sand and shale - gray - very stiff (CL) LL=24% PL=12% PI=12%	14"	S-5	4-5-7 WC = 19.8 Qp = 3.5 tsf
622.72	15.0		Silt, trace fine sand - gray - dense - wet (ML)	12"	S-6	12-19-22 WC = 12.7

HOLE NO. L-37-22-05

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE 637.7

Hole No. L-37-22-05

PROJECT: Des Plaines River, IL Floodwall 37

INSTALLATION:

SHEET 2 OF 3 SHEETS

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
621.72	16.0		Silty clay, trace fine gravel, fine to coarse sand and shale - gray - stiff (CL) LL=24% PL=13% PI=11%	9"	S-7	10-8-5 WC = 13.0 Qp = 1.5 tsf
620.72	17.0		Silty clay, trace fine gravel, fine to coarse sand and shale - gray - hard (CL) LL=20% PL=12% PI=8%	6"	S-7A	WC = 10.9 Qp = 4.5+ tsf
			Silty clay, trace fine to medium sand and shale - gray - stiff to very stiff (CL)			
				18"	S-8	2-4-3 WC = 15.3 Qp = 1.0 tsf
			LL=25% PL=13% PI=12%	12"	S-9	1-5-6 WC = 14.6 Qp = 1.5 tsf
				12"	S-10	4-8-10 WC = 15.5 Qp = 2.5 tsf
612.72	25.0					
611.97	25.8		Fine to coarse sand, little silt, trace fine gravel and shale - gray - dense - wet (SP)	9"	S-11	18-37-43 WC = 12.7
			Silt, trace clay - gray - extremely dense to dense - moist (ML)	9"	S-11A	WC = 15.0
			LL=21% PL=18% PI=3%	12"	S-12	22-20-17 WC = 10.9
607.72	30.0					
			Silty clay, trace fine gravel, fine to coarse sand and shale - gray - hard (CL)	18"	S-13	5-10-14 WC = 11.9 Qp = 4.5+ tsf
				12"	S-14	20-24-23 WC = 11.4 Qp = 4.5+

HOLE NO. L-37-22-05

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE 637.7

Hole No. L-37-22-05

PROJECT: Des Plaines River, IL Floodwall 37

INSTALLATION:

SHEET 3 OF 3 SHEETS

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Silty clay, trace fine gravel, fine to coarse sand and shale - gray - hard (CL)			
				12"	S-15	12-19-33 WC = 16.6 Qp = 4.5+
600.22	37.5					
			Silt, little clay, trace fine sand - gray - dense - moist (ML)	16"	S-16	16-20-22 WC = 12.2
597.72	40.0					
			Silty clay, trace fine gravel, fine to coarse sand and shale - gray - hard (CL)	16"	S-17	11-24-29 WC = 10.0 QP = 4.5+
596.22	41.5					
			End of Boring Borehole backfilled upon completion. Casing used: 9 ft. of 4 in. Automatic-Mobile hammer used for Standard Penetration Tests.			

HOLE NO. L-37-23-05

DRILLING LOG

DIVISION	
INSTALLATION	
SHEET	1 OF 3 SHEETS
1. PROJECT	Des Plaines River, IL Floodwall 37
JOB NUMBER	31130-A
2. LOCATION (Coordinates or Station)	Cook County, IL N 1982472.554 E 618894.153
3. DRILLING AGENCY	Subsurface Exploration, Inc.
4. HOLE NO. (As shown on drawing title and file number)	L-37-23-05
5. NAME OF DRILLER	Dan Malouf
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	41.5 ft.
8. DEPTH DRILLED INTO ROCK	0.0 ft.
9. TOTAL DEPTH OF HOLE	41.5
10. SIZE AND TYPE OF BIT	4-1/2" PA to 7.5 ft.; 3-7/8" RB to 40.0'
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	MSL
12. MANUFACTURER'S DESIGNATION OF DRILL	B-57
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 17; UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	Dry to 630.938; 629.938 BCR
16. DATE HOLE	STARTED 6/15/05; COMPLETED 6/15/05
17. ELEVATION TOP OF HOLE	639.938
18. TOTAL CORE RECOVERY FOR BORING	%
19. SIGNATURE OF INSPECTOR	

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Fill: Silty clay, little fine to coarse sand - brown - hard to very stiff (CL)	11"	S-1	4-9-10 WC = 6.3 Qp = 4.5+ tsf
				12"	S-2	3-7-6 WC = 11.9 Qp = 3.0 tsf
634.94	5.0					
			Silty clay, trace fine to medium sand - brown - very stiff (CL)	17"	S-3	1-2-2 WC = 24.0 Qp = 2.0 tsf
			LL=41% PL=20% PI=21%	10"	S-4	2-2-3 WC = 22.3 Qp = 3.75 tsf
631.44	8.5					
			Fine to medium sand, little silt and clay, trace shale - gray - loose - saturated (SP-SM)	6"	S-4A	WC = 24.3
			Gravel=0.9%, Sand=88.4%, Silt & Clay=10.7%	10"	S-5	3-3-3 WC = 28.1
628.94	11.0					
			Silty clay, trace fine gravel, fine to medium sand and shale - gray - very stiff to stiff (CL)	4"	S-5A	WC = 14.7 Qp = 2.0 tsf
				15"`	S-6	2-3-4 WC = 14.3 Qp = 1.5 tsf

HOLE NO. L-37-23-05

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE 639.9

Hole No. L-37-23-05

PROJECT: Des Plaines River, IL Floodwall 37

INSTALLATION:

SHEET 2 OF 3 SHEETS

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Silty clay, trace fine gravel, fine to medium sand and shale - gray - very stiff to stiff (CL) LL=24% PL=13% PI=11%	15"	S-7	2-2-4 WC = 15.6 Qp = 2.5 tsf
				15"	S-8	3-5-8 WC = 17.1 Qp = 2.5 tsf
				12"	S-9	3-6-10 WC = 15.8 Qp = 3.5 tsf
				13"	S-10	5-5-9 WC = 17.6 Qp = 3.0 tsf
				12"	S-11	3-5-8 WC = 14.5 Qp = 3.0 tsf
612.44	27.5					
			Silty clay, trace fine gravel, fine to medium sand and shale - gray - hard (CL) LL=22% PL=12% PI=10%	7"	S-12	11-9-7 WC = 12.5 Qp = 4.5+ tsf
609.94	30.0					
			Fine to coarse sand, trace silt, fine gravel and shale - gray - medium dense - saturated (SP)	12"	S-13	3-6-7 WC = 26.2
608.94	31.0					
			Silty clay, trace fine gravel, fine to coarse sand and shale - gray - hard (CL) LL=26% PL=15% PI=11%	6"	S-13A	WC = 17.3 Qp = 4.5+ tsf
607.44	32.5					
			Fine to medium sand, trace silt and fine gravel - grayish brown - medium dense - moist to wet (SP)	15"	S-14	5-10-11 WC = 19.3
606.24	33.7					
			Silty clay, trace fine sand - gray - hard (CL)	4"	S-14A	WC = 14.8 Qp = 4.5+ tsf

HOLE NO. L-37-23-05

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE 639.9

Hole No. L-37-23-05

PROJECT: Des Plaines River, IL Floodwall 37

INSTALLATION:

SHEET 3 OF 3 SHEETS

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Silty clay, trace fine sand - gray - hard (CL)			
			LL=23% PL=14% PI=9%	15"	S-15	11-14-18 WC = 15.0 Qp = 4.5+ tsf
602.44	37.5					
			Silty clay, little fine to medium sand, trace fine gravel and shale - gray - hard (CL)	12"	S-16	20-25-30 WC = 15.8 Qp = 4.5+ tsf
				7"	S-17	11-11-15 WC = 15.0 Qp = 4.5+ tsf
598.44	41.5					
			End of Boring Borehole backfilled upon completion. Casing used: 10 ft. of 4 in. Automatic-Mobile hammer used for Standard Penetration Tests.			

HOLE NO. L-37-24-05

DRILLING LOG

DIVISION	
INSTALLATION	
SHEET	1 OF 3 SHEETS
1. PROJECT	Des Plaines River, IL Floodwall 37
JOB NUMBER	31130-A
2. LOCATION (Coordinates or Station)	Cook County, IL N 1982411.360 E 619126.820
3. DRILLING AGENCY	Subsurface Exploration, Inc.
4. HOLE NO. (As shown on drawing title and file number)	L-37-24-05
5. NAME OF DRILLER	Dan Malouf
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	40.5 ft.
8. DEPTH DRILLED INTO ROCK	0.0 ft.
9. TOTAL DEPTH OF HOLE	40.5
10. SIZE AND TYPE OF BIT	4-1/2" PA to 7.5 ft.; 3-7/8" RB to 39.0'
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	MSL
12. MANUFACTURER'S DESIGNATION OF DRILL	B-57
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 17 / UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	Dry to 630.500; 629.500 BCR
16. DATE HOLE	STARTED 6/13/05 / COMPLETED 6/13/05
17. ELEVATION TOP OF HOLE	639.500
18. TOTAL CORE RECOVERY FOR BORING	%
19. SIGNATURE OF INSPECTOR	

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Fill: Sandy topsoil, trace roots - brown	3"	S-1	4-7-10 WC = 9.5
638.00	1.5		Fill: Silty clay, little fine to coarse sand, trace fine gravel - brown - hard to stiff (CL)			
				15"	S-2	2-7-10 WC = 10.9 Qp = 4.5+ tsf
				15"	S-3	2-2-6 WC = 18.8 Qp = 1.5
632.00	7.5		Silty clay - gray - stiff to very stiff (CL) LL=29% PL=13% PI=16%	15"	S-4	3-4-6 WC = 25.2 Qp = 2.75 tsf
628.75	10.8		Gravel = 0.0%, Sand = 0.5%, Silt & Clay = 99.5%	6"	S-5	3-4-8 WC = 26.0 Qp = 2.75 tsf
			Clayey fine to medium sand, little fine gravel, trace shale - gray - medium - wet (SC)	6"	S-5A	WC = 29.8
627.00	12.5		Silty clay, trace fine sand - grayish brown - very stiff (CL) LL=47% PL=17% PI=30%	12"	S-6	3-5-7 WC = 25.2 Qp = 3.5 tsf
624.50	15.0					

HOLE NO. L-37-24-05

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE 639.5

Hole No. L-37-24-05

PROJECT: Des Plaines River, IL Floodwall 37

INSTALLATION:

SHEET 2 OF 3 SHEETS

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Fine to coarse sand, trace silt, fine gravel and shale - gray - medium dense - saturated (SP)	12"	S-7	5-6-7 WC = 20.5
622.00	17.5					
621.50	18.0		Silty clay, trace fine gravel, fine to coarse sand and shale - gray - very stiff (CL) LL=24% PL=13% PI=11%	5"	S-8	6-3-5 WC = 15.0 Qp = 3.25 tsf
			Fine to coarse sand, little clay, trace silt, fine gravel and shale - gray - loose - saturated (SP)	6"	S-8A	WC = 8.8
619.50	20.0					
			Silty clay, trace fine gravel, fine to coarse sand and shale - gray - very stiff (CL) LL=27% PL=15% PI=12%	11"	S-9	3-4-7 WC = 16.9 Qp = 2.75 tsf
617.00	22.5					
			Medium to coarse sand, trace silt and clay - gray - medium dense - saturated (SP)	3"	S-10	4-5-11 WC = 18.6
614.50	25.0					
			Silty clay, trace fine gravel, fine to coarse sand and shale - gray - hard (CL)	12"	S-11	14-14-17 WC = 11.7 Qp = 4.5+ tsf
612.00	27.5					
			Silty clay, trace fine sand and shale - gray - hard (CL) LL=23% PL=13% PI=10%	12"	S-12	6-9-13 WC = 11.9 Qp = 4.5+ tsf
				12"	S-13	13-18-19 WC = 13.0 Qp = 4.5+ tsf
				15"	S-14	10-16-24 WC = 12.9 Qp = 4.5+ tsf

HOLE NO. L-37-24-05

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE 639.5

Hole No. L-37-24-05

PROJECT: Des Plaines River, IL Floodwall 37

INSTALLATION:

SHEET 3 OF 3 SHEETS

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
604.50	35.0					
			Clayey silt, trace fine sand and shale - gray - dense to very dense - moist (CL-ML)	12"	S-15	13-20-27
				12"	S-16	20-29-36 WC = 14.8
600.50	39.0					
			Silty clay, trace fine gravel, fine to coarse sand and shale - gray - hard (CL)	12"	S-17	13-20-23 WC = 13.3 Qp = 4.5+ tsf
599.00	40.5					
			End of Boring Borehole backfilled upon completion. Casing used: 10 ft. of 4 in. Automatic-Mobile hammer used for Standard Penetration Tests.			

HOLE NO. L-37-25-05

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 3 SHEETS

1. PROJECT	Des Plaines River, IL Floodwall 37
JOB NUMBER	31130-A
2. LOCATION (Coordinates or Station)	Cook County, IL N 1982378.897 E 619282.594
3. DRILLING AGENCY	Subsurface Exploration, Inc.
4. HOLE NO. (As shown on drawing title and file number)	L-37-25-05
5. NAME OF DRILLER	Dan Malouf
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	41.5 ft.
8. DEPTH DRILLED INTO ROCK	0.0 ft.
9. TOTAL DEPTH OF HOLE	41.5
10. SIZE AND TYPE OF BIT	4-1/2" PA to 7.5 ft.; 3-7/8" RB to 40.0'
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	MSL
12. MANUFACTURER'S DESIGNATION OF DRILL	B-57
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 17; UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	Dry to 631.009; 632.009 BCR
16. DATE HOLE	STARTED 6/13/05; COMPLETED 6/13/05
17. ELEVATION TOP OF HOLE	640.009
18. TOTAL CORE RECOVERY FOR BORING	%
19. SIGNATURE OF INSPECTOR	

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Fill: Silty clay, little fine to coarse sand, trace fine gravel - brown - hard to very stiff (CL)	9"	S-1	3-6-7 WC = 10.9 Qp = 4.5+ tsf
				9"	S-2	3-8-8 WC = 11.6 Qp = 4.5+ psf
				9"	S-3	2-5-4 WC = 13.0 Qp = 2.0 tsf
632.51	7.5		Silty clay, trace fine gravel, fine to medium sand and shale - gray - stiff to very stiff (CL)	15"	S-4	2-2-4 WC = 28.4 Qp = 1.25 tsf
				9"	S-5	3-4-7 WC = 25.1 Qp = 2.75 tsf
627.51	12.5		Fine to coarse sand, little fine to medium gravel, trace silt - gray - medium dense - saturated (SW)	7"	S-6	11-12-13 WC = 9.8

HOLE NO. L-37-25-05

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE 640.0

Hole No. L-37-25-05

PROJECT: Des Plaines River, IL Floodwall 37

INSTALLATION:

SHEET 2 OF 3 SHEETS

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Fine to coarse sand, little fine to medium gravel, trace silt - gray - medium dense - saturated (SW)	3"	S-7	2-9-7 WC = 17.8
622.51	17.5					
622.01	18.0		Silty clay, little fine gravel, trace coarse gravel and fine to coarse sand - gray (CL)	5"	S-8	5-8-4 WC = 17.8
621.81	18.2		Sample 8 disturbed by large gravel. LL=25% PL=14% PI=11%	2"	S-8A	WC = 11.7
			Fine gravel, some fine to coarse sand, little silt and clay - gray- medium dense - saturated (GP-GM)	5"	S-8B	WC = 17.3
			Silty clay, little fine to coarse sand, trace fine to coarse gravel and shale - gray - very stiff (CL) Sample 8B is disturbed by gravel. LL=28% PL=13% PI=15%	15"	S-9	3-6-10 WC = 16.0 Qp = 2.5 tsf
				11"	S-10	4-8-10 WC = 16.0 Qp = 2.75 tsf
615.01	25.0		Clayey silt, trace fine sand and shale - gray - very dense - moist (CL-ML) LL=22% PL=15% PI=7%	12"	S-11	38-33-57 Wc = 16.2
612.51	27.5		Silty clay, trace fine gravel, fine to coarse sand and shale - gray- hard (CL)	11"	S-12	9-18-20 WC = 14.1 Qp = 4.5+ tsf
				12"	S-13	8-12-17 WC = 12.5 Qp = 4.5+ tsf
			LL=25% PL=14% PI=11%	11"	S-14	11-15-25 WC = 15.3 Qp = 4.5+ tsf

HOLE NO. L-37-25-05

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE 640.0

Hole No. L-37-25-05

PROJECT: Des Plaines River, IL Floodwall 37

INSTALLATION:

SHEET 3 OF 3 SHEETS

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Silty clay, trace fine gravel, fine to coarse sand and shale - gray- hard (CL)			
				18"	S-15	17-47-35 WC = 9.7 Qp = 4.5+ tsf
			LL=26% PL=13% PI=13%	18"	S-16	10-14-20 WC = 15.9 Qp = 4.5+ tsf
				18"	S-17	7-12-16 WC = 14.0 Qp = 4.5+ tsf
598.51	41.5		End of Boring Borehole backfilled upon completion. Casing used: 10 ft. of 4 in. Automatic-Mobile hammer used for Standard Penetration Tests.			

HOLE NO. L-37-26-05

DRILLING LOG

DIVISION	
INSTALLATION	
SHEET	1 OF 3 SHEETS
1. PROJECT	Des Plaines River, IL Floodwall 37
JOB NUMBER	31130-A
2. LOCATION (Coordinates or Station)	Cook County, IL N 1982353.373 E 619463.873
3. DRILLING AGENCY	Subsurface Exploration, Inc.
4. HOLE NO. (As shown on drawing title and file number)	L-37-26-05
5. NAME OF DRILLER	Dan Malouf
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	41.5 ft.
8. DEPTH DRILLED INTO ROCK	0.0 ft.
9. TOTAL DEPTH OF HOLE	41.5
10. SIZE AND TYPE OF BIT	4-1/2" PA to 7.5 ft.; 3-7/8" RB to 40.0'
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	MSL
12. MANUFACTURER'S DESIGNATION OF DRILL	B-57
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 17 / UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	Dry to 635.315; 636.815 BCR
16. DATE HOLE	STARTED 6/16/05 / COMPLETED 6/16/05
17. ELEVATION TOP OF HOLE	642.815
18. TOTAL CORE RECOVERY FOR BORING	%
19. SIGNATURE OF INSPECTOR	

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Fill: Silty clay, little fine to coarse sand, trace fine gravel - brown and dark brown - hard (CL) Sample 1: Trace roots noted.	12"	S-1	3-7-8 WC = 8.3 Qp = 4.5+ tsf
				12"	S-2	4-4-6 WC = 16.2 Qp = 4.5+ tsf
			Sample 3: Trace wood and topsoil noted.	10"	S-3	1-2-3 WC = 13.9 Qp = 4.0 tsf
636.82	6.0		Silty clay, trace fine gravel and fine to coarse sand - brown - very stiff (CL)	5"	S-3A	WC = 19.6 Qp = 2.0 tsf
			LL=40% PL=18% PI=22%	15"	S-4	2-4-5 WC = 22.8 Qp = 4.0 tsf
				15"	S-5	2-4-5 WC = 29.8 Qp = 3.5 tsf
630.32	12.5		Sandy fine to medium gravel, little clay, trace silt - gray - medium dense - saturated (GP)	1"	S-6	7-9-14 WC = 25.5
627.82	15.0					

HOLE NO. L-37-26-05

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE 642.8

Hole No. L-37-26-05

PROJECT: Des Plaines River, IL Floodwall 37

INSTALLATION:

SHEET 2 OF 3 SHEETS

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
627.32	15.5		Silty clay, trace fine sand and shale - gray - hard (CL) LL=28% PL=14% PI=14%	6"	S-7	5-11-14 WC = 20.3 Qp = 4.5 tsf
			Silt, trace fine sand, trace clay - gray - medium dense to loose - saturated (ML)	9"	S-7A	WC = 22.1
			LL=20% PL=19% PI=1% Gravel = 0.0%, Sand = 1.6%, Silt & Clay = 98.4%	11"	S-8	3-3-3 WC = 24.8
622.32	20.5			4"	S-9	5-2-3 WC = 21.2
			Silty clay, trace fine gravel, fine to medium sand and shale - gray - medium (CL)	7"	S-9A	WC = 15.5 Qp = 0.5 tsf
			LL=22% PL=12% PI=10%	6"	S-10	3-6-8 WC = 16.7 Qu = .75 tsf
617.82	25.0		Silty clay, trace fine gravel, fine to coarse sand and shale - gray - hard (CL)	12"	S-11	5-8-12 WC = 16.2 Qp = 4.0 tsf
				13"	S-12	4-8-15 WC = 14.9 Qp = 4.5 tsf
				11"	S-13	9-13-14 WC = 12.0 Qp = 4.5+ tsf
				15"	S-14	11-15-17 WC = 12.1 Qp = 4.5+ tsf

HOLE NO. L-37-26-05

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE 642.8

Hole No. L-37-26-05

PROJECT: Des Plaines River, IL Floodwall 37

INSTALLATION:

SHEET 3 OF 3 SHEETS

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Silty clay, trace fine gravel, fine to coarse sand and shale - gray - hard (CL)			
			LL=28% PL=15% PI=13%	12"	S-15	11-19-27 WC = 13.4 Qp = 4.5+
				13"	S-16	12-24-26 WC = 12.7 Qp = 4.5+ tsf
				15"	S-17	10-15-20 WC = 13.5 Qp = 4.5+ tsf
601.32	41.5		End of Boring Borehole backfilled upon completion. Casing used: 10 ft. of 4 in. Automatic-Mobile hammer used for Standard Penetration Tests.			

HOLE NO. L-37-27-05

DRILLING LOG

DIVISION	
INSTALLATION	
SHEET	1 OF 3 SHEETS
1. PROJECT	Des Plaines River, IL Floodwall 37
JOB NUMBER	31130-A
2. LOCATION (Coordinates or Station)	Cook County, IL N 1982449.143 E 620251.951
3. DRILLING AGENCY	Subsurface Exploration, Inc.
4. HOLE NO. (As shown on drawing title and file number)	L-37-27-05
5. NAME OF DRILLER	Dan Malouf
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	40.5 ft.
8. DEPTH DRILLED INTO ROCK	
9. TOTAL DEPTH OF HOLE	40.5
10. SIZE AND TYPE OF BIT	4-1/2" PA to 7.5 ft.; 3-7/8" RB to 40.5'
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	MSL
12. MANUFACTURER'S DESIGNATION OF DRILL	D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 17; UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	See end of Boring Log
16. DATE HOLE	STARTED 6/14/05; COMPLETED 6/14/05
17. ELEVATION TOP OF HOLE	640.123
18. TOTAL CORE RECOVERY FOR BORING	%
19. SIGNATURE OF INSPECTOR	Ryan Red

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
639.87	0.3		Fill: Fine to medium gravel (crushed asphalt), little fine to coarse sand (GP)			
			Fill: Silty clay, little fine to coarse sand - dark brown - hard to stiff (CL)	12"	S-1	6-6-6 WC = 12.1 Qp = 4.5+ tsf
				18"	S-2	5-9-7 WC = 18.8 Qp = 2.0 tsf
				15"	S-3	3-4-5 WC = 14.0 Qp = 4.0 tsf
				18"	S-4	3-3-4 WC = 12.1 Qp = 1.75 tsf
630.12	10.0		Silty clay, trace fine to medium sand - brownish gray - medium (CL)	6"	S-5	2-3-4 WC = 28.2 Qp = 0.5 tsf
627.62	12.5		Fine to medium sand, little silt and clay - gray - medium dense - saturated (SM) Gravel = 0.0%, Sand = 82.8%, Silt & Clay = 17.2%	12"	S-6	3-7-10 WC = 22.4
626.12	14.0		Clayey silt, trace fine sand and shale - gray - medium dense - moist (CL-ML)			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (modified by GCA 1/94)

PROJECT Des Plaines River, IL Floodwall 37 HOLE NO. L-37-27-05

HOLE NO. L-37-27-05

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE 640.1

Hole No. L-37-27-05

PROJECT: Des Plaines River, IL Floodwall 37

INSTALLATION:

SHEET 2 OF 3 SHEETS

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Clayey silt, trace fine sand and shale - gray - medium dense - moist (CL-ML)	15"	S-7	7-12-13 WC = 14.6
			LL=18% PL=13% PI=5%	15"	S-8	4-6-7 WC = 15.4
620.12	20.0					
			Silty clay, trace fine gravel, fine to coarse sand and shale - gray - stiff to hard (CL)	15"	S-9	3-4-7 WC = 15.5 Qp = 1.75 tsf
			LL=30% PL=13% PI=17%	15"	S-10	7-12-14 WC = 15.4 Qp = 4.0 tsf
				12"	S-11	7-11-18 WC = 16.1 Qp = 4.5 tsf
612.62	27.5					
			Silty clay to clayey silt - gray - dense - moist to wet (CL-ML) Sample 12: Fine to medium sand in lower tip. LL=19% PL=13% PI=6%	18"	S-12	19-24-20 WC = 18.7
610.12	30.0					
			Silty clay, trace fine to coarse gravel, fine to coarse sand and shale - gray - hard (CL)	18"	S-13	9-12-19 WC = 12.7 Qp = 4.5+ tsf
			LL=22% PL=14% PI=8%	18"	S-14	18-23-25 WC = 12.7 Qp = 4.5+ tsf

HOLE NO. L-37-27-05

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE 640.1

Hole No. L-37-27-05

PROJECT: Des Plaines River, IL Floodwall 37

INSTALLATION:

SHEET 3 OF 3 SHEETS

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Silty clay, trace fine to coarse gravel, fine to coarse sand and shale - gray - hard (CL)			
				12"	S-15	14-23-41 WC = 15.0 Qp = 4.5+ tsf
604.12	36.0					
			Silt, trace clay - gray - extremely dense - moist to wet (ML)	5"	S-15A	WC = 19.8
602.62	37.5					
			Silty clay, trace fine gravel, fine to coarse sand and shale - gray - hard (CL) LL=30% PL=15% PI=15%	15"	S-16	12-21-28 WC = 15.5 Qp = 4.5+ tsf 75% mud loss drilling from 37.5 to 39.0 ft.
				15"	S-17	24-35-42 WC = 10.8 Qp = 4.5+ tsf
599.62	40.5					
			End of Boring Borehole backfilled upon completion. Casing used: 10 ft. of 4 in. Automatic-Diedrich hammer used for Standard Penetration Tests. Dry to 631.123, 628.123 BCR, 629.123 ACR WCI @ 630.12 24 hrs. AB			

HOLE NO. L-37-28-05

DRILLING LOG

DIVISION	
INSTALLATION	
SHEET	1 OF 3 SHEETS
1. PROJECT	Des Plaines River, IL Floodwall 37
JOB NUMBER	31130-A
2. LOCATION (Coordinates or Station)	Cook County, IL N 1982476.035 E 620406.261
3. DRILLING AGENCY	Subsurface Exploration, Inc.
4. HOLE NO. (As shown on drawing title and file number)	L-37-28-05
5. NAME OF DRILLER	Dan Malouf
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	41.5 ft.
8. DEPTH DRILLED INTO ROCK	
9. TOTAL DEPTH OF HOLE	41.5
10. SIZE AND TYPE OF BIT	4-1/2" PA to 10 ft.; 3-7/8" RB to 40.0'
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	MSL
12. MANUFACTURER'S DESIGNATION OF DRILL	D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 17; UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	629.575 WD; 636.575 BCR
16. DATE HOLE	STARTED 5/15/05; COMPLETED 6/15/05
17. ELEVATION TOP OF HOLE	639.575
18. TOTAL CORE RECOVERY FOR BORING	%
19. SIGNATURE OF INSPECTOR	

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
639.08	0.5		Fill: Clayey topsoil, trace fine to medium sand and roots - black (CL-OL)	6"	S-1	3-6-9 WC = 21.3
			Fill: Silty clay, trace fine gravel and fine to coarse sand - brown - hard (CL)	6"	S-1A	WC = 12.2 Qp = 4.5+ tsf
637.08	2.5					
			Silty clay, little fine to coarse sand, trace fine gravel and shale - brown and gray - very stiff to stiff (CL)	18"	S-2	3-4-5 WC = 16.9 Qp = 3.5 tsf
				18"	S-3	3-5-7 WC = 20.3 Qp = 3.5 tsf
			Gravel = 3.8%, Sand = 19.4%, Silt & Clay = 76.8%	6"	S-4	6-12-17 WC = 12.9 Qp = 1.5 tsf
631.58	8.0					
			Fine to medium sand, trace silt, fine gravel, coarse sand and shale - brown - medium dense - moist (SP)	12"	S-4A	WC = 5.2
629.58	10.0					
629.08	10.5		Fine to medium sand, trace silt and clay - gray - medium dense - wet (SP)	6"	S-5	7-7-7 WC = 15.3
			Silty clay, trace fine gravel, fine to coarse sand and shale - brownish gray to gray - hard (CL)	12"	S-5A	WC = 14.2 Qp = 4.5+ tsf
			LL=27% PL=15% PI=12%	6"	S-6	6-8-13 WC = 18.4 Qp = 4.0 tsf
626.58	13.0					
			Fine to medium sand, trace silt - gray-medium dense - saturated (SP)	6"	S-6A	WC = 17.5
624.58	15.0					

HOLE NO. L-37-28-05

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE 639.6

Hole No. L-37-28-05

PROJECT: Des Plaines River, IL Floodwall 37

INSTALLATION:

SHEET 2 OF 3 SHEETS

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Clayey silt, trace fine sand - gray - hard (CL-ML)	18"	S-7	10-13-13 WC = 14.0 Qp = 4.25 tsf
622.08	17.5					
			Silty clay, little fine to coarse sand, trace fine gravel and shale - gray - very stiff (CL) LL=23% PL=13% PI=10%	12"	S-8	5-6-10 WC = 13.8 Qp = 2.75 tsf
621.08	18.5					
			Fine to medium sand, little coarse sand, trace silt and fine gravel - gray - medium dense - saturated (SP)	6"	S-8A	WC = 15.3
619.58	20.0					
			Silty clay, trace fine gravel, fine to medium sand and shale - gray - very stiff to hard (CL)	18"	S-9	3-5-6 WC = 15.3 Qp = 2.0 tsf
			LL=28% PL=14% PI=14%	18"	S-10	5-8-11 WC = 14.9 Qp = 4.5+ tsf
				18"	S-11	8-12-24 WC = 14.1 Qp = 4.5+ tsf
613.08	26.5					
			Silt, little clay - gray - extremely dense - moist to wet (ML)			
			LL=20% PL=17% PI=3%	18"	S-12	28-48-60 WC = 16.6
609.58	30.0					
			Silty clay to clayey silt, trace fine gravel, fine to coarse sand and shale - gray- hard (CL-ML)	18"	S-13	10-15-20 WC = 12.7 Qp = 4.5+ tsf
			LL=21% PL=16% PI=5%	18"	S-14	16-26-30 WC = 11.9 Qp = 4.5+ tsf

HOLE NO. L-37-28-05

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE 639.6

Hole No. L-37-28-05

PROJECT: Des Plaines River, IL Floodwall 37

INSTALLATION:

SHEET 3 OF 3 SHEETS

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Silty clay to clayey silt, trace fine gravel, fine to coarse sand and shale - gray- hard (CL-ML)			
				18"	S-15	11-18-23 WC = 15.2 Qp = 4.5+ tsf
				18"	S-16	12-19-24 WC = 13.7 Qp = 4.5+ tsf
600.58	39.0		Clayey silt, trace fine gravel, fine to coarse sand and shale - gray - hard (CL-ML)			
				6"	S-17	15-28-28 WC = 15.1 Qp = 4.5+ tsf
598.08	41.5		End of Boring Borehole backfilled upon completion. Casing used: 10 ft. of 4 in. Automatic-Diedrich hammer used for Standard Penetration Tests.			

DRILLING LOG

HOLE NO. L-37-29-06

DIVISION

INSTALLATION

SHEET 1 OF 3 SHEETS

1. PROJECT: Des Plaines River, IL Floodwall 37
JOB NUMBER: 200701129
2. LOCATION (Coordinates or Station): Cook County, Illinois N1980138.0535 E1105334.0530
3. DRILLING AGENCY: Subsurface Exploration, Inc.
4. HOLE NO. (As shown on drawing title and file number): L-37-29-06
5. NAME OF DRILLER: Baker
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: 51.5
8. DEPTH DRILLED INTO ROCK: 0.0
9. TOTAL DEPTH OF HOLE: 51.5
10. SIZE AND TYPE OF BIT: 4-1/2" PA to 15'; 3-7/8" RB to 50'
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
12. MANUFACTURER'S DESIGNATION OF DRILL: Mobile B-61
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 21, UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES: 0
15. ELEVATION GROUND WATER: See End of Boring Log
16. DATE HOLE: STARTED 9/19/07, COMPLETED 9/19/07
17. ELEVATION TOP OF HOLE: 632.755
18. TOTAL CORE RECOVERY FOR BORING: %
19. SIGNATURE OF INSPECTOR: [signature]

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
632.46	0.3		Bituminous concrete pavement			
631.76	1.0		Portland cement concrete			
			Fill: Gravelly fine to coarse sand, trace silt and clay - brown - loose - moist (SP)	3"	~~S-1 1.0-1.25~~	2-3-3-4
630.26	2.5			12"	S-1A 1.25-3.0	WC = 18.8%
			Fill: Silty clay, trace gravel and sand - brown - very stiff to soft (CL)	15"	S-2 3.0-5.0	3-3-4-3 WC = 26.6% Qp = 2.0 tsf
				12"	S-3 5.0-7.0	1-2-2-3 WC = 17.3% Qp = 1.0 tsf
624.26	8.5			12"	S-4 7.5-8.5	4-5-4-5 WC = 19.1% Qp = 0.25 tsf
			Clayey sand, little gravel - loose - moist (SC)	12"	S-4A 8.5-9.5	WC = 8.7%
622.76	10.0		Silty clay, trace sand and shale - gray - hard (CL)	18"	S-5 10.0-11.5	6-9-7 WC = 16.5% Qp = 4.5+ tsf
620.26	12.5					
619.76	13.0		Fine to medium sand, trace silt and gravel - gray - saturated (SP)	6"	S-6 12.5-13.0	8-10-14 WC = 16.2%
			Sandy silt, trace clay - gray - medium dense - saturated (ML) Gravel=0%, Sand=21.7%, Silt & Clay=83.7%	12"	S-6A 13.0-14.0	

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (modified by GCA 1/94)

PROJECT: Des Plaines River, IL Floodwall 37 HOLE NO. L-37-29-06

HOLE NO. L-37-29-06

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE 632.755

Hole No. L-37-29-06

PROJECT: Des Plaines River, IL Floodwall 37

INSTALLATION:

SHEET 2 OF 3 SHEETS

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Sandy silt, trace clay - gray - medium dense - saturated (ML)	15"	S-7 15.0-16.5	12-14-10 WC = 17.8%
615.26	17.5		Silty clay, trace sand and shale - gray - stiff to hard (CL)	18"	S-8 17.5-19.0	3-4-7 WC = 14.9% Qp = 1.0 tsf
				18"	S-9 20.0-21.5	6-12-16 WC = 12.3% Qp = 2.0 tsf
				15"	S-10 22.5-24.0	5-9-19 WC = 13.6% Qp = 4.5+ tsf
607.76	25.0		Silt, little clay, trace sand and shale - gray - medium dense to dense - saturated (ML) LL=20, PL=14, PI=6	18"	S-11 25.0-26.5	9-14-17 WC = 22.3%
				18"	S-12 27.5-29.0	8-13-11 WC = 17.0%
				18"	S-13 30.0-31.5	12-16-13 WC = 21.7%
				18"	S-14 32.5-34.0	12-19-14 WC = 17.7%

HOLE NO. L-37-29-06

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE 632.755

Hole No. L-37-29-06

PROJECT: Des Plaines River, IL Floodwall 37

INSTALLATION:

SHEET 3 OF 3 SHEETS

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Silt, little clay, trace sand and shale - gray - medium dense to dense - saturated (ML)			
				18"	S-15 35.0-36.5	14-17-9 WC = 22.5%
				18"	S-16 37.5-39.0	9-11-11 WC = 15.2%
593.26	39.5					
			Silty clay, trace sand and shale - gray - hard (CL)			
				18"	S-17 40.0-41.5	9-10-13 WC = 14.4% Qp = 4.5+ tsf
				18"	S-18 42.5-44.0	7-10-13 WC = 15.4% Qp = 4.5+ tsf
				18"	S-19 45.0-46.5	5-13-19 WC = 10.0% Qp = 4.5+ tsf
				18"	S-20 47.5-49.0	12-15-26 WC = 10.2% Qp = 4.5+ tsf
				18"	S-21 50.0-51.5	10-19-32 WC = 12.1% Qp = 4.5+ tsf
581.26	51.5					
			End of Boring Borehole grouted upon completion. Casing used: 15 ft. of 4 in. Automatic-Mobile hammer used for Standard Penetration Tests. Elevation Groundwater 624.255 WS; 614.755 BCR; 614.755 ACR; 620.755 @ 24 hrs. AB			WS = While Sampling BCR = Before Casing Recovery ACR = After Casing Recovery 24 hrs. AB = 24 hrs. After Boring

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (modified by GCA 1/94)

PROJECT: Des Plaines River, IL Floodwall 37 HOLE NO. L-37-29-06

HOLE NO. L-37-30-06

DRILLING LOG

DIVISION	
INSTALLATION	
SHEET	1 OF 3 SHEETS
1. PROJECT	Des Plaines River, IL Floodwall 37
JOB NUMBER	200701129
2. LOCATION (Coordinates or Station)	Cook County, Illinois N1981117.0720 E1105216.0640
3. DRILLING AGENCY	Subsurface Exploration, Inc.
4. HOLE NO. (As shown on drawing title and file number)	L-37-30-06
5. NAME OF DRILLER	Baker
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	51.5
8. DEPTH DRILLED INTO ROCK	0.0
9. TOTAL DEPTH OF HOLE	51.5
10. SIZE AND TYPE OF BIT	4-1/2" PA to 15'; 3-7/8" RB to 50'
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	MSL
12. MANUFACTURER'S DESIGNATION OF DRILL	Mobile B-61
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 21; UNDISTURBED --
14. TOTAL NUMBER CORE BOXES	--
15. ELEVATION GROUND WATER	See End of Boring Log
16. DATE HOLE	STARTED 9/20/07; COMPLETED 9/20/07
17. ELEVATION TOP OF HOLE	638.341
18. TOTAL CORE RECOVERY FOR BORING	%
19. SIGNATURE OF INSPECTOR	

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
638.09	0.3		Bituminous concrete pavement			
637.34	1.0		Portland cement concrete			
635.84	2.5		Fill: Fine to coarse sand, trace silt and gravelly clay - brown - loose - moist (SP)	15"	S-1 1.0-2.5	7-4-4
631.84	6.5		Fill: Silty clay, little sand, trace gravel - brown - soft (CL) Petroleum odor noted.	12"	S-2 2.5-4.5	12-8-4-6 WC = 22.6% Qp = 0.25 tsf
				18"	S-3 5.0-6.5	3-7-7-8 WC = 15.7% Qp = 0.25 tsf
628.34	10.0		Silty clay, trace sand and shale - brown and gray - hard (CL)	6"	S-3A 6.5-7.0	WC = 19.2% Qp = 4.5+ tsf
				18"	S-4 7.5-9.0	7-9-14 WC = 19.9% Qp = 4.5+ tsf
625.84	12.5		Fine to medium sand, trace silt and gravel - gray and black -loose (SP) Petroleum odor noted.	24"	S-5 10.0-12.0	3-3-3-5
			Silt, trace clay and sand - gray - loose to medium dense - saturated (ML)	12"	S-6 12.5-14.5	2-2-2-2

HOLE NO. L-37-30-06

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE 638.341

Hole No. L-37-30-06

PROJECT: Des Plaines River, IL Floodwall 37

INSTALLATION:

SHEET 2 OF 3 SHEETS

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Silt, trace clay and sand - gray - loose to medium dense - saturated (ML)	15"	S-7 15.0-17.0	2-5-5-7 WC = 16.9%
620.84	17.5					
			Silty clay, trace sand and shale - gray - stiff to hard (CL)	15"	S-8 17.5-19.0	5-1-5 WC = 15.0% Qp = 1.75 tsf
				15"	S-9 20.0-21.5	5-8-14 WC = 13.7% Qp = 4.5+ tsf
			LL=29, PL=14, PI=15	15"	S-10 22.5-24.0	8-7-10 WC = 15.8% Qp = 4.5+ tsf
			LL=25, PL=14, PI=11	18"	S-11 25.0-26.5	7-10-16 WC = 15.8% Qp = 4.5+ tsf
611.34	27.0					
			Silt, little clay, trace sand - gray - dense (ML)	18"	S-12 27.5-29.0	10-18-22 WC = 16.4%
608.34	30.0					
			Silty clay, trace sand and shale - gray - hard (CL)	12"	S-13 30.0-31.5	5-8-8 WC = 15.0% Qp = 4.5+ tsf
				15"	S-14 32.5-34.0	8-10-13 WC = 14.8% Qp = 4.5+ tsf

HOLE NO. L-37-30-06

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE 638.341

Hole No. L-37-30-06

PROJECT: Des Plaines River, IL Floodwall 37

INSTALLATION:

SHEET 3 OF 3 SHEETS

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Silty clay, trace sand and shale - gray - hard (CL)			
				12"	S-15 35.0-36.5	8-16-25 WC = 12.2% Qp = 4.5+ tsf
				18"	S-16 37.5-39.0	9-11-11 WC = 13.7% Qp = 4.5+ tsf
				18"	S-17 40.0-41.5	9-10-13 WC = 12.3% Qp = 4.5+ tsf
				18"	S-18 42.5-44	7-10-13 WC = 11.9% Qp = 4.5+ tsf
				18"	S-19 45.0-46.5	5-13-19 WC = 12.3% Qp = 4.5+ tsf
				18"	S-20 47.5-49.0	12-15-26 WC = 9.8% Qp = 4.5+ tsf
				18"	S-21 50.0-51.5	10-19-32 WC = 12.3% Qp = 4.5+ tsf
586.84	51.5		End of Boring Borehole grouted upon completion. Casing used: 10 ft. of 4 in. Automatic-Mobile hammer used for Standard Penetration Tests. Elevation Groundwater 628.241 WS; 619.841 BCR; 619.841 ACR; 628.841 @ 24 hrs. AB			WS = While Sampling BCR = Before Casing Recovery ACR = After Casing Recovery 24 hrs. AB = 24 hrs. After Boring

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (modified by GCA 1/94)

PROJECT: Des Plaines River, IL Floodwall 37 | HOLE NO. L-37-30-06

Hole No. DPRL-5

DRILLING LOG

DIVISION	North Central
INSTALLATION	Chicago District
SHEET	1 OF 1 SHEETS
1. PROJECT	Des Plaines River Levee - 5235.10
2. LOCATION (Coordinates or Station)	Levee 37 N 1981370 E 620859
3. DRILLING AGENCY	Patrick Drilling
4. HOLE NO. (As shown on drawing title and file number)	DPRL-5
5. NAME OF DRILLER	Jerry Copak
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED 0.0 DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	15.0
8. DEPTH DRILLED INTO ROCK	0.0
9. TOTAL DEPTH OF HOLE	15.0
10. SIZE AND TYPE OF BIT	3 1/4" I.D. HSA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	MSL
12. MANUFACTURER'S DESIGNATION OF DRILL	CME 55
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 8 / UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	N/A
15. ELEVATION GROUND WATER	
16. DATE HOLE	STARTED JUN 16 97 / COMPLETED JUN 16 97
17. ELEVATION TOP OF HOLE	637.7
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Brown to black silty CLAY, trace coarse to fine sand, moist, topsoil -FILL- CL		AU-1 0.0 1.0	2" split-spoon samples were obtained using a 140 lb. hammer falling 30 inches.
636.7	1.0		Very stiff brown silty CLAY, some coarse to fine sand, little fine gravel, trace organics, low plasticity, moist -FILL- CL	18/24"	SS-2 1.0 3.0	3/4/6/9 qu* = 3.0tsf LL = 27 PL = 14 Moisture Content = 16.0%
634.9	2.8		Stiff brown silty CLAY, little coarse to fine sand, trace organics, medium plasticity, wet -FILL- CL	12/24"	SS-3 3.0 5.0	3/4/7/7 qu* = 1.8tsf Moisture Content = 22.0%
633.2	4.5		Stiff brown silty CLAY, some coarse to fine sand, little coarse to fine gravel, trace organics, low plasticity, wet -FILL- CL	18/24"	SS-4A/B 5.0 7.0	4/7/14/15 SS-4A: Moisture Content = 22.3% Gravel = 16.6% Sand = 25.5% Fines = 57.9% SS-4B: qu* > 4.5tsf LL = 37 PL = 17 Gravel = 0.0% Sand = 13.3% Silt = 43.0% Clay = 43.7%
632.2	5.5		Hard gray silty CLAY, trace coarse to fine sand, medium plasticity, moist CL	18/24"	SS-5A/B 7.0 9.0	7/8/9/16 SS-5A: Moisture Content = 17.2% qu* > 4.5tsf SS-5B: Moisture Content = 14.7% Gravel = 0.6% Sand = 82.7% Fines = 16.7%
629.4	8.3		Medium dense gray coarse to fine SAND, little silt, moist SM	24/24"	SS-6 9.0 11.0	4/9/13/17
628.9	8.8		Medium dense gray SILT, trace clay, trace medium to fine sand, moist ML	24/24"	SS-7 11.0 13.0	6/11/11/14 Moisture Content = 16.6%
				18/24"	SS-8 13.0 15.0	6/11/11/14
622.7	15.0		End of Boring at 15.0'.			Borehole backfilled with granular bentonite.

D-9-14

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (modified by USACE 1993)

PROJECT: Des Plaines River Levee - 5235.10 | HOLE NO. -DPRL-5

Hole No. DPRL-6

DRILLING LOG

DIVISION	North Central
INSTALLATION	Chicago District
SHEET	1 OF 1 SHEETS
1. PROJECT	Des Plaines River Levee - 5235.10
2. LOCATION (Coordinates or Station)	Levee 37 N 1979028 E 620340
3. DRILLING AGENCY	Patrick Drilling
4. HOLE NO. (As shown on drawing title and file number)	DPRL-6
5. NAME OF DRILLER	Jerry Copak
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED 0.0 DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	15.0
8. DEPTH DRILLED INTO ROCK	0.0
9. TOTAL DEPTH OF HOLE	15.0
10. SIZE AND TYPE OF BIT	3 1/4" I.D. HSA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	MSL
12. MANUFACTURER'S DESIGNATION OF DRILL	CME 55
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 8 / UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	N/A
15. ELEVATION GROUND WATER	626.0
16. DATE HOLE	STARTED JUN 16 97 / COMPLETED JUN 16 97
17. ELEVATION TOP OF HOLE	634.5
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Dark brown SILT, trace clay, trace organics, moist, topsoil -FILL- ML		AU-1 0.0 1.0	2" split-spoon samples were obtained using a 140 lb. hammer falling 30 inches.
633.0	1.5		Very stiff brown silty CLAY and coarse to fine sand, low plasticity, moist -FILL- CL	14/24"	SS-2 1.0 3.0	4/6/11/12 qu* = 3.4tsf
				6/24"	SS-3 3.0 5.0	9/11/15/18 Coarse gravel in spoon tip. Moisture Content = 15.4%
630.2	4.3		Hard gravish brown silty CLAY, trace medium to fine sand, high plasticity, wet CH	24/24"	SS-4 5.0 7.0	9/11/16/21 Moisture Content = 21.7% qu* = 4.25tsf LL = 50 PL = 21
627.3	7.2		Very stiff to medium stiff gray SILT and clay, trace medium to fine sand, low plasticity, wet ML	18/24"	SS-5 7.0 9.0	9/11/14/14 qu* = 0.8tsf
				24/24"	SS-6 9.0 11.0	Water level approximately 8.5' after 18 hours with approximately 4.0' of cave-in. 6/9/11/12 qu* = 1.8tsf Moisture Content = 22.0%
				24/24"	SS-7 11.0 13.0	4/6/9/11 qu* = 1.75tsf Gravel = 0.0% Sand = 6.9% Silt = 72.6% Clay = 20.5%
				24/24"	SS-8 13.0 15.0	4/7/11/14 qu* = 2.5tsf Moisture Content = 13.0%
619.5	15.0		End of Boring at 15.0'.			Borehole backfilled with granular bentonite. Offset hole to obtain a Shelby tube sample. See Log DPRL-6A.

D-9-15

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE (modified by GCA 1/94)

PROJECT: Des Plaines River Levee - 5235.10 | HOLE NO. -DPRL-6

Des Plaines River Levee - 5235.10 -DPRL-6

MES

SOIL BORING LOG

Date 6/1/05

ROUTE FAP 374 - IL Route 21 (Milwaukee Avenue) DESCRIPTION Roadway Soil Survey LOGGED BY MES

SECTION 3268F-WRS LOCATION Wheeling, SEC. 24, TWP. 42, RNG. 11, 3rd PM

COUNTY Cook DRILLING METHOD Hollow Stem Auger HAMMER TYPE Automatic

STRUCT. NO.
Station

BORING NO. B-01 Milwaukee Avenue
Station 105+50
Offset 0.00ft center
Ground Surface Elev. 640.00 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter 629.0 ft ▼
Upon Completion ft
After Hrs. ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
0-3" CONCRETE (PCC) 639.75		-		
Brown fine to coarse SAND (fill)		- -	-	13.0
637.00		2		
Dark Brown Sandy Silty CLAY with fine to coarse Sand (fill)		2 2	-	22.0
635.00	-5			
Brown to Dark Brown Black Silty CLAY some fine to coarse Sand (fill)		2		
		2 1	1.0 P	22.0
632.00		3		
Brown Silty CLAY		4 8	-	22.0
630.00	-10			
Brown fine to coarse SAND		9		
	▼	9 11	-	10.0
628.50				
End of Boring				
	-15			
	-20			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, from 137 (Rev. 8-99)

MES

SOIL BORING LOG

Date 6/2/05

ROUTE FAP 374 - IL Route 21 (Milwaukee Avenue) DESCRIPTION Roadway Soil Survey LOGGED BY MES

SECTION 3268F-WRS LOCATION Wheeling, SEC. 24, TWP. 42, RNG. 11, 3rd PM

COUNTY Cook DRILLING METHOD Hollow Stem Auger HAMMER TYPE Automatic

STRUCT. NO.
Station

BORING NO. B-02 Milwaukee Avenue
Station 109+50
Offset 16.00ft right
Ground Surface Elev. 639.00 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter 629.0 ft ▼
Upon Completion ft
After Hrs. ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Brown Silty Sandy CLAY trace fine Gravel and Brick (fill)		-		
		-	-	13.0
		-		
636.50				
Brown Silty CLAY A-7-6 (28) Silty Clay Loam, LL=52, PI=32		3		
		3	1.6	26.0
		3	B	
634.00	-5			
Brown fine to medium SAND (4" seam Brown Sandy Clayey SILT @10')		6		
		8	-	17.0
		10		
		10		
		14	3.3	20.0
		13	P	
	▼-10			
		4		
		8	-	18.0
627.50		10		
End of Boring				
	-15			
	-20			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, from 137 (Rev. 8-99)

MES

SOIL BORING LOG

Date 6/2/05

ROUTE FAP 374 - IL Route 21 (Milwaukee Avenue) DESCRIPTION Roadway Soil Survey LOGGED BY MES

SECTION 3268F-WRS LOCATION Wheeling, SEC. 24, TWP. 42, RNG. 12, 3rd PM

COUNTY Cook DRILLING METHOD Hollow Stem Auger HAMMER TYPE Automatic

STRUCT. NO.
Station

BORING NO. B-03 Milwaukee Avenue
Station 112+50
Offset 13.00ft left
Ground Surface Elev. 638.00 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter DRY ft
Upon Completion ft
After Hrs. ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
0-3" ASPHALT 637.75		-		
3-14" CONCRETE (PCC) 636.83		- -	-	8.0
Mixed Brown Black Silty CLAY with fine to coarse Sand (fill) 635.50				
Dark Gray Silty CLAY 635.00		4		
Brown Silty CLAY 633.00	-5	3 4	1.8 P	27.0
Brown Sandy CLAY trace medium Sand (2" Brown fine to medium Sand seam @7.5') 630.50		5 6 7	-	20.0
Gray Clayey SILT (2" Gray fine Sand seam) 626.50	-10	3 5 14 9	1.7 B	26.0
		10 11	1.5 B	15.0
End of Boring	-15 -20			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, from 137 (Rev. 8-99)

MES

SOIL BORING LOG

Date 6/2/05

ROUTE FAP 374 - IL Route 21 (Milwaukee Avenue) DESCRIPTION Roadway Soil Survey LOGGED BY MES

SECTION 3268F-WRS LOCATION Wheeling, SEC. 19, TWP. 42, RNG. 12, 3rd PM

COUNTY Cook DRILLING METHOD Hollow Stem Auger HAMMER TYPE Automatic

STRUCT. NO.
Station

BORING NO. B-04 Milwaukee Avenue
Station 116+50
Offset 14.00ft left
Ground Surface Elev. 637.00 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter DRY ft
Upon Completion ft
After Hrs. ft

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
0-3" ASPHALT	636.75		-		
3-15" CONCRETE (PCC)	635.75		- -	-	14.0
Dark Gray Dark Brown Silty CLAY with fine to coarse Sand little fine Gravel (fill)	633.00		3 3 5	1.8 P	30.0
Mixed Dark Gray Brown Silty CLAY (fill)	632.00	-5	4		
Brown Sandy CLAY trace medium to coarse Sand	629.50		2 2	1.0 P	18.0
Mottled Brown Gray Silty CLAY trace medium Sand	627.00	-10	4 7 8	3.0 P	17.0
Brown Silty CLAY trace medium Sand	625.50		4 8 9	4.3 P	23.0
End of Boring		-15 -20			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, from 137 (Rev. 8-99)

MES

SOIL BORING LOG

Date 6/1/05

ROUTE FAP 374 - IL Route 21 (Milwaukee Avenue) DESCRIPTION Roadway Soil Survey LOGGED BY MES

SECTION 3268F-WRS LOCATION Wheeling, SEC. 19, TWP. 42, RNG. 12, 3rd PM

COUNTY Cook DRILLING METHOD Hollow Stem Auger HAMMER TYPE Automatic

STRUCT. NO.
Station

BORING NO. B-05 Milwaukee Avenue
Station 116+50
Offset 35.00ft right
Ground Surface Elev. 636.00 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter 628.5 ft ▼
Upon Completion ft
After Hrs. ft

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Dark Brown Black Sandy Silty CLAY trace Organics (topsoil)	635.17		-		
Dark Brown Silty CLAY trace medium Sand, trace Organics (slight petroleum odor) A-7-6(9) Loam LL=47, PI=20			- -	- -	21.0
			6		
			2 7	3.5 P	24.0
	631.00	-5			
Dark Brown to Dark Gray Silty CLAY trace medium Sand, trace Organics (slight petroleum odor)			3		
			3 4	1.0 P	28.0
		▼			
	628.00		7		
Brown Silty CLAY and fine to coarse SAND			13 18	3.0 P	16.0
	626.00	-10			
Brown fine to medium SAND trace fine Gravel	625.50		7		
			9 10	1.5 P	18.0
Brown Silty CLAY trace medium Sand	624.50				
End of Boring					
		-15			
		-20			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, from 137 (Rev. 8-99)

MES

SOIL BORING LOG

Date 6/6/05

ROUTE FAP 374 - IL Route 21 (Milwaukee Avenue) DESCRIPTION Roadway Soil Survey LOGGED BY MES

SECTION 3268F-WRS LOCATION Wheeling, SEC. 19, TWP. 42, RNG. 12, 3rd PM

COUNTY Cook DRILLING METHOD Hollow Stem Auger HAMMER TYPE Automatic

STRUCT. NO.
Station

BORING NO. B-06 Milwaukee Avenue
Station 118+50
Offset 80.00ft right
Ground Surface Elev. 634.00 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter DRY ft
Upon Completion ft
After Hrs. ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Black Brown Silty CLAY, trace Organcis (topsoil)		2 1 2	-	23.0
631.50				
Brown Silty CLAY, trace medium Sand A-7-6(30) Silty Clay LL=58, PI=34		3 7 7	3.5 P	28.0
630.00				
Brown fine to coarse SAND	-5	2 2 2	-	15.0
627.50				
Brown Silty CLAY, trace medium Sand		5 4 5	4.0 P	23.0
626.00				
Sampler Refusal - Possible Limestone 625.90				
End of Boring	-10			
	-15			
	-20			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

MES

SOIL BORING LOG

Date 6/1/05

ROUTE FAP 374 - IL Route 21 (Milwaukee Avenue) DESCRIPTION Roadway Soil Survey LOGGED BY MES

SECTION 3268F-WRS LOCATION Wheeling, SEC. 19, TWP. 42, RNG. 12, 3rd PM

COUNTY Cook DRILLING METHOD Hollow Stem Auger HAMMER TYPE Automatic

STRUCT. NO.
Station

BORING NO. B-06A Route 45
Station 303+00
Offset 65.00ft right
Ground Surface Elev. 638.00 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter DRY ft
Upon Completion ft
After Hrs. ft

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Black Silty CLAY trace Organics (topsoil)	637.75		-		
Brown Silty CLAY with medium to coarse Sand			- -	-	31.0
	635.50				
Brown to Dark Brown Silty CLAY trace Gravel			4		
			4 4	2.3 P	20.0
	634.00				
Brown Sandy Silty CLAY trace roots		-5	3		
			4 5	2.8 P	25.0
	630.00		6		
Brown Clayey fine to coarse SAND			6 9	-	15.0
	628.50				
Brown Silty CLAY (2" Gray fine Sand seam @ 9.5 feet)		-10	5		
			8 8	3.0 P	17.0
	626.50				
End of Boring		-15			
		-20			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, from 137 (Rev. 8-99)

MES

SOIL BORING LOG

Date 6/1/05

ROUTE FAP 374 - IL Route 21 (Milwaukee Avenue) DESCRIPTION Roadway Soil Survey LOGGED BY MES

SECTION 3268F-WRS LOCATION Wheeling, SEC. 19, TWP. 42, RNG. 12, 3rd PM

COUNTY Cook DRILLING METHOD Hollow Stem Auger HAMMER TYPE Automatic

STRUCT. NO.
Station

BORING NO. B-06B Route 45
Station 300+00
Offset 0.00ft center
Ground Surface Elev. 634.00 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter 624.0 ft ▼
Upon Completion ft
After Hrs. ft

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
0-14" CONCRETE (PCC)			-		
	632.83		-	-	9.0
Brown Clayey fine to coarse SAND and GRAVEL (fill)			-		
	631.50				
Brown Sandy CLAY (fill) A-6(5) Clay Loam LL=27, PI=13			3		
	630.50		5	2.0	21.0
Crushed ASPHALT with fine to coarse Sand, trace fine Gravel (fill)	630.00		10	P	
	629.67				
Brown fine to coarse SAND (fill)		-5	4		
Brown Silty CLAY			8	2.0	16.0
			10	P	
			2		
			3	1.3	23.0
	625.00		10	P	
Gray fine to coarse SAND		▼-10	11		
			16	-	10.0
	622.50		10	-	
End of Boring		-15			
		-20			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, from 137 (Rev. 8-99)

MES

SOIL BORING LOG

Date 6/2/05

ROUTE FAP 374 - IL Route 21 (Milwaukee Avenue) DESCRIPTION Roadway Soil Survey LOGGED BY MES

SECTION 3268F-WRS LOCATION Wheeling, SEC. 19, TWP. 42, RNG. 12, 3rd PM

COUNTY Cook DRILLING METHOD Hollow Stem Auger HAMMER TYPE Automatic

STRUCT. NO.
Station

BORING NO. B-07 Milwaukee Avenue
Station 121+00
Offset 15.00ft right
Ground Surface Elev. 637.00 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter DRY ft
Upon Completion ft
After Hrs. ft

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
0-2" ASPHALT	636.83		-		
2-10" CONCRETE (PCC)	636.17		-	-	12.0
Dark Brown to Brown Silty CLAY with medium Sand (fill)	635.50		-		
Brown fine to medium Sandy CLAY A-2-4(0) Sandy Loam LL=22, PI=6			3		
			3 4	1.8 P	10.0
		-5	3		
			4 6	0.5 P	22.0
	629.50				
Brown fine to medium SAND			3		
			4 8	-	18.0
	628.00				
Gray Clayey SILT		-10	3		
			4 9	2.5 P	14.0
	625.50				
End of Boring		-15			
		-20			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, from 137 (Rev. 8-99)

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1.2 FLOW-DURATION DATA
1.3 COMPUTED STAGE HYDROGRAHPS
1.4 COMPUTED MAXIMUM RIVER STAGES
1.5 FORECAST AND REAL TIME STAGE AND FLOW DATA

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

-- End of Document Table of Contents --

SECTION 00800B

EXISTING CONDITIONS

PART 1 HYDRAULIC CONDITIONS

1.1 GENERAL

The Des Plaines River is subject to local moderate variations due to storm water runoff. Flow duration frequency data, computed period of record stage hydrographs, and maximum annual stage frequencies depicting these variations for the Levee 37 project location are included in this section, along with links to river stage forecast and real-time gage data.

1.2 FLOW-DURATION DATA

Table 00800 -B1 below presents flow-duration data taken from average daily flow data recorded at the Des Plaines Gage at Des Plaines, Illinois. This gage is located downstream of Euclid Avenue at Cook County Forest Preserve Dam Number 2, just downstream of the project. The percent chance exceedence flow data in this Table can be interpreted as follows: The 50% exceedence flow for any one year is 138 cubic feet per second (cfs) and is shown in bold italics. 50 percent of the time during any one year, average daily flows will be greater than this flow, per the period of record statistics. The flows in the Table can be converted to approximate stages for the project location using the flow versus stage data also included in the Table. This flow versus stage data is also presented graphically on Plate 00800-B1.

1.3 COMPUTED STAGE HYDROGRAHPS

The computed stage hydrographs for the project location for the period of record (01 October 1940 to 17 October 2004) are shown on Plates 00800-B2 through 00800-B9. Plate 00800-B2 presents the entire period of record, while the other plates show the period of record broken up into intervals of 10 years or less. These stage hydrographs were computed using average daily flow data taken from the Des Plaines River gage at Des Plaines, Illinois, then converting to stages at the project location using flow versus stage data taken from the Corps current Des Plaines River HEC-2 model, at river mile 70.74 located approximately 1700 feet downstream of the Milwaukee Avenue bridge.

1.4 COMPUTED MAXIMUM RIVER STAGES

From the Des Plaines River HEC-2 model, the maximum river stages were developed for the Des Plaines River at the upstream end of the project location, located just downstream of Palatine Road (river mile 71.72) for seven flood event frequencies. The data is presented in Table 00800-B2. The percent chance exceedence in this Table represents the probability in percent in any one year that the maximum stage will be reached, in other words the flood with the 100 year recurrence interval has a one percent chance of happening in any one year.

1.5 FORECAST AND REAL TIME STAGE AND FLOW DATA

Forecast and real-time stage and flow data is available at the following

website for the Des Plaines River gage at Des Plaines, Illinois: http://www.crh.noaa.gov/cgi-bin/ahps.cgi?lot&dspi2.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

-- End of Section --

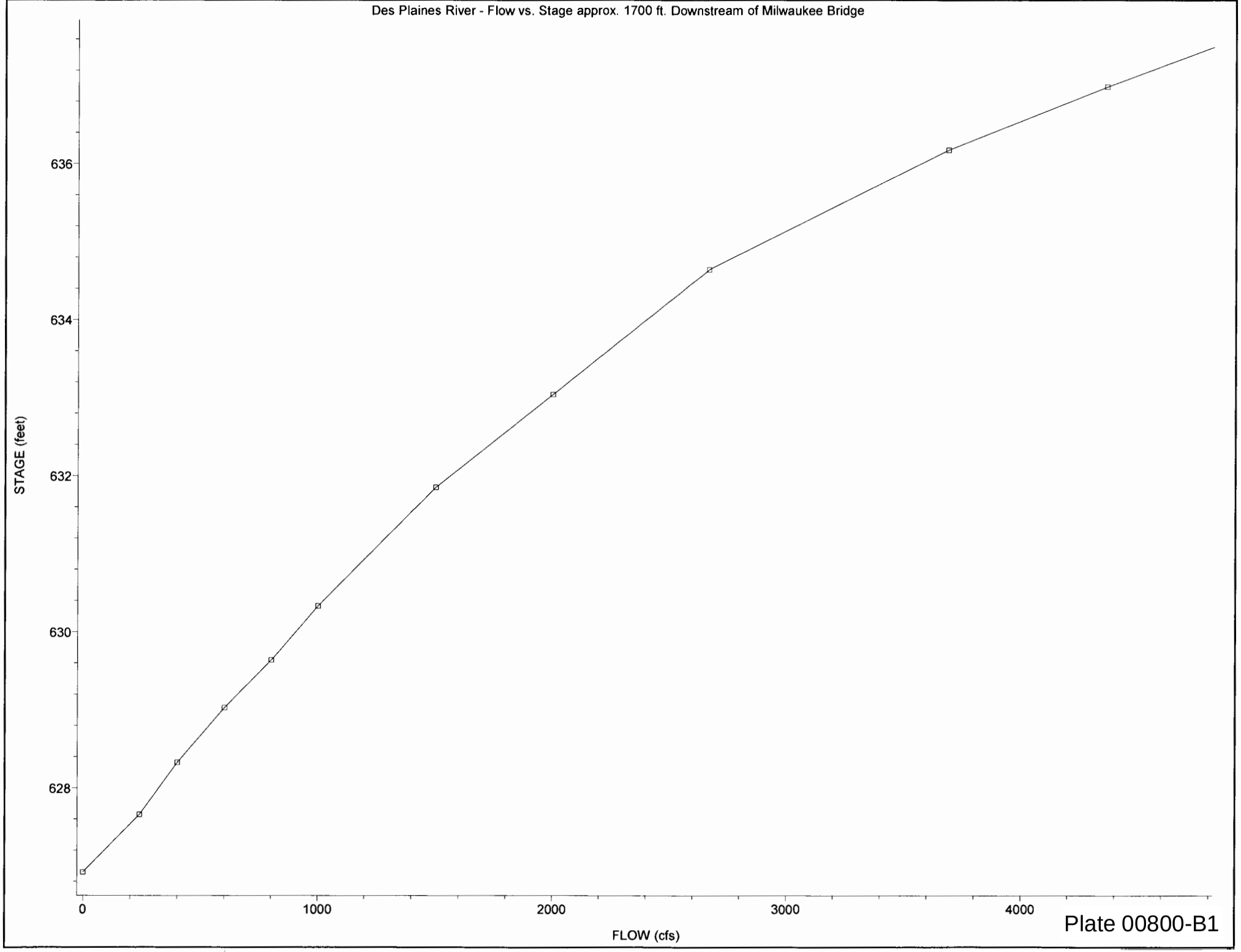
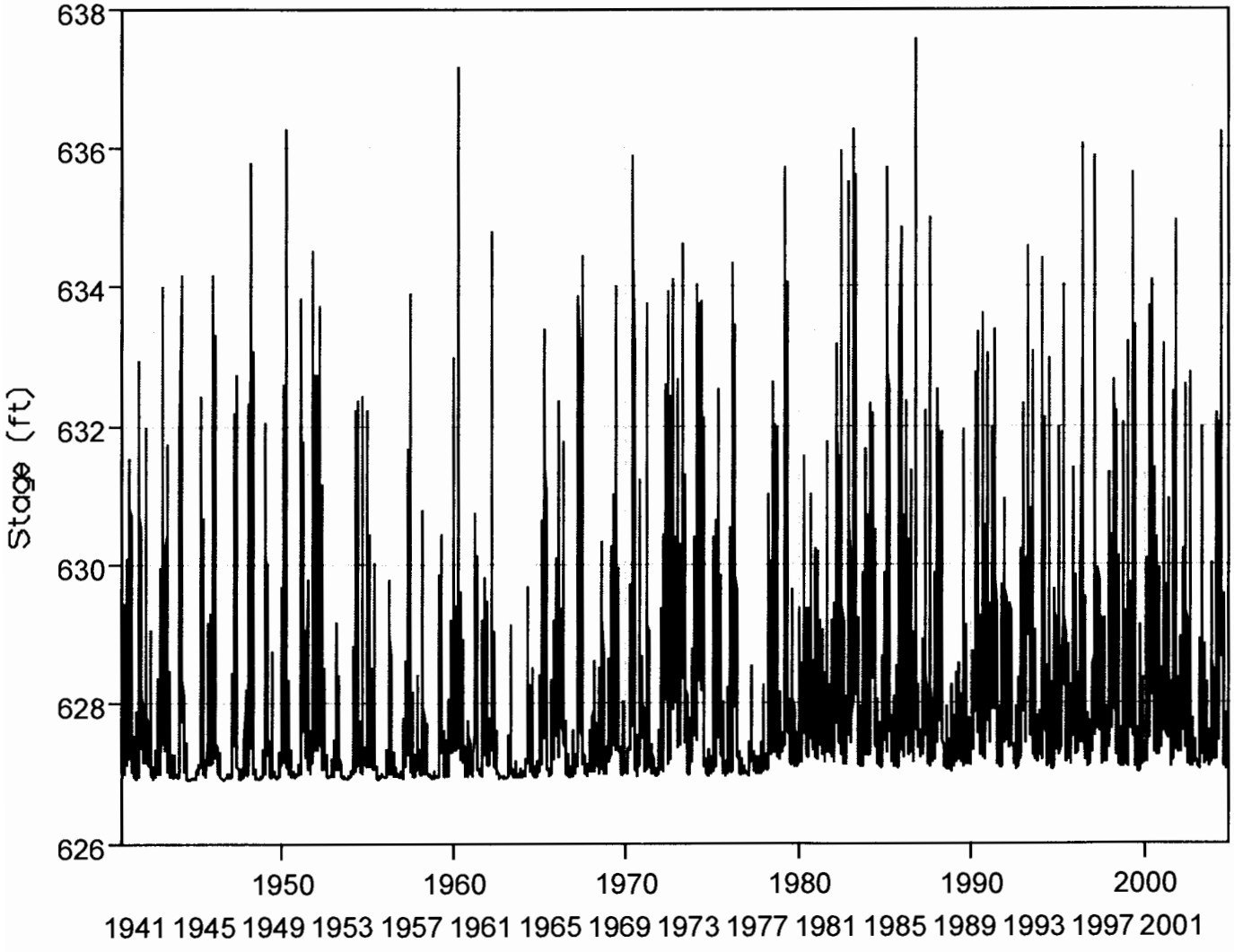


Plate 00800-B1

/DES PLAINES RIVER/DES PLAINES GAGE/STAGE/01JAN1940/1DAY//



DES PLAINES GAGE STAGE

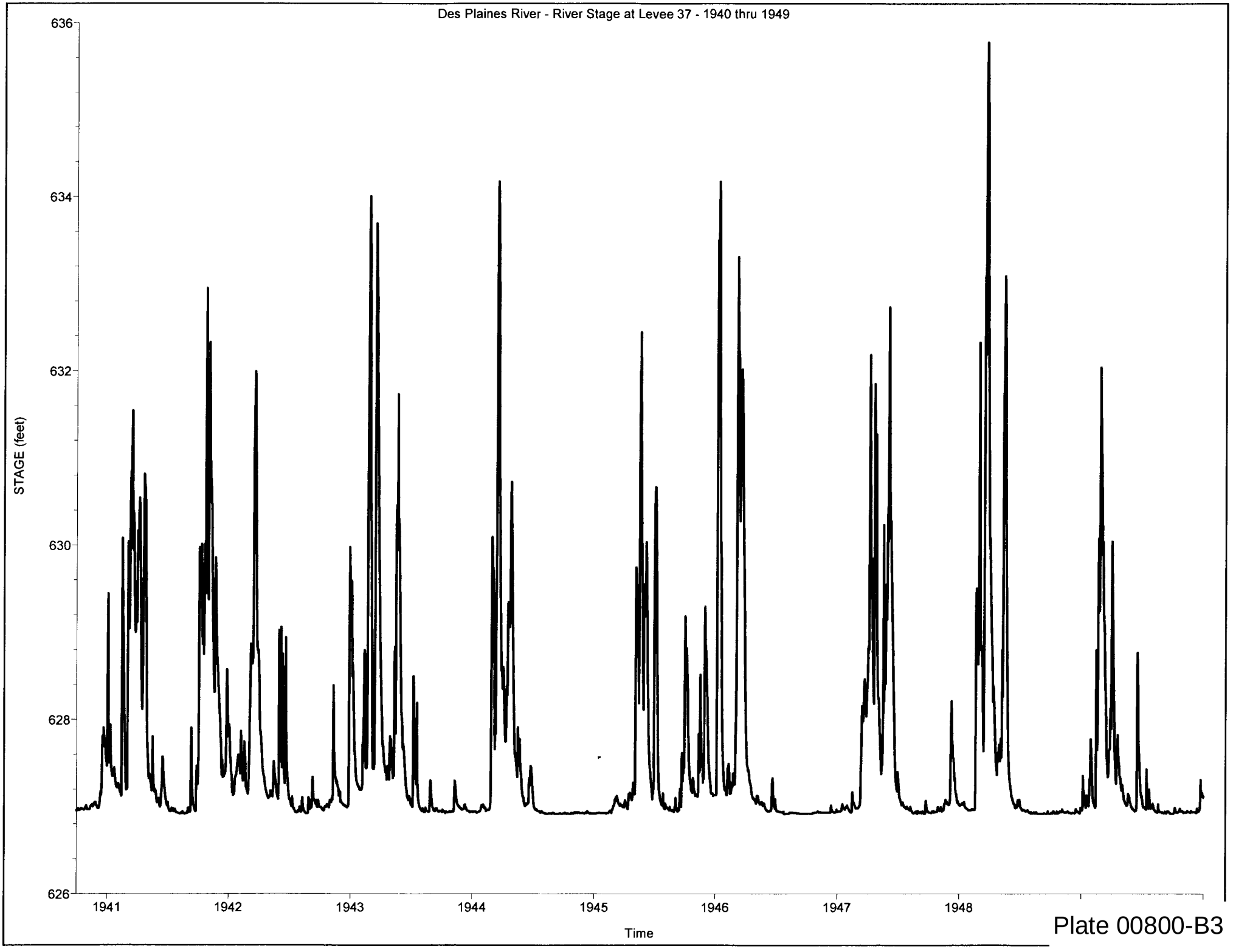


Plate 00800-B3

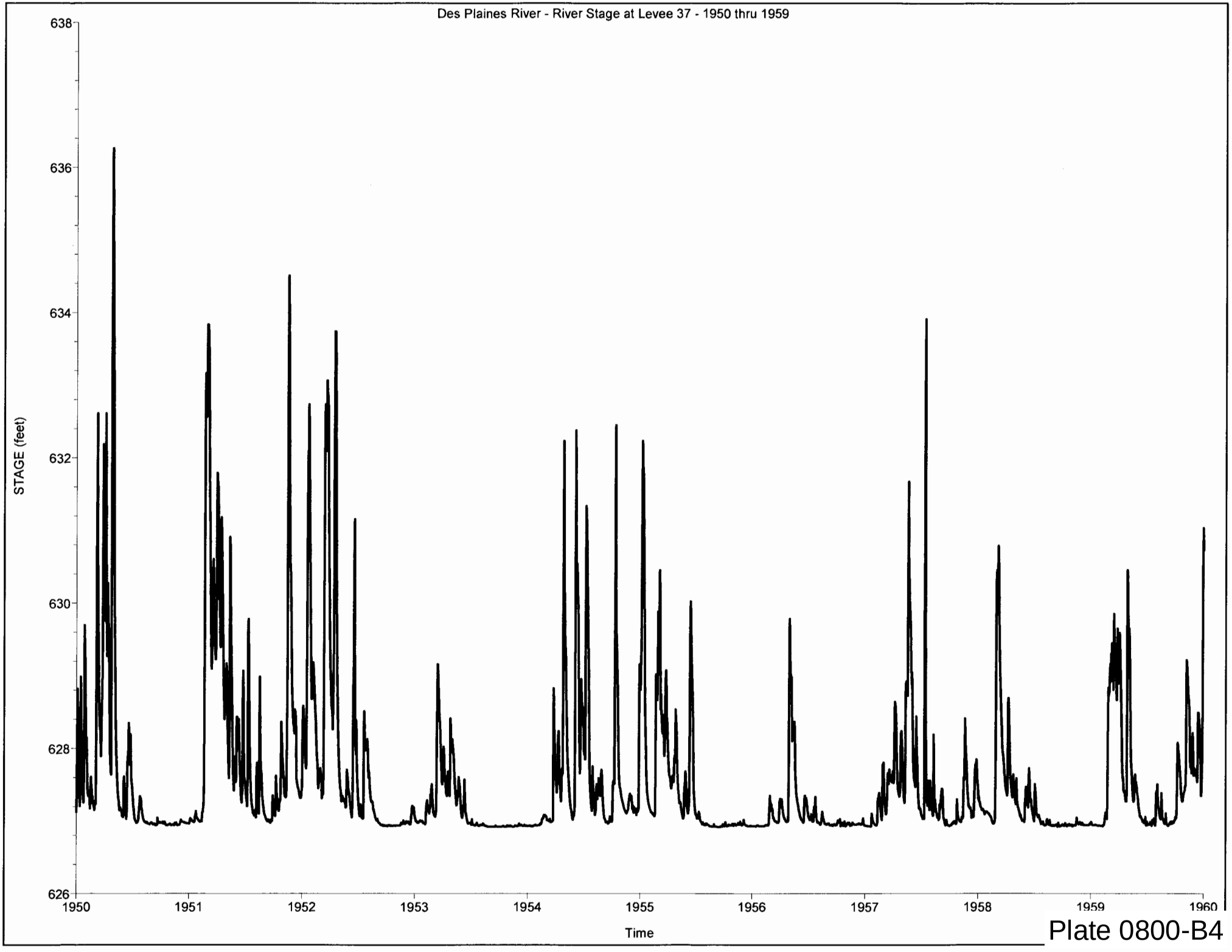


Plate 0800-B4

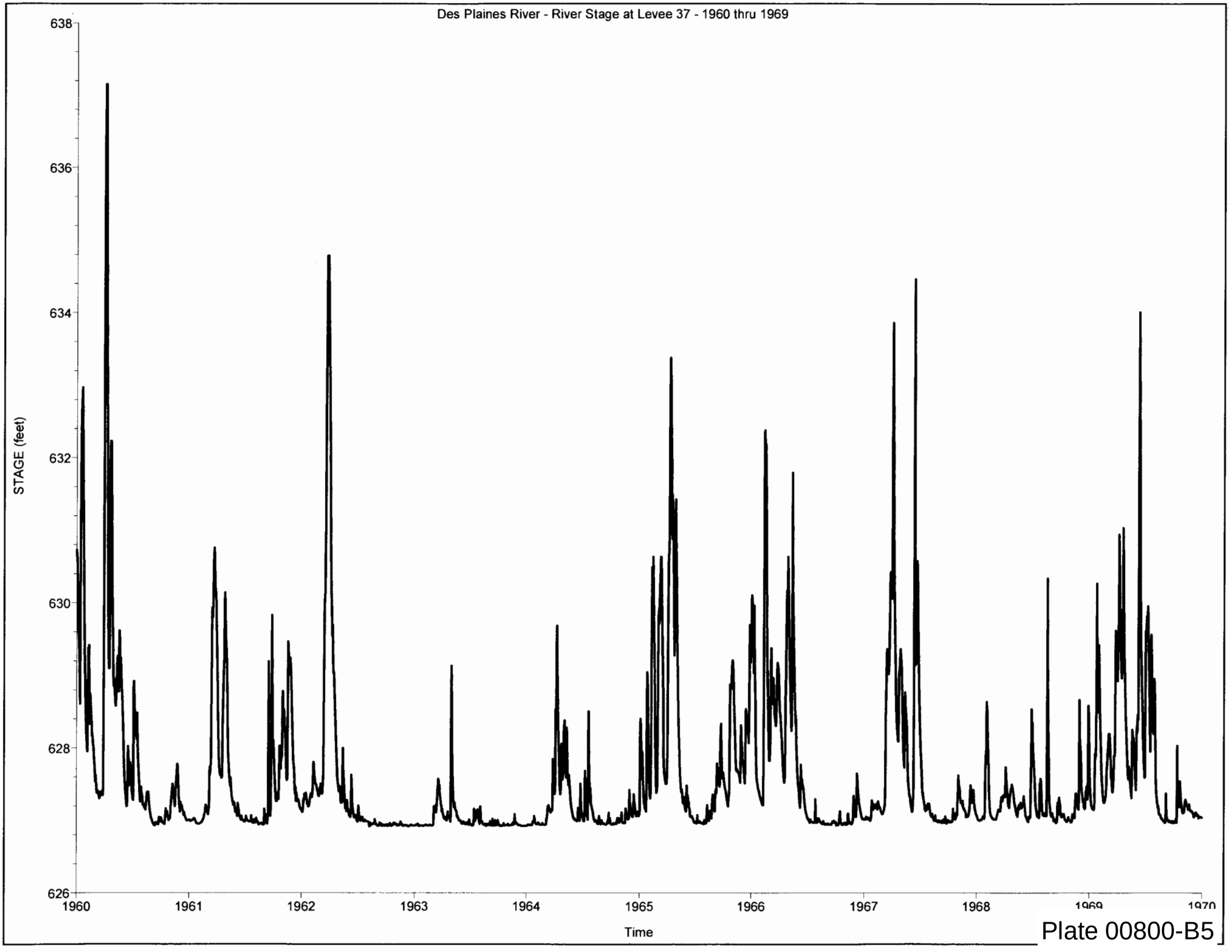


Plate 00800-B5

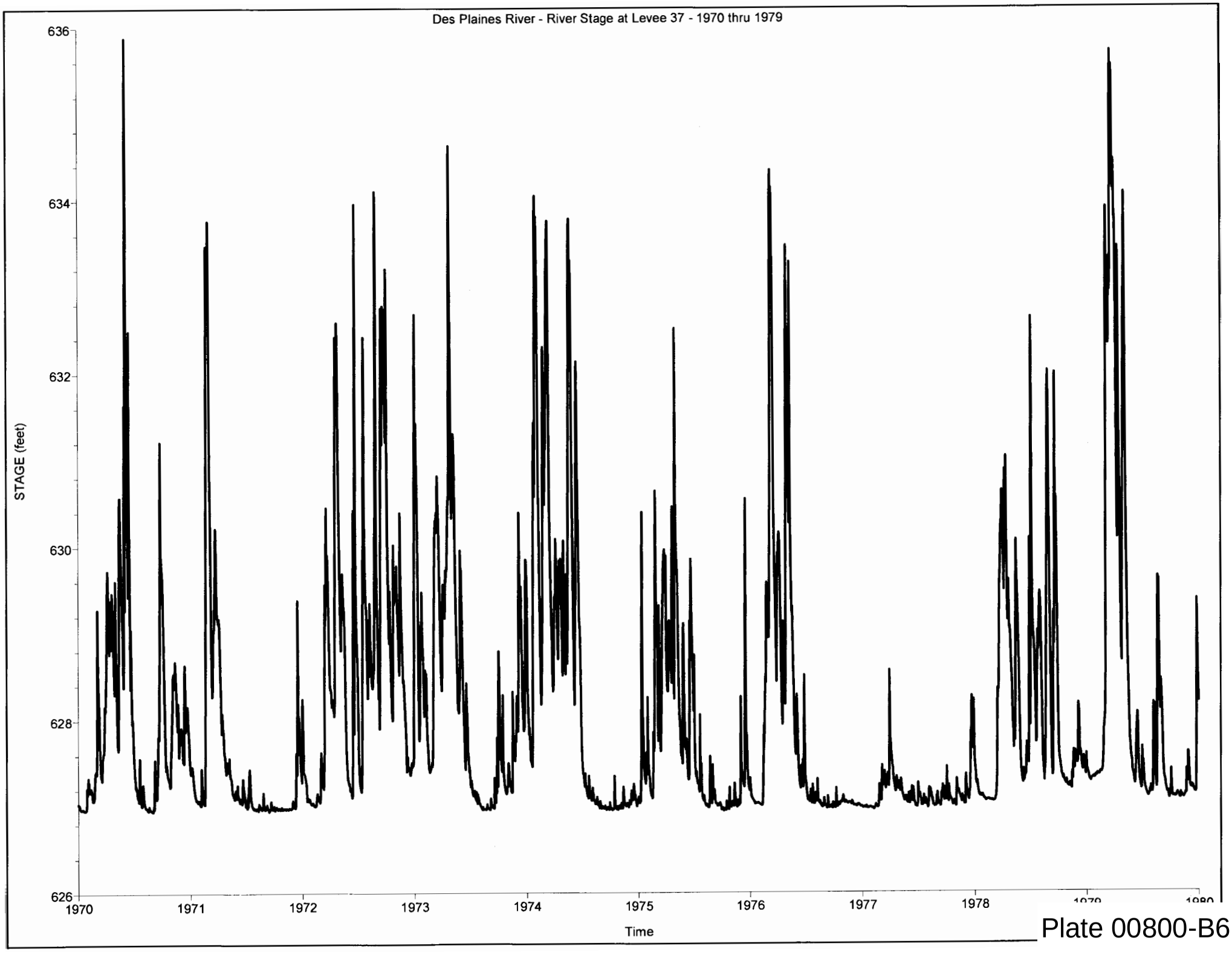


Plate 00800-B6

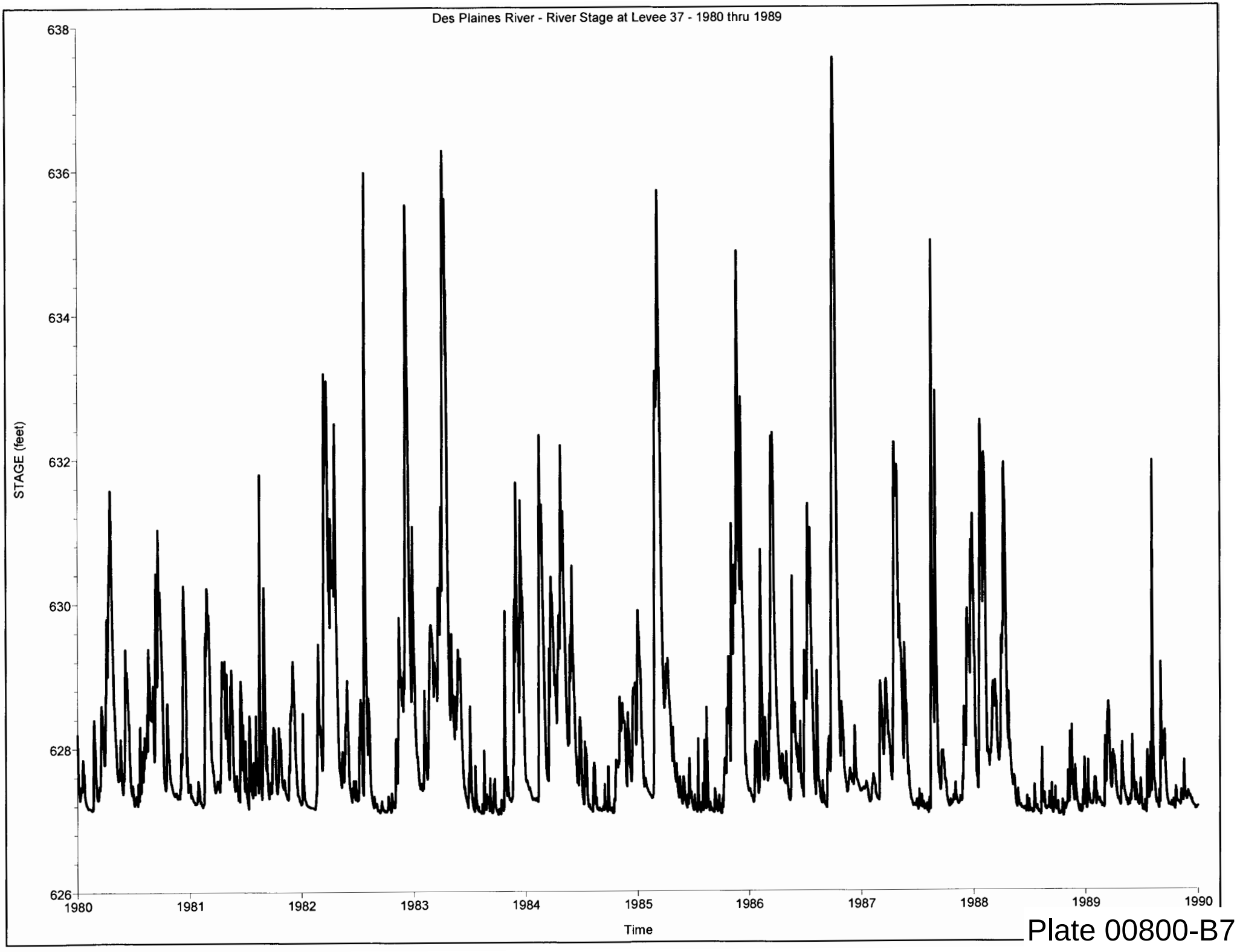


Plate 00800-B7

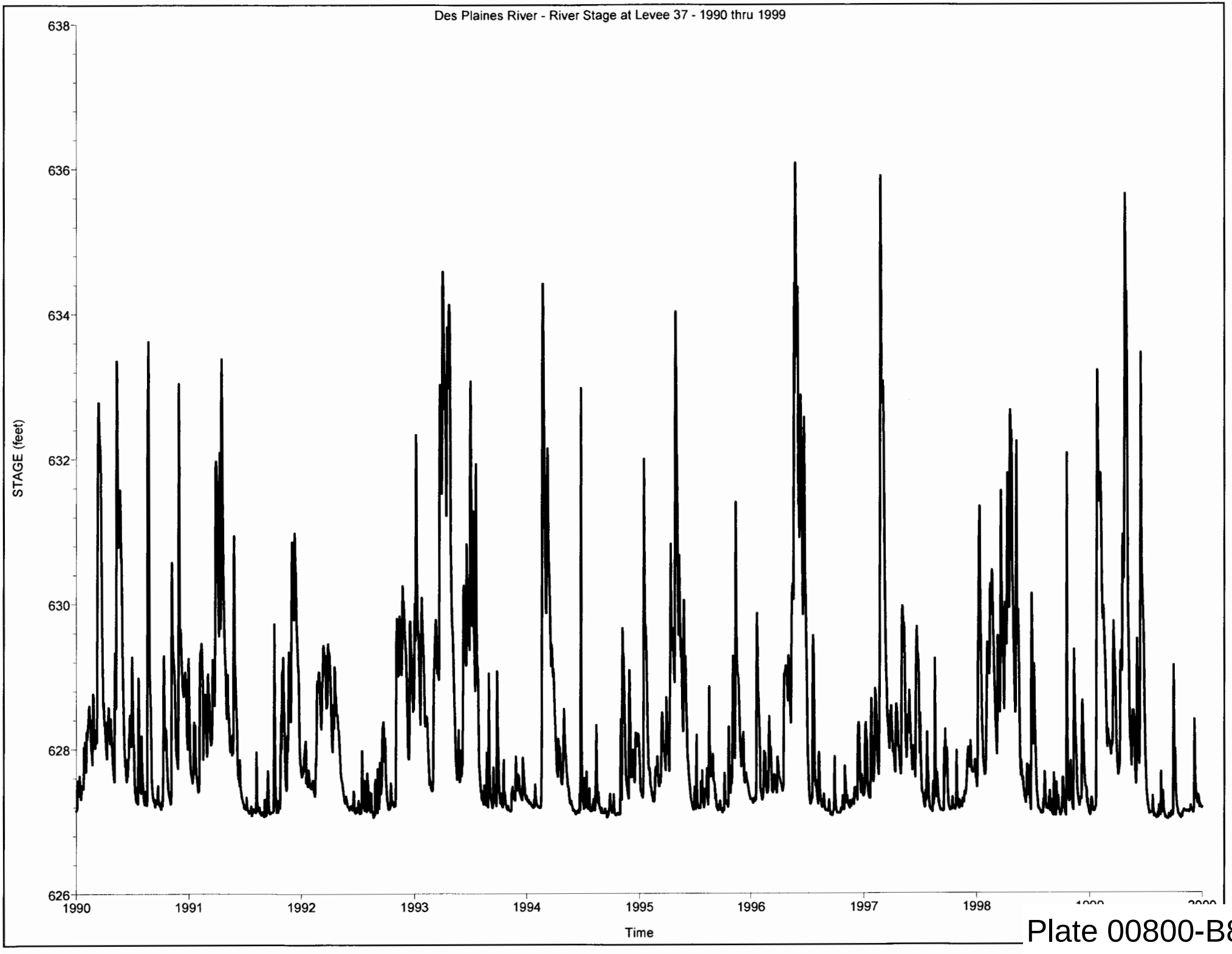


Plate 00800-B8

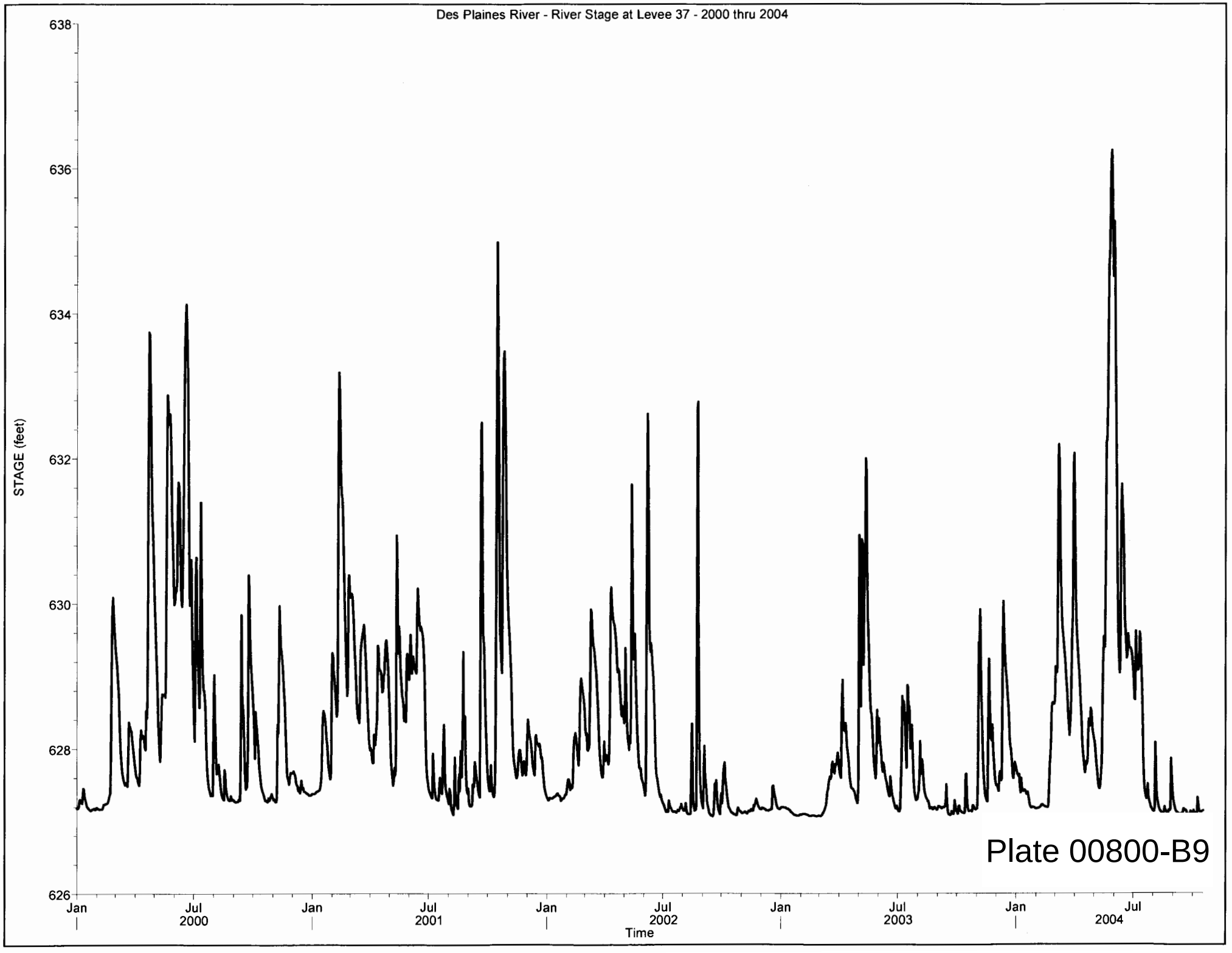

Des Plaines River - River Stage at Levee 37 - 2000 thru 2004
STAGE (feet)
638
636
634
632
630
628
626
Jan
Jul
2000
Jan
Jul
2001
Jan
Jul
2002
Jan
Jul
2003
Jan
Jul
2004
Time
Plate 00800-B9

Table 00800B –1

Average Daily Flow Statistics for Des Plaines River at Des Plaines, IL Gage

Exceedences	January	February	March	April	May	June	July	August
1%	1804	2154	2760	2674	2119	1870	1320	1480
5%	935.5	1310	1900	1840	1200	1030	706.7	505.8
10%	631.2	817.2	1400	1360	891.7	754	461	312.4
20%	308	507.2	916	935	657.2	448	248.4	166.4
50%	121.5	149.5	464.5	453	286	159	82	62
80%	26	45	182	206	114	63	26	13
90%	8	14	86	140	75	36	15	6
95%	4	7.6	46	82.5	50	23	9.1	2.3
99%	2.3	3.58	21	32	27.53	10	4.7	0
average day	234.5	320.2	618	631.9	420.7	299.9	176	133.1
maximum day	2470	3500	3760	4510	3620	3490	3550	2910
minimum day	0.8	0.8	5	18	19	6	0	0

Exceedences	September	October	November	December	Year
1%	1605	1664	1356	1240	2109
5%	587	654	759	825.3	1090
10%	313	366	589	580	774
20%	160	196	358	343.2	468
50%	52	65	107	137	***138***
80%	10	10	16	25.6	31
90%	3.6	5	6.5	8	12
95%	0.4	2.7	4.2	3.9	5.3
99%	0	0.2	2.3	1.86	0.8
average day	136	158	213.2	227.6	297
maximum day	4650	4870	2820	3250	4870
minimum day	0	0.1	0.8	0.6	0

Flow vs. Stage Rating Curve approx. 1700 ft. Downstream of Milwaukee Bridge

FLOW cfs	STAGE feet	FLOW cfs	STAGE feet
0	626.9	3686	636.2
240	627.7	4364	637.0
400	628.3	5162	637.9
600	629.0	5752	638.6
800	629.6	6201	639.1
1000	630.3	7358	640.2
1500	631.9		
2000	633.0		
2665	634.6		

Table 00800B –2

Maximum Des Plaines River Stages at the Levee 37 Project Site

Recurrence Interval	Percent Chance Exceedence Frequency	Maximum Stage (ft. NGVD)
2 year	50	635.5
5 year	20	637.0
10 year	10	637.9
25 year	4	638.7
50 year	2	639.4
100 year	1	639.9
500 year	0.2	641.0

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DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01100

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1.6.1.3 Phase 3 (Sta. 203+00 to 240+00)
1.7 AS-BUILT DRAWINGS
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1.7.7 FINAL AS-BUILT DRAWING SUBMITTAL
1.8 PROJECT FOUNDATION REPORT
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PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

-- End of Section Table of Contents --

SECTION 01100

GENERAL PROVISIONS

PART 1 GENERAL

1.1 CERTIFICATES OF COMPLIANCE

Any certificates required for demonstrating proof of compliance of materials with specification requirements shall be executed in two copies. Each certificate shall be signed by an official authorized to certify in behalf of the manufacturing company and shall contain the name and address of the Contractor, the project name and location, and the quantity and date or dates of shipment or delivery to which the certificates apply. Copies of laboratory test reports submitted with certificates shall contain the name and address of the testing laboratory and the date or dates of the tests to which the report applies. Certification shall not be construed as relieving the Contractor from furnishing satisfactory material, if, after tests are performed on selected samples, the material is found not to meet specific requirements.

1.2 RESPONSIBILITY OF THE CONTRACTOR

a. The Contractor shall be responsible for the professional quality, technical accuracy and the coordination of all designs, drawings and specifications furnished by the Contractor under this contract. The Contractor shall, without additional compensation, correct or revise designs, drawings and specifications.

b. Neither the Government's review, approval or acceptance of, nor payment for, any of the services required under this contract shall be construed to operate as a waiver of any rights under this contract or of any cause or action arising out of the performance of this contract, and the Contractor shall be and remain liable to the Government in accordance with applicable law for all damages to the Government caused by the Contractor's negligence in connection with designs, drawings and specifications, furnished under this contract.

c. The rights and remedies of the Government provided for under the contract are in addition to any other rights and remedies provided by law.

1.3 REFERENCES

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

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2003) Safety and Health Requirements Manual

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation;

submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

IDOT Highway Permit Bond; G, RE

Condition of Existing Structures; G, CN

Condition Survey of Existing RCPs; G, CN

Coordination with Others; G, CN

Drug Free Workplace

Refer to FAR CLAUSE entitled DRUG FREE WORKPLACE in Section 00700.

SD-11 Closeout Submittals

As-Built Drawings; G, CN

Condition Survey of Existing RCPs; G, CN

1.5 REAL ESTATE

All required right-of-way to do the work is available to the Contractor, and is included on the contract drawings. In the event the Contractor requires any additional access roads and storage areas, he shall obtain such areas at his own expense. The Contractor shall furnish to the Contracting Officer copies of all legal documents or leases permitting his use of private or other properties other than included in the contract.

1.6 CONSTRUCTION SCHEDULE

The Construction Schedule shall be in accordance with Section 01320A PROJECT SCHEDULE FOR NORTHERN AREA AND MCCOOK FIELD OFFICES and the FAR clause entitled SCHEDULES FOR CONSTRUCTION CONTRACTS in Section 00700.

1.6.1 Construction Phases

Work shall be done in accordance to the phases described below:

1.6.1.1 Phase 1 (Sta. 270+30 to 291+29)

Phase 1 construction includes all work within Sta. 270+30 and 291+29 as shown on the drawings including closure #8, closure #9, pumpstation #3 and closure #10.

1.6.1.2 Phase 2 (Sta. 240+00 to 263+40)

Phase 2 construction includes all work within Sta. 240+00 and 263+40 as shown on the drawings including closure #5, backflow structure #1, pump station #2, and closure #6 & #7.

1.6.1.3 Phase 3 (Sta. 203+00 to 240+00)

Phase 3 construction includes all work within Sta. 203+00 and 240+00 as

shown on the drawings including pumpstation #1, closure #2, closure #3, closure #4, driveway #1 and turn-around. Phase 3 construction also includes the swing gate construction.

1.7 AS-BUILT DRAWINGS

1.7.1 GENERAL

An as-built drawing is a contract construction drawing revised to reflect the final as-built conditions of the project because of modifications, changes, corrections to the project design required during construction, submittals and extensions of design. The terms "drawings," "contract drawings," "drawing files," "working as-built drawings" and "final as-built drawings" refer to contract drawings that are revised to be the "RECORD DRAWING AS-BUILTS".

The Contractor shall follow procedures identified in document: "CELRC-As-Built Guidance.PDF" (Revised 11-21-2007), posted at the following web address:

http://www.lrc.usace.army.mil/ts-d-c/support/asbuilt/As-Built-ChicagoGuidance.htm

As a resource to contractors a web page was developed that may assist in locating a trained CADD professional to develop the as-builts or train an existing employee to develop the as-builts.

http://www.lrc.usace.army.mil/ts-d-c/support/asbuilt/BentleyResources.htm

1.7.2 GOVERNMENT-FURNISHED FILES

The Contractor will be provided files at the beginning of construction for use during the construction phase which are to be maintained during construction for the preparation of as-builts. The Contractor shall enter changes and corrections on the working drawings on a weekly basis in accordance with Paragraph "Maintenance of Working As-Built Drawings" and update the CADD as-built drawings on a monthly basis. Both paper and electronic documents shall be available at all times and shall be provided promptly to the Contracting Officer when requested. The Contractor shall be responsible for backup of electronic files during construction and for controlling release of information.

1.7.3 MAINTENANCE OF WORKING AS-BUILT DRAWINGS

The Contractor shall revise and maintain during the execution of the project two (2) sets of full-scale paper prints by red-line process to show the as-built conditions. These working as-built drawings shall be kept current and available for review on the jobsite at all times. Changes from the contract drawings that are made in the work or additional information that might be uncovered in the course of construction shall be accurately, legibly and neatly recorded and dated as they occur by means of details and notes. All variations from the contract drawings, for whatever reason, including those occasioned by modifications, optional material and the required coordination between trades, shall be indicated. These variations shall be shown in the same general detail that is utilized in the contract drawings. Changes must be reflected on all sheets affected by the change.

The working as-built drawings will be jointly reviewed for accuracy and completeness by the COR and the Contractor prior to submission of each monthly pay estimate. If the Contractor fails to maintain the working

as-built drawings as specified herein, the COR shall deduct from the monthly progress payment an amount representing the estimated cost of maintaining the working as-built drawings. The working as-built drawings shall show the following information, but not be limited thereto:

1. The actual location, kinds and sizes of all sub-surface utility lines. In order that the location of these lines and appurtenances may be determined in the event the surface openings or indicators become covered or obscured, the as-built drawings shall show, by offset dimensions to two permanently fixed surface features, the end of each run including each change in direction. Valves, splice boxes and similar appurtenances shall be located by dimensioning along the utility run from a reference point. The average depth below the surface of each run shall also be recorded.

2. The location and dimensions of any changes within the building structure.

3. Correct grade, elevations, cross section, or alignment of roads, earthwork, structures or utilities if any changes were made from contract plans.

4. Additional as-built information that exceeds the detail shown on the Contract Drawings. These as-built conditions include those that reflect structural details, fabrication, erection, installation plans and placing details, pipe sizes, insulation material, dimensions of equipment foundations and layouts, equipment, sizes, mechanical room layouts and other extensions of design, that were not shown in the original contract documents because the exact details were not known until after the time of approved shop drawings. It is recognized that these shop drawing submittals (revised showing as-built conditions) will serve as the as-built record without actual incorporation into the contract drawings. All such shop drawing submittals must include, along with the hard copy of the drawings, CADD files of the shop drawings in a commercially available digital format, compatible with the Using Agency System (see paragraph "Computer Aided Design and Drafting (CADD) Drawings"). .

5. The topography, invert elevations and grades of drainage installed or affected as part of the project construction.

6. Changes or modifications which result from the final inspection.

7. Where contract drawings or specifications present options, only the option selected for construction shall be shown on the final as-built drawings.

8. If borrow material for this project is from sources on Government property, or if Government property is used as a spoil area, the Contractor shall furnish a contour map of the final borrow pit/spoil area elevations.

9. Modifications (change order price shall include the Contractor's incidental cost to change working and final as-built drawings to reflect modifications) and compliance with the following procedures:

(1) Directions in the modification for posting descriptive changes shall be followed.

(2) A Modification Equilateral Triangle (3/8" per side) shall be placed at the location of each deletion.

(3) For new details or sections which are added to a drawing, a Modification Equilateral Triangle shall be placed by the detail or section title.

(4) For minor changes, a Modification Equilateral Triangle shall be placed by the area changed on the drawing (each location).

(5) For major changes to a drawing, a Modification Equilateral Triangle shall be placed by the title of the affected plan, section, or detail at each location.

(6) For changes to schedules or drawings, a Modification Equilateral Triangle shall be placed either by the schedule heading or by the change in the schedule.

(7) All other changes shall be annotated with a triangle and sequential number at the following locations:

bottom of the revised detail
right hand and bottom border aligned with the revised detail
the revision block of the title block

1.7.4 RETAINAGE

a. The cost of as-built document preparation shall include all requirements of this clause:

1. Maintenance of working as-built drawings

2. Conversion of submittals and other miscellaneous documents into electronic files

3. Creation of a CD containing all required files.

4. Submittal of as-built documents in the required media forms and numbers of copies

If the Contractor fails to maintain the working as-built drawings as specified herein, the Contracting Officer will deduct from the monthly progress payment an amount that, in the Contracting Officer's judgment, represents the estimated cost of bringing the as-built documents up to date. This monthly deduction will continue until an agreement can be reached between the Contracting Officer and the Contractor regarding the accuracy and completeness of working as-built documents.

b. Retainage for the final as-built drawings in the amount of $42000.00 shall be withheld from the amounts due to the Contractor when progress under the contract reaches 80% completion. This amount shall be withheld until the Final As-Built Drawings (including CD-ROM and full-scale prints) are accepted by the Government. If an acceptable As-Built Drawing submittal is not provided within 45 calendar days from the date the Contractor received the approved working as-built drawings, the Government reserves the right to unilaterally modify the contract to de-obligate the aforementioned amount from the final Contract amount.

No separate payment will be made for providing approved as-built drawings

required under this contract. All costs in connection therewith shall be considered a subsidiary obligation of the Contractor.

1.7.5 PRELIMINARY SUBMITTAL

Within 15 calendar days after completion of the work, the Contractor shall prepare and deliver two (2) copies of the working as-built drawings to the COR for review and approval. These working as-built marked drawings shall be neat, legible and accurate. If upon review, the working as-built drawings are found to contain errors and/or omissions, they shall be returned to the Contractor within 15 calendar days for corrections. The Contractor shall complete the corrections and return the working as-built drawings within 15 calendar days to the COR for approval. The working as-built drawings shall be reviewed within 15 calendar days. Upon approval, the working as-built drawings will be returned to the Contractor for use in preparation of final as-built drawings.

1.7.6 COMPUTER AIDED DESIGN AND DRAFTING (CADD) DRAWINGS

Only personnel proficient in the preparation of CADD drawings shall be employed to modify the contract drawings or prepare additional new drawings. Additions and corrections to the contract drawings shall be equal in quality to that of the originals. Line work, line weights, lettering, layering conventions, and symbols shall be the same as the original line work, line weights, lettering, layering conventions, and symbols. If additional drawings are required, they shall be prepared using the specified electronic file format applying the same guidance specified for original drawings. Three dimensional (3D) elements shall be placed in files in their proper locations when using 3D files with spatially correct elements. The title block and drawing border to be used for any new final as-built drawings shall be identical to that used on the contract drawings. Additions and corrections to the contract drawings shall be accomplished using CADD media files supplied by the Government. All work by the Contractor shall be done on files in the format in which they are provided. Translation of files to a different format, for the purpose of As-Built production, and then retranslating back to the format originally provided, will not be acceptable. The media files will be supplied by the Contractor to the COR. The Contracting Officer will review final as-built drawings for accuracy and the Contractor shall make all required corrections, changes, additions, and deletions.

1. When final revisions have been completed, the cover sheet drawing shall show the wording "RECORD DRAWING AS-BUILT" followed by the name of the Contractor in letters at least 3/16 inch high. All other contract drawings shall be marked in the bottom right-hand corner of each drawing either "AS-BUILT" drawing denoting no revisions on the sheet, or "REVISED AS-BUILT" denoting one or more revisions. Original contract drawings shall be dated in the revision block.

2. Revision markers defined in paragraph "Markings and Indicators" shall be placed as follows:

(1) At the detail, placed in the design file where the revised graphics are located and the revision was placed.

(2) Right hand and bottom border in the drawing sheet file revision block of the title block in the drawing sheet file.

1.7.7 FINAL AS-BUILT DRAWING SUBMITTAL

Within 30 calendar days after receipt of the approved working as-built drawings and the Chicago District provided digital contract drawings in Microstation .DGN format, the Contractor shall prepare and make the final submittal. This submittal shall include all of the following:

1. One CD-ROM containing the electronic files for final as-built drawings.

(1) The CD-ROM shall be labeled with the following information:

Project Name
Date CD was created
Contract Number
Contractors Name

(2) The CD-ROM shall use the same directory structure and file names as provided in the contract set by the Government.

(3) The CD-ROM shall contain the following files:

A list of files in either a Microsoft Word or ASCII text file, containing the electronic file names and sheet titles where applicable.
Microstation dgn files for all CADD files.
Adobe PDF copy for all CADD files.
All other non-electronic documents which may include design analysis, catalog cuts, certification documents that are not available in native electronic format shall be scanned and provided in an organized manner in Adobe PDF format.

2. One set of full-scale prints

(1) The full-scale prints shall be plotted from the CD-ROM, to ensure the electronic files provided to the Government are complete and accurate.

3. One set of half-scale prints

(1) The half-scale prints shall be plotted from the CD-ROM, to ensure the electronic files provided to the Government are complete and accurate.

4. One set of the approved working as-built drawings.

These contract drawings shall be modified as may be necessary to correctly show the features of the project as it has been constructed by bringing the contract drawings into agreement with approved working as-built drawings, adding such additional drawings as may be necessary.

In the event the Contractor accomplishes additional work which changes the as-built conditions of the facility, after submission and approval of the working as-built drawings, he shall be responsible for the addition of these changes to the working as-built drawings and also to the final as-built documents.

1.8 PROJECT FOUNDATION REPORT

A Project Foundation Report will be developed by the Government. In order to prepare this report, various documents shall be compiled and provided to the Government by the Contractor. An outline of the Foundation Report is provided below to assist the Contractor in compiling and organizing the necessary data for this report:

For sheetpile, control-structures and pump houses, the Contractor shall provide in MS word and .pdf format: a list of significant subcontractors and roles; dates of construction; construction equipment; construction procedures, and quality control test results. Additionally, for sheetpile, the report will include a section describing type and length or sheetpile and driving records. For control structures and pump house foundations, the report shall include a section describing dewatering procedures, dewatering regulatory requirements, and characteristics of excavated soil and foundation.

The Contractor shall compile the submittals listed below and submit them in .pdf format on CD-ROMs to the Government after construction is complete. All documents that fall into the above-mentioned categories should be placed on the same CD. If multiple CDs are needed to complete the compilation, then the CD should be labeled with what type of document is included on the CD and also that it is 1 of 2, 2 of 2, etc.

The following submittals shall be included in the Foundation Report:

a. Section 02300, SD-06 Test Reports

- Testing

b. Section 02464, SD-02 Shop Drawings

- Shop Drawings
- Driving Equipment

c. Section 02464, SD-06 Test Reports

- Records

Within 30 calendar days of completion of the physical construction, the Contractor shall submit all documents requested in the required format. The Contractor shall submit two (2) copies of CDs for Government review. Upon Government approval, the Contractor shall submit five (5) copies of the CD(s). A sum of $5,000 will be retained until final approval of the submittal.

1.9 INSPECTION

The presence or absence of a QA representative shall not relieve the Contractor of responsibility for the proper execution of work in accordance with the plans and specifications.

1.10 CONDITION OF EXISTING STRUCTURES

Prior to commencement of operations by the Contractor at the site, the Contractor shall complete and submit three (3) copies of a detailed video

survey, in DVD format, of all existing structures that may be affected by the Contractor's operations. The survey will be conducted in coordination with local interests, Contractor, Corps of Engineers Representative, and private parties concerned and will be sufficient in scope to provide advance agreement among all concerned as to the condition of the existing structures. The Contractor shall be responsible for full and active participation in such pre-construction surveys of existing structures as deemed necessary to permit determination and accurate assessment of any subsequent damage to existing structures that may be incurred during the period of the contract.

1.10.1 Condition Survey of Existing RCPs

The Contractor shall include in the DVDs stated above a video condition surveys of the existing 60 inch and 36 inch RCP, located at staging area #1 and #3 respectively, prior and after construction. The DVDs shall be submitted to the COR. The Contractor is responsible for protecting the pipes from damage. Any damage to the pipes shall be repaired by the Contractor at no additional cost to the Government.

1.11 PRESERVATION OF HISTORICAL, ARCHAEOLOGICAL AND CULTURAL RESOURCES

If, during construction activities, the Contractor observes items that might have historical or archaeological value, such observations shall be reported immediately to the Contracting Officer's Representative (COR) so that the appropriate authorities may be notified and a determination can be made as to their significance and what, if any, special disposition of the finds should be made. The Contractor shall cease all activities that may result in the destruction of these resources and shall prevent his employees from trespassing on, removing, or otherwise damaging such resources.

1.12 MINIMUM AMOUNT OF INSURANCE REQUIRED

In accordance with FAR CLAUSE entitled WORK IN A GOVERNMENT INSTALLATION, the following minimum insurance coverage and limits are required. The term "Installation" referred to in this clause is deemed to mean Corps of Engineers project site or Federal property.

a. Evidence of the following minimum insurance coverage and limits, with concurrent policy expiration dates, must be received by the Department of the Army, Corps of Engineers before the Contractor can begin work. This evidence must be on a fully-completed, signed and dated ACCORD Certificate of Insurance. In addition, policy endorsements must be issued by or in behalf of the insuring company or companies naming the Department of the Army, Corps of Engineers, Village of Prospect Heights, and Village of Mount Prospect as Additional Interest Insured regarding the work. The endorsements must also provide that the Department of the Army, Corps of Engineers receive direct written notice at least thirty (30) calendar days before the effective date of any material changes to, any cancellation of, or any non-renewal of these coverage during the time period of the Contractor's work.

b. Should the coverage expire or be terminated during the time period of the Contractor's work, the Department of the Army, Corps of Engineers must receive an ACCORD Certificate of Insurance as evidence of renewal or replacement insurance coverage and the supporting policy endorsements as specified above. The required

evidence of renewal replacement insurance must be received by either the Contracting Officer or Contracting Officer's Representative at least ten (10) calendar days before the coverage expires or is being terminated.

c. All insuring companies must be rated A- or Excellent, by A.M. Best Company, an independent insurance rating service. The ACCORD Certificate must list the A.M. Best Company insurance company code of listed insurance companies being offered.

Comprehensive General Liability	
(Occurrence policy form only)	
General Aggregate	$2,000,000
Products/Completed Operations	$2,000,000
Each Occurrence	$1,000,000
Fire Damage Legal Liability	$ 50,000
Comprehensive Automobile Liability	
(Including Hired Automobile Liability	
and Non-Owned Automobile Liability)	
Combined Single Limit	$1,000,000
Employers' Liability	
Each Occurrence	$ 500,000
Policy Limit	$ 500,000
Each Employee	$ 500,000
Workers Compensation	
(As required by state law or Federal law)	
Umbrella Liability	
(Occurrence policy form only)	
Each Occurrence and Aggregate	$5,000,000

d. Prior to commencement of work hereunder, the Contractor shall furnish to the Contracting Officer a certificate or written statement of the above required insurance. The policies evidencing required insurance shall contain an endorsement to the effect that cancellation or any material change in the policies adversely affecting the interests of the Government in such insurance shall not be effective for such period as may be prescribed by the laws of the State in which contract is to be performed and in no event less than thirty (30) calendar days after written notice thereof to the Contracting Officer.

1.13 TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER

This clause specifies the procedure for the determination of time extensions for unusually severe weather in accordance with the CONTRACT CLAUSE entitled "DEFAULT (FIXED PRICE CONSTRUCTION)." In order for the Contracting Officer to award a time extension under this clause, the weather experienced at the project site during the contract period must be found to be unusually severe, that is, more severe than the adverse weather anticipated for the project location during any given month.

The following schedule of monthly anticipated adverse weather delays is based on National Oceanic and Atmospheric Administration (NOAA) or similar data for the project location and will constitute the base line for monthly weather time evaluations. The Contractor's progress schedule must reflect

these anticipated adverse weather delays in all weather dependent activities.

MONTHLY ANTICIPATED ADVERSE WEATHER DELAY
WORK DAYS BASED ON A FIVE (5) DAY WORK WEEK

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC 1-15	DEC 16-31
22	20	21	7	4	3	3	5	3	5	7	3	12

Upon acknowledgement of Notice to Proceed (NTP) and continuing throughout the contract, the Contractor will record on the daily CQC report, the occurrence of adverse weather and resultant impact to normally scheduled work. Actual adverse weather delay days must prevent work on critical activities for 50 percent or more of the Contractor's scheduled workday.

The number of actual adverse weather delay days shall include days impacted by actual adverse weather (even if adverse weather occurred in previous month), be calculated chronologically from the first to the last day of each month, and be recorded as full days. If the number of actual adverse weather delays exceeds the number of days anticipated in paragraph 2, above, the Contracting Officer will convert any qualifying delays to calendar days, giving full consideration for equivalent fair weather work days, and issue a modification in accordance with the contract clause entitled "Default (Fixed Price Construction)".

1.14 PERMITS AND RESPONSIBILITIES

It shall be the responsibility of the Contractor to obtain all permits/licenses required for this project as required under CONTRACT CLAUSES paragraph entitled "PERMITS AND RESPONSIBILITIES".

1.14.1 IDOT Highway Permit Bond

The Contractor shall obtain a highway permit bond as described in the permit application attached at the end of this section. The permit bond shall be for $100,000,000.

1.15 COORDINATION WITH OTHERS

The Contractor shall schedule and coordinate its operations affecting other Contractors, Government hired labor forces, utilities, and/or property within the work limits. Such scheduling shall be accomplished with lead time sufficient for coordination of all involved parties as necessary for timely completion of each contract feature. As evidence of this compliance with this General Provision, the Contractor shall furnish the Contracting Officer's Representative (COR) with a copy of each coordinated schedule prior to commencing operations affecting such other Contractors, utilities, and/or property.

Construction limits of this contract overlap with construction limits of Contract listed below. Each Contract includes work items requiring close coordination between the Contractors regarding the sequence and timing for the proper execution and successful completion of work items.

IDOT FAP RT 374 (IL ROUTE 374), MILWAUKEE AVE SECTION 3268F-R-1

LOCATION	Tentative Start Date	Tentative Completion Date
IL 21 between Willow Road and Sanders	Spring 2008	Winter 2009

Road-Reconfiguration of
intersection of US45/IL21

1.16 SPECIAL SAFETY REQUIREMENTS

The Contractor shall comply with all applicable Federal, state and local safety requirements including, but not limited to, those provided in EM 385-1-1.

1.17 ONE CALL SYSTEMS FOR EXCAVATORS

One call systems, established by law, are operated by owners of underground facilities for excavators. Upon notification by an excavator through a one call system, all participating operators of underground facilities in a covered area will identify and locate their facilities. One call systems will be identified by contacting the following:

ILLINOIS
JULIE UTILITIES PROTECTION SERVICES
1-800-892-0123

1.18 ELECTRICAL POWER LINES

The Contractor shall study the construction plans and site and know in detail all locations of power lines within the rights of way. Prior to performing any construction operation adjacent to power lines, appropriate danger signs shall be provided where any equipment scheduled for use on the site is capable of contacting such lines. To confirm the location of underground lines, the Contractor shall contact the appropriate council listed in paragraph ONE CALL SYSTEMS FOR EXCAVATORS. Aerial power lines shall either be shut off and a positive means taken to prevent the lines from being energized, or clearances required by EM 385-1-1, Safety and Health Requirements Manual, shall be maintained. Work shall not proceed into dangerous areas without an additional workman being assigned the crew to watch the movements of other personnel and equipment to assure that designated clearances are maintained.

1.19 BORROW/DISPOSAL SITES AND QUARRIES

This paragraph, Borrow/Disposal Sites and Quarries, applies only to the ability of the Contractor to utilize a particular borrow/disposal site or quarry, and does not address the use of materials from that site or quarry. Nothing in this paragraph, Borrow/Disposal, shall relieve the Contractor of complying with the specific testing requirements for material taken from any borrow/disposal sites or quarries as set forth in the technical provisions of this Contract.

a. Definitions. For purposes of this general provision, the following definitions apply:

(1) Government-Suggested borrow/disposal site or quarry means a site or quarry suggested by the Government for use by the Contractor concerning which all applicable Federal, state and local environmental statutory and regulatory requirements may or may not have been satisfied.

(2) Commercial/existing borrow/disposal site or quarry means a site or quarry which is either in the business of providing borrow material or has been used as a disposal site for other purposes

and is available for use; and concerning which all applicable Federal, state and local environmental statutory and regulatory requirements have been satisfied.

(3) Contractor-chosen borrow/disposal site or quarry means a site or quarry chosen by the Contractor for use concerning which none or not all of the applicable Federal, state and local environmental statutory and regulatory requirements have been satisfied.

b. If a borrow/disposal site or quarry is identified in the contract specifications as Government-Suggested, it is the responsibility of the Contractor to ascertain whether or not all Federal, state and local environmental statutory and regulatory requirements have been satisfied. If any of such requirements have not been satisfied, the Contractor is required to follow the procedures set forth in paragraph d(4) below. Use of such a site or quarry must be approved by the Contracting Officer.

c. If the Contractor chooses a commercial/existing borrow/disposal site or quarry, the Contractor is not required to ensure that all applicable Federal, state and local environmental statutory and regulatory requirements have been satisfied, but is required to provide to the Government either, as a minimum, a letter from the owner/operator of the commercial/existing borrow/disposal site or quarry certifying that all environmental and operating permits have been acquired, or actual copies of all such environmental and operating permits. Use of such a site or quarry must be approved by the Contracting Officer. The Contractor shall adhere to all rules, regulations and business practices required by the owner/operator.

d. If a Contractor decides to use a Contractor-chosen borrow/disposal site or quarry, it is the Contractor's responsibility to ensure that all applicable Federal, state and local environmental statutory and regulatory requirements have been satisfied. Use of such a site or quarry must be approved by the Contracting Officer, and such approval will not be granted unless all applicable requirements have been met and such use of the site does not pose significant environmental impacts.

(1) The specific requirements which must be met by the Contractor before a Contractor-chosen (or, when applicable, a Government-recommended) site or quarry will be approved by the COR include, at a minimum, but are not necessarily limited to, compliance with the following environmental laws, regulations and executive orders:

Name	Agency
<u>Federal Laws, Regulations, and Executive Orders</u>	
Section 404, Clean Water Act (Permit)	U.S. Army Corps of Engineers, Detroit District (IN/WI) Chicago District (IL)
Section 10, River and Harbor Act of 1899 (Permit)	U.S. Army Corps of Engineers

Emission Limitations, Clean Air Act	U.S. Environmental Protection Agency
Section 9, Endangered Species Act of 1973	U.S. Fish and Wildlife Service, Barrington Office (IL) Bloomington Office (IN) Green Bay Office (WI)
Section 703, Migratory Bird Treaty Act of 1918	U.S. Fish and Wildlife Service
Section 106, National Historic Preservation Act of 1966	Illinois Historic Preservation Agency (IL)
Flood Plain Management, Executive Order 11988	U.S. Army Corps of Engineers, Chicago District
Surface Mining Control and Reclamation Act of 1977	Bureau of Mines
Resource Conservation and Recovery Act of 1976	U.S. Environmental Protection Agency
Toxic Substance Control Act	U.S. Environmental Protection Agency

Illinois State Statutes

Construction Within a Floodway (Permit)	Illinois Department of Transportation, Division of Water Resources
Illinois Endangered Species	Illinois Department of Conservation
Section 401, Clean Water Act (Permit)	Illinois Environmental Protection Agency, Division of Water Pollution Control
Section 402, Clean Water Act (NPDES Permit)	Illinois Environmental Protection Agency, Division of Water Pollution Control
State Agency Historic Resources Protection Act	Illinois Historic Preservation Agency
Human Grave Protection Act	Illinois Historic Preservation Preservation Agency

It is the Contractor's responsibility to ensure that all applicable Federal, state and local environmental statutory and regulatory

requirements are satisfied, regardless of their presence on, or absence from, the above list.

(2) It is the responsibility of the Government to ensure that the requirements of the National Environmental Policy Act (NEPA) have been complied with. If the Contractor decides to use a site or quarry which has not previously undergone an environmental review under NEPA (either Government-recommended or Contractor-chosen), the Contractor will so notify the Contracting Officer, who shall arrange for such an environmental review. This review and compliance process may include inter-agency coordination and the preparation and circulation for public review of environmental documentation. It is the responsibility of the Contractor to allow sufficient time in the construction schedule to accommodate this review and compliance process, and to provide the Contracting Officer with any and all information that the Contracting Officer deems necessary to facilitate the process. The review and compliance process requires a minimum time frame of ninety (90) calendar days, but could take substantially longer, possibly up to one year or, in unusual circumstances, even longer than one year, to complete. Any construction delays caused by the need to conduct an environmental review under NEPA shall be solely the responsibility of the Contractor, at no additional cost to the Government.

(3) It is also the responsibility of the Government to perform Section 7 consultation under the Endangered Species Act, to coordinate with the U.S. Fish and Wildlife Service and appropriate state wildlife agencies under the Fish and Wildlife Coordination Act, and to perform a Farmland Conversion Impact Rating under the Farmland Protection Policy Act for all Government-Suggested or Contractor-Chosen sites. This shall be accomplished concurrently with the NEPA environmental review process. It is the responsibility of the Contractor to allow sufficient time in the construction schedule to accommodate these consultation and coordination requirements as well as the NEPA review process, and to provide the Contracting Officer with any and all information that the Contracting Officer deems necessary to facilitate the completion of these consultation and coordination requirements.

(4) The Government cannot guarantee that any Government-Suggested or Contractor-chosen site is capable of complying with all applicable Federal, state and local environmental statutory and regulatory requirements and may reject any such site proposed for use by the Contractor for environmental reasons. If the Contracting Officer does not approve the use of a Government-recommended or Contractor-chosen borrow/disposal site or quarry because not all applicable Federal, state or local environmental statutory and regulatory requirements have been satisfied, or because the Government determines that such site or quarry could not be used for environmental reasons as a result of the environmental review under NEPA, it is the Contractor's responsibility to locate an alternate site or quarry and to perform all necessary reviews to obtain approval of the use of such alternative site or quarry. Any construction delays caused by the need to locate an alternate site or quarry, shall be solely the responsibility of the Contractor, at no additional cost to the Government.

(5) Nothing in this clause shall relieve the Contractor from the responsibility of obtaining all non-environmental permits and licenses which may be required under Federal, state or local statutes, regulations and ordinances.

1.20 TAX EXEMPTION

Pursuant to the rulings of the Illinois Department of Revenue, materials which are to be physically incorporated into real estate owned by the Government are exempt from Illinois Retailers' Occupational Tax and Use Tax. However, sales of tools, fuel, lumber for forms and other end use or consumption items which are not physically incorporated into real estate are taxable sales. After contract award, the Contractor may request the Government Sales Tax Exemption Number, which must be used when purchasing tax exempt material. Nothing herein shall be construed to affect the provisions contained in Section 00700, Contract Clause entitled FEDERAL, STATE, AND LOCAL TAXES.

1.21 PROGRESS MEETINGS

A progress meeting will be held once every two weeks (biweekly). The meetings shall be held on-site, in the contractor's field trailer, unless the Government elects to hold the meetings at an alternate off-site location. The day and time for conducting meetings will be mutually agreed to between the Contractor, the Government, the Local Sponsors and other participants as required, within 30 calendar days after receipt of the notice to proceed. The Contractor shall be required to fully participate in the progress meeting.

Unless the Contracting Officer's Representative (COR) specifically indicates in writing otherwise, the Contractor shall prepare meeting agendas and meeting minutes for each meeting. The agenda and minutes shall be prepared in a format acceptable to the COR and shall contain all information required by the COR, including, but not limited to:

a. A listing of all meeting participants;

b. The financial progress, including original and current contract amounts, the amount paid to date, and original and current contract completion dates;

c. A list of work completed since the last meeting;

d. A list of work activities scheduled for the upcoming two weeks;

e. Critical work activities in the project schedule;

f. Old business, including summaries of the status of unresolved issues discussed at previous progress meetings;

g. New business, including summaries of issues that need to be addressed and have not been included in previous meeting minutes;

h. Potential items of interest to the public, local sponsor, or local community;

i. The status of submittals, including lists of outstanding submittals, key submittals in review, and upcoming submittals;

j. A listing of all field changes/modifications.

The progress meeting minutes shall be submitted to the Government and all other meeting participants for review and approval within seven days of the meeting. The review and approval process will allow for mutual acceptance of the minutes as written. As directed by the Government, the Contractor shall edit the minutes to add, delete, and/or correct items that were covered in the weekly meeting. The edited meeting minutes shall then be resubmitted within 7 days of the receipt of the Government comments.

1.22 QUANTITY SURVEYS

a. Quantity surveys shall be conducted and the data derived from these surveys shall be used in computing the quantities of work performed and the actual construction completed and in place.

b. The Contractor shall conduct the original and final surveys and surveys for any periods for which progress payments are requested. Original and final surveys shall be done by an independent, registered land surveyor. All these surveys shall be witnessed by a representative of the Contracting Officer, unless the Contracting Officer waives this requirement in a specific instance. Prior to any scheduled survey, the COR/Area Engineering Office will be given 48-hour notice. The Contractor's independent surveyor shall make such computations as are necessary to determine the quantities of work performed or finally in place. The Contractor shall make the computations based on the surveys for any periods for which progress payments are requested.

c. Promptly upon completing a survey, the Contractor shall furnish the originals of all field notes and all other records relating to the survey or to the layout of the work to the Contracting Officer, who shall use them as necessary to determine the amount of progress payments. The Contractor shall retain copies of all such material furnished to the Contracting Officer.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

-- End of Section --

ILLINOIS DEPARTMENT OF TRANSPORTATION
DISTRICT 1
201 West Center Court
Schaumburg, Illinois 60196-1096
847-705-4131
847-705-5498 FAX

HIGHWAY PERMIT APPLICATION INSTRUCTION SHEET

ALL PERMIT APPLICATIONS for work to be done on State highways in Cook, Lake, Kane, DuPage, Will and McHenry Counties should be submitted to the Permit Engineer at the address shown above.

A single permit can be issued covering all work undertaken at any one location However, if the anticipated construction is to be done by more than one contractor, then each contractor must make a separate permit application for this respective portion of work.

Each HIGHWAY PERMIT APPLICATION should include the following items:

a) A transmittal letter which includes general description and location of permit work requested, contact name, address and phone number.
b) Two copies of drawings depicting the proposed installation.

Issuance of the HIGHWAY PERMIT is subject to receipt of the following items:

- Three signed copies of the Highway Permit Form (BT-1045)
- Three fully executed copies of the individual highway permit bond form (BT-1046)
- Five copies of approved drawings depicting the proposed installation.

THE HIGHWAY PERMIT FORMS (BT-1045) are to be submitted in triplicate, signed by the property owner and the contractor. The owner, lessee or trust executor signs as the Applicant with his mailing address on the line below. The contractor signs on the line marked Witness together with his mailing address. Please leave the remainder of the form blank. Upon issuance of the permit, a copy is mailed to the owners and the contractor at the address shown on the application.

THE INDIVIDUAL HIGHWAY PERMIT BOND (BT-1046) is executed by a licensed bonding company with the petitioner or contractor as principal, and is to be submitted in triplicate. The amount of the bond is set by the Department and is dependent upon the amount of the work to be done within the State right of way. For extensive installations, a review of the plans will normally precede setting the bond amount.

THE DRAWINGS or PLANS may vary from a pencil sketch on white 8 1/2" x 11" paper to complete sets of engineering drawings. The criteria for acceptable drawings is that they render a clear and true representation of what is being proposed. The following are guidelines for plan preparation:
be completed before this permit can be approved.

ACCURATE LOCATION OF WORK: Mailing address of property, legal description of property/location with respect to intersecting streets, railroads, streams, etc.
DEPICTION OF EXISTING CONDITIONS: Width of pavement and right of way, storm drainage scheme-existence of curb, gutter, sidewalk, median, shoulder and ditch, location of poles, street lights, traffic signals, hydrants and trees-indicate underground mains, cables and ducts, etc.
DESCRIPTION OF PROPOSED WORK: Geometrics of driveways, street returns, pavement widening and parking layouts-show lateral and longitudinal location of proposed mains and sewers-indicated elevations of all underground installation-include a detailed internal site plan showing proposed drainage-give material specifications such as size thickness, diameter, weight, gauge type, class, etc.
MISCELLANEOUS: Show north arrow, scale of drawing if used and name and telephone number of person who can be called if questions should arise.

The above listing of suggested information is not to be considered all-inclusive and additions to same may be required.

Illinois Department of Transportation

Highway Permit

District Serial No. _____

Whereas, I (We) _____ _____
(Name of Applicant) (Mailing Address)

_____ _____ hereinafter termed the Applicant,
(City) (State)

request permission and authority to do certain work herein described on the right-of-way of the State Highway known as _____ Route _____, Section _____, from Station _____ to Station _____ _____ County. The work is described in detail on the attached plan or sketch and/or as follows:

All work authorized by this permit shall be completed _____ after the date this permit is approved, otherwise the permit becomes null and void.

This permit is subject to the conditions and restrictions printed on the reverse side of this sheet.

This permit is hereby accepted and its provisions agreed to this _____ day of _____, _____

Witness _____ Signed _____
Applicant

_____ _____
Mailing Address Mailing Address

_____ _____
City State City State

SIGN AND RETURN TO: Regional Engineer _____

Approved this _____ day of _____, _____

Department of Transportation

BY: _____
Deputy Director of Highways, Regional Engineer

First: The Applicant represents and warrants that he/she is the party in interest respecting this Permit and that he/she is the agent in fact with authority to bind all parties in interest to the obligations and undertakings agreed to in this Permit. The Applicant represents and warrants that the property lines shown on the attached plan sheet(s) or sketch are true and correct, and that all proposed work is accurately depicted thereon.

Second: The proposed work shall be located and constructed to the satisfaction of the Regional Engineer or his/her duly authorized representative. No revisions or additions shall be made to the proposed work on the right-of-way without the written permission of the Regional Engineer. The Applicant agrees to complete all work to the standards and specifications identified by the Regional Engineer or his/her authorized representative as a condition of granting this Permit. The Applicant agrees to furnish all labor, equipment and material, and do all work and pay all costs associated with the work authorized by this Permit. The Applicant agrees to restore any and all damaged portions of the highway right-of-way to the condition satisfactory to the Regional Engineer or his/her authorized representative including, but not limited to, all landscape restoration. The Applicant shall not trim, cut or in any way disturb any trees or shrubbery along the highway without the approval of the Regional Engineer or his/her duly authorized representative. Any and all documents, writings and notes reflecting or identifying the standards, specifications, understandings and conditions applicable to the performance of the permitted work required by the Regional Engineer or his her authorized representative are hereby incorporated into this Permit by reference as though fully set forth herein.

Third: The Applicant shall at all times conduct the work in such a manner as to minimize hazards to vehicular and pedestrian traffic. Traffic controls and work site protection shall be in accordance with the applicable requirements of Part 6 (Temporary Traffic Control) of the Illinois Manual on Uniform Traffic Control Devices and with the traffic control plan if one is required elsewhere in the permit. All signs, barricades, flaggers, etc., required for traffic control shall be furnished by the Applicant. The work may be done on any day except Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day. Work shall be done only during daylight hours.

Fourth: The work performed by the Applicant is for the bona fide purpose expressed and not for the purpose of, nor will it result in, the parking or servicing of vehicles on the highway right-of-way. Signs located on or overhanging the right-of-way shall be prohibited.

Fifth: The Applicant shall agrees to require any contractors or subcontractors to hold harmless and indemnify the State, and their official's employees and agents, from any and all losses, expenses, damages and claims arising out of any service provided in connection with this Permit and the contractors or subcontractors shall defend any suite or action, whether at law or in equity, based on any alleged injury or damage of any type arising from the actions or inactions of the contractors or subcontractors and/or the contra's or subcontractors employees or agents and the contractors and subcontractors shall pay all damages, judgments, costs, expenses, and fees, including attorney's fees incurred by the State and their official, employees and agents in connection therewith.

Sixth: The State reserves the right to make such changes, additions, repairs and relocations within its statutory limits to the facilities constructed under this permit or their appurtenances **in consultation with the Applicant,** on the right-of-way as may at any time be considered necessary to permit the relocation, reconstruction, widening or maintaining of the highway and/or provide proper protection to life and property on or adjacent to the State right-of-way. However, in the event this permit is granted to construct, locate, operate and maintain utility facilities on the State right-of-way, the Applicant, upon written request by the Regional Engineer, shall perform such alterations or change of location of the facilities, without expense to the State, and should the Applicant fail to make satisfactory arrangements to comply with this request within a reasonable time, the State reserves the right to make such alterations or change of location or remove the work, and the Applicant agrees to pay for the cost incurred.

Seventh: This permit is effective only insofar as the Department has jurisdiction and does not presume to release the Applicant from compliance with the provisions of any existing statutes or local regulations relating to the construction of such work.

Eighth: The Construction of access driveways is subject to the regulations listed in the "Policy on Permits for Access Driveways to State Highways." If, in the future, the land use of property served by an access driveway described and constructed in accordance with this permit changes so as to require a higher driveway type as defined in that policy, the owner shall apply for a new permit and bear the costs for such revisions as may be required to conform to the regulations listed in the policy. Utility installations shall be subject to the "Policy on the Accommodation of Utilities on Right-of-Way of the Illinois State Highway System."

Ninth: If the work covered by this permit includes construction of additional lanes, turn lanes, median cross-overs or traffic signals on, along or adjacent to a highway under Department jurisdiction, the permittee shall use only contractor(s) approved by the Department of Transportation for the performance of said work on the State highway. A contractor currently prequalified by the Department in the work rating governing the said work shall be approved. Prior to the commencement of the said work on the State highway, the applicant shall furnish the Regional Engineer a copy of the contractor's current Certificate of Eligibility, or, if the permittee proposes to use a contractor not currently prequalified by the Department, information satisfactory to the Department evidencing the contractor's qualification and ability to perform the said work. No work on the State highway shall be performed until the Department issues an approval of the proposed contractor.

Illinois Department of Transportation

Individual Highway Permit Bond

Address _____ District _____

City / State _____ Bond No. _____

KNOWN ALL MEN BY THE PRESENTS, That I (We) _____,
(Name of Applicant)

_____
(Mailing Address)

as Principal, and _____,
(Surety Company)

a corporation organized and existing under the laws of the State of _____
and licensed to do business in the State of Illinois, are held firmly bound unto the people of the State of Illinois in the penal sum of _____ Dollars

($ _____) lawful money of the United States well and truly to be paid unto said people of the State of Illinois, for payment of which we bind ourselves, our successors and assigns, jointly, severally, and firmly by these presents.

WHEREAS, Highway Permit No. _____ Issued by the Department of Transportation

of the State of Illinois grants to _____ permission and authority to construct, locate, operate, and maintain the work described in said Permit, upon or adjacent to _____ Route _____ in _____ County as more fully described in said Permit and Sketch, which by this reference are made a part hereof as if written herein at length, in and by which Permit and Sketch the said Principal has promised and agreed to perform said described operation and related activities in accordance with the terms and conditions of and description in said Permit and Sketch.

NOW, THEREFORE, if the said Principal shall well and truly perform said operations in accordance with the terms and conditions of and description in said Permit and Sketch to the satisfaction of said Department, and shall perform no other work or construction at said location without first applying for and receiving another permit from said Department, then no claim or demand will be made against the above obligation. Otherwise, this bond or so much thereof as may be necessary shall insure to the said Department as cost and expense to change and correct, during a period of five years from the date of approval of this bond by the Department, said construction to conform to the terms and conditions of and description in said Permit and Sketch.

IN WITNESS WHEREOF, WE HAVE DULY EXECUTED THE FOREGOING

This _____ Day of _____, _____

Surety _____

Address _____

City / State _____

By _____
Attorney in Fact

(Seal)

Agent for Surety _____

Address _____

City / State _____

By _____

Principal _____

Address _____

City / State _____

Telephone ( ) _____

By _____

(Seal)

Department of Transportation

By _____
District Engineer

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SECTION 01270

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.1 LUMP SUM PAYMENT ITEMS

Payment items for the work of this contract for which contract lump sum payments will be made are listed in the BIDDING SCHEDULE and described below. All costs for items of work, which are not specifically mentioned to be included in a particular lump sum or unit price payment item, shall be included in the listed lump sum item most closely associated with the work involved. The lump sum price and payment made for each item listed shall constitute full compensation for furnishing all plant, labor, materials, and equipment, and performing any associated Contractor quality control, environmental protection, meeting safety requirements, tests and reports, and for performing all work required for which separate payment is not otherwise provided.

1.1.1 Mobilization and Demobilization (Bid Item 0001)

1.1.1.1 Payment

Payment will be made for costs associated with mobilization and demobilization, as defined in Special Clause PAYMENT FOR MOBILIZATION AND DEMOBILIZATION.

1.1.1.2 Unit of Measure

Unit of measure: lump sum.

1.1.2 Temporary Field Office, Project and Safety Signs (Bid Item 0002)

1.1.2.1 Payment

Full compensation for all labor, equipment and materials for the temporary field office, project signs, safety signs, warning signs, and furnishing and installing the temporary fence complete with posts, chain link fabric, top and bottom rails, truss rods, hardware, and other incidental items as described in SECTION 01500 TEMPORARY CONSTRUCTION FACILITIES & SECTION 01580 PROJECT SIGNS AND SAFETY SIGNS shall be included in the lump sum contract price for Bid Item 0002 of the Bid Schedule.

1.1.2.2 Unit of Measure

Unit of measure: lump sum.

1.1.3 Clearing and Grubbing (Bid Item 0003)

1.1.3.1 Payment

Payment for clearing and grubbing and all other incidental work as described in Section 02231 CLEARING AND GRUBBING will be made at the contract lump sum price for Bid Item 0003 of the Bid Schedule. The

refilling of holes resulting from grubbing operations will not be measured for payment but will be considered as an incidental obligation under this Bid Item of the Bid Schedule. No payment will be made for hauling salable timber to an off work site location, nor will payment be made for disposing salable timber at an off site location.

1.1.3.2 Unit of Measure

Unit of measure: lump sum.

1.1.4 Reinforced Concrete Structure and Misc. Metal (Bid Item 0004AD, 0006AA, 0007AA, 0010AA, 0011AA, 0012AA, 0013AA, 0014AA, 0015AA, 0016AA, 0017AA, 0018AA, 0019AA, 0020AA, & 0021AA)

1.1.4.1 Payment

All costs associated with manufacturing, furnishing, delivering, forming, placing, finishing, and curing of concrete, including the cost of all miscellaneous metal (includes but not limited to trash racks, ladders, gratings and pump station fencing) and formwork, as described in SECTION 03300 CONCRETE and SECTION 02630 STORM-DRAINAGE SYSTEM shall be paid for at the contract lump sum price for the Bid Items listed above of the Bid Schedule.

1.1.4.2 Unit of Measure

Unit of measure: lump sum.

1.1.5 Pumps, Discharge Piping and Valves (Bid Items 0007AB, 0015AC, & 0020AC)

1.1.5.1 Payment

The cost of furnishing all plant, labor, materials, and equipment shall be measured as lump sum and included in the contract lump sum price for Bid Items 0007AB, 0015AC, & 0020AC of the Bid Schedule. The pay items shall include materials, installation, start-up, and testing of the pumps described in SECTION 11310 PUMPS, SEWAGE AND SLUDGE and SECTION 15132 SUBMERSIBLE PUMP, MIXED-FLOW TYPE. No separate payment will be made for the storm water pumps and the associated accessories.

1.1.5.2 Unit of Measure

Unit of measure: lump sum.

1.1.6 Metalwork Fabrication, Machine Work, Miscellaneous Metals (Bid Items 0007AC, 0015AB, 0020AB)

1.1.6.1 Payment

Payment shall constitute full compensation for furnishing all plant, labor, materials and equipment and performing all operations necessary for the metalwork fabrication, machine work, miscellaneous provisions as specified in Section 05502 METALS: MISCELLANEOUS, STANDARD ARTICLES, SHOP FABRICATED ITEMS and Section 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

1.1.6.2 Unit of Measurement

Unit of measure: lump sum.

1.1.7 Electrical Work and Pump Controller (Bid Items 0007AD, 0015AD, & 0020AD)

1.1.7.1 Payment

The cost of furnishing all plant, labor, materials, and equipment shall be measured as lump sum and included in the contract lump sum price for Bid Items 0007AD, 0015AD, & 0020AD of the Bid Schedule. The pay items shall include furnishing and installing electrical work on the pump station including commercial power service to the pump station, MCC, controls, cables and conduits, lighting and miscellaneous items as shown in the contract drawings and specified in SECTION 16415 ELECTRICAL WORK and SECTION 16225 PUMP CONTROLLER. No separate payment will be made for electrical work and pump controller work. All associated costs shall be included in the lump sum price.

1.1.7.2 Unit of Measure

Unit of measure: lump sum.

1.1.8 Sluice Gates and Flap Gates (Bid Item 0006AB, 0006AC, 0006AD, 0010AB, 0010AC, 0011AB, 0011AC, 0012AB, 0012AC, 0013AB, 0013AC, 0014AB, 0015AE, 0016AB, 0017AB, 0017AC, 0018AB, 0018AC, 0019AB, 0019AC, 0021AB, 0021AC, & 0021AD)

1.1.8.1 Payment

All costs associated with the fabrication, shop assembly, delivery, and installation of sluice gates and flap gates and appurtenant items, as described in SECTION 11280 SLUICE AND FLAP GATES shall be paid for under the contract Lump Sum price for Bid Items Item listed above of the Bid Schedule. Payment shall constitute full compensation for all plant, labor, materials, and incidentals necessary for the work completely installed and tested.

1.1.8.2 Unit of Measure

Unit of measure: lump sum.

1.1.9 Painting of Hydraulic Structures (Bid Items 0007AE, 0015AF, & 0020AE)

1.1.9.1 Payment

Payment will be made for costs associated with "Painting of Hydraulic Structures", which includes full compensation for furnishing all materials, equipment, and labor required to paint the hydraulic structures, including discharge tubes and appurtenances and wall thimble for all seven pumps in three pump stations, in accordance with Section 09964 PAINTING: HYDRAULIC STRUCTURE.

1.1.9.2 Unit of Measurement

Unit of measure: lump sum.

1.1.10 Swing Gate Closure (Bid Item 0022AA)

1.1.10.1 Payment

The cost of furnishing all plant, labor, materials and equipment shall be measured as lump sum and included in the contract lump sum price for Bid Item 0022AA of the Bid Schedule. The pay item shall include materials, construction, installation, and testing of the gate, foundation, and all other work associated with the Swing Gate Closure structure as described in SECTION 11289 CLOSURE GATES and shown on the drawings. No seperate payment shall be made for the gates and the associated accessories including the insertable check valve for structure 273 as described in Section 11280 SLUICE AND FLAP GATES.

1.1.10.2 Unit of Measure

Unit of measure: lump sum.

1.1.11 Storm Drainage Structures (Bid Item 0026)

1.1.11.1 Payment

Payment for precast manholes, catch basins, flared end sections, and reinforced concrete pipes shall be paid for at the contract lump sum price for Bid Item 0026 of the Bid Schedule. The contract lump sum price shall constitute full compensation for plant, labor, materials, and incidentals required to complete work as described in SECTION 02630 STORM-DRAINAGE SYSTEM. Pipe transitions and pipe plugs shall be incidental to this bid item. Manholes and catch basin adjustments shall also be incidental to this bid item.

1.1.11.2 Unit of Measure

Unit of measure: lump sum.

1.1.12 Cofferdams (Bid Item 0029)

1.1.12.1 Payment

Costs for labor, plant, equipment and materials required for the design, installation and removal of cofferdams, dewatering systems, and incidentals necessary for construction, as described in Section 02215 Cofferdams, shall be paid of the contract lump sum price for Bid Item 0029 of the bidding schedule. Cost associated with sheet pile cofferdam to remain in place at closure #8 shall be paid under Bid Item 0004.

1.1.12.2 Unit of Measurement

Unit of measure: lump sum.

1.1.13 Demolition (Bid Item 0030)

1.1.13.1 Payment

Full compensation for all labor, equipment and materials shall be made for the demolition and salvage of existing reinforced concrete pipes, flared end sections, catch basins, manholes, guardrails, utility pole, concrete structures, existing riprap, and other items for removal as indicated in the contract drawings and in accordance to SECTION 02220 DEMOLITION at the

contract lump sum price for Bid Item 0030 of the Bidding Schedule. The removal of resulting rubbish and debris to off-site locations shall be incidental to this Bid Items.

1.1.13.2 Unit of Measurement

Unit of measure: lump sum.

1.1.14 Maintenance of Traffic (Bid Item 0031)

1.1.14.1 Payment

Payment for maintenance of traffic and any other incidental work shall be made at the contract lump sum price as shown on Bid Item 0031 of the Bid Schedule. Payment shall include all costs for labor, equipment, and materials required to maintain traffic as described in SECTION 01550 MAINTENANCE OF TRAFFIC.

1.1.14.2 Unit of Measure

Unit of measure: lump sum.

1.1.15 Performance and Payment Bonds (Bid Item 0034)

1.1.15.1 Payment

Payment will be made for the performance and payment bonds that are required as part of this contract. The Government will pay the actual cost of the bonds or the Contractor's bid price, whichever is less.

1.1.15.2 Unit of Measurement

Unit of measure: lump sum.

1.2 UNIT PRICE PAYMENT ITEMS

Payment items for the work of this contract on which the contract unit price payments will be made are listed in the BID SCHEDULE and described below. The unit price and payment made for each item listed shall constitute full compensation for furnishing all plant, labor, materials, and equipment, and performing any associated Contractor quality control, environmental protection, meeting safety requirements, tests and reports, and for performing all work required for each of the unit price items.

1.2.1 Steel Sheet Pile AZ-13, AZ-18 & AZ-46 (Bid Items 0004AA, 0004AB & 0004AC)

1.2.1.1 Payment

Payment shall cover all costs of furnishing, handling, storing and installing piling including placing, driving, cutting holes, studs, stiffener plates, isolation joint components and other materials and work incident thereto. Payment for steel sheet piling in place of the size and type of sheet piling specified shall be made at the contract unit price per square foot for Bid Items 0004AA, 0004AB & 0004AC of the Bid Schedule. Contractor furnished pilings which have been installed and are pulled at the direction of the Contracting Officer and found to be in good condition will be paid for at the applicable contract unit price for furnishing and installing the pilings in their initial position plus an equal amount for

the cost of pulling. When such pulled pilings are redriven an additional amount equal to 50 percent of the applicable contract unit price for furnishing and driving the pilings will be paid for redriving pilings. This additional price constitutes payment for redriving only. The cost of furnishing, initial driving and pulling the pilings is to be paid for as specified herein. When pilings are pulled and found to be damaged no payment will be made for the initial furnishing and driving or for the pulling of such pilings. Pilings replacing damaged pilings will be paid for at the applicable contract unit prices.

The cost of each splice made shall be incidental to the cost of the square foot area of the pile extension. An additional sum will be paid for each square foot of piling extension at the contract unit price per square foot of this bid item of the Bidding Schedule. Payment will be made for each piling spliced, at the direction of the Contracting Officer, in order to drive the piling to a depth greater than shown on the drawings and extend the piling up to the required top elevation.

1.2.1.2 Measurement

Steel Sheet Pile shall be measured for payment by the area of 2-dimensional projected wall area for each size pile used. Projected wall area shall be computed by multiplying the horizontal length of wall measured along the centerline of wall times the length of piles measured from the tip elevation to the cut-off elevation. For installed pilings directed to be cut off before reaching the penetration depth shown on drawings the portion cut off will be measured for payment as the difference between the total length of piling shown on the plans for that location and the length of piling installed below the point of cut-off. This will equal the square footage of sheet pile. Pilings not driven to the penetration depths shown on the drawings which are directed by the Contracting Officer Representative to be cutoff, except for those cutoffs necessitated by excessive battering, will be paid by each square foot of sheet pile for the portion cut off. Measurement for payment will be as stipulated herein at the rate of 50 percent of the applicable contract unit price.

1.2.1.3 Unit of Measure

Unit of measure: square foot (SF)

1.2.2 Earthen Levee and Reptile Crossing 1 & 2 (Bid Item 0005AA & 0005AE)

1.2.2.1 Payment

Payment for earthen levee and reptile crossing 1 & 2 will be made at the contract unit price for Bid Item 0005AA and 0005AE of the Bid Schedule including stripping, hauling, stockpiling, sub-grade preparation, filling, compacting, grading, and finishing suitable for the application of turf. The contract unit price shall include full compensation for furnishing all plant, labor, materials, and incidentals necessary to complete the work. Payment for turf placement will be made under Bid Item 0027, SEEDING. Inspection trench excavating and backfilling will be incidental to this pay item.

1.2.2.2 Measurement

Earthen levee shall be measured by the actual cubic yard of cohesive material placed to the dimension as shown on the plans and cross sections. Quantities shall be determined by the average end area method every 100

feet, or as directed by the Contracting Officer. Pre-placement surveys shall be taken after the stripping, excavation, and other preparation of the area has been performed.

The Contractor shall notify the COR sufficiently on advance of the start of the placing operation and upon completion of the placement operation before the final survey is performed. The contractor shall have the surveys performed by an independent licensed surveyor. The Contractor should note that subsurface soils may be compressible, and shrinkage and settlement may occur during construction. No additional volume of material shall be added to the survey quantity to account for settlement or shrinkage, but shall be incidental to this bid item

1.2.2.3 Unit of Measurement

Unit of measure: cubic yard (CY)

1.2.3 Satisfactory Fill (Bid Item 0005AB)

1.2.3.1 Payment

Payment will be made at the contract unit price for satisfactory fill placed in accordance with SECTION 02300 EARTHWORK, including excavating, loading, hauling, placing and compacting. Payment constitutes full compensation for furnishing all labor, materials, equipment, tools, and incidentals necessary to complete the work.

1.2.3.2 Measurement

Satisfactory fill will be measured for payment by the cubic yard of material placed to the dimension as shown on the plans and cross section. Quantities shall be determined by the average end area method every 100 feet, or as directed by the Contracting Officer. Pre-placement surveys shall be taken after the stripping, excavation, and other preparation of the area has been performed. The final quantity survey and quantity calculations for satisfactory levee fill shall be submitted for approval within 20 calendar days after completion of each clearly definable section of work.

The Contractor shall notify the COR sufficiently on advance of the start of the placing operation and upon completion of the placement operation before the final survey is performed. The contractor shall have the surveys performed by an independent licensed surveyor. The Contractor should note that subsurface soils may be compressible, and shrinkage and settlement may occur during construction. No additional volume of material shall be added to the survey quantity to account for settlement or shrinkage, but shall be incidental to this bid item.

1.2.3.3 Unit of Measurement

Unit of measure: cubic yard (CY)

1.2.4 Stripping Topsoil (Bid Item 0005AC)

1.2.4.1 Payment

Costs for furnishing all labor, materials, equipment, tools, and incidentals necessary to complete the work, as described in Section 02300 EARTHWORK, shall be paid for at the contract unit price for Bid Item 0005AC

of the bidding schedule. Costs for excavating, loading, hauling, and stockpiling topsoil shall also be included under this bid item.

1.2.4.2 Measurement

Quantity measured for payment shall be the actual number of cubic yards (CY) stripped to the depth indicated within the limits of construction shown on the plans and cross sections, or as directed by the Contracting Officer. Quantities shall be determined by multiplying the surface area of topsoil placed by an average thickness of 6 inches.

1.2.4.3 Unit of Measure

Unit of measure: cubic yard (CY)

1.2.5 Swale Grading (Bid Item 0005AD)

1.2.5.1 Payment

Swale grading will be paid for at the contract unit price for Bid Item 0005AD of the bidding schedule. The price shall be full compensation for all plant, labor, equipment, and materials required to perform the work necessary to achieve the lines, grades, and elevations of the ditch as shown on the contract drawings. This shall also include the stockpiling of material from the excavation as necessary. Satisfactory fill for swale grading shall be incidental to this bid item.

1.2.5.2 Measurement

Swale grading will be measured for payment by the linear foot (LF) of respective ditch work completed and accepted.

1.2.5.3 Unit of Measure

Unit of measure: linear foot (LF)

1.2.6 Strip Aggregate Base Course, Bituminous Binder, and Bituminous Surface (Bid Items 0008AA and 0009AA)

1.2.6.1 Payment

Costs for stripping the aggregate base course, bituminous binder, and bituminous surface materials shall be paid at the contract unit price per square yard (SY). The price shall include compensation for removing, loading, hauling, and disposal of this material, and for furnishing all labor, materials, equipment, tools, and incidentals necessary to complete the work. Strip Aggregate Base Course, Bituminous Binder, and Bituminous Surface price shall be given in Bid Items 0008AA and 0009AA of the Bid Schedule.

1.2.6.2 Measurement

The quantity measured for payment shall be the actual area in square yards (SY) of existing pavement and subbase removed.

1.2.6.3 Unit of Measure

Unit of measure: square yard (SY)

1.2.7 Aggregate Base Course (Bid Items 0008AB and 0009AB)

1.2.7.1 Payment

Aggregate Base Course will be paid for at the contract unit price for Bid Items 0008AB and 0009AB of the Bid Schedule. Payments shall constitute full compensation for all plant, labor, materials, and incidentals necessary for the work.

1.2.7.2 Measurement

Aggregate Base Course will be measured by the tons (TN) of material placed and accepted, for Bid Items 0008AB and 0009AB of the Bid Schedule. The Contractor shall provide trip tickets indicating the stone weight by a certified vendor scale.

1.2.7.3 Unit of Measure

Unit of measure: Tons (TN)

1.2.8 Bituminous Binder and Bituminous Surface (Bid Items 0008AC, 0008AD, 0009AC, and 0009AD)

1.2.8.1 Payment

Bituminous Concrete Surface Course: Bituminous concrete surface course will be paid for at the contract unit price for Bid Items 0008AD and 0009AD of the Bid Schedule. Payments shall constitute full compensation for preparing or reconditioning the base course or existing pavement; for furnishing all materials, equipment, plant, and tools; and for labor and other incidentals necessary to complete work required as described in Section 02741 Bituminous Concrete Pavement. Prime/tack coat, as necessary, shall be included in surface course payment.

Bituminous Concrete Binder Course: Bituminous concrete binder course will be paid for at the contract unit price for Bid Items 0008AC and 0009AC of the Bid Schedule. Payments shall constitute full compensation for all plant, labor, materials, and incidentals necessary to complete the work as described in Section 02741 Bituminous Concrete Pavement.

No separate measurement or direct payment will be made for bituminous pavement used to repair street cuts for drainage structure and culvert installations. All associated costs for repair work shall be included with the applicable unit prices in the Bid Schedule.

No separate measurement or direct payment will be made for pavement stripping.

1.2.8.2 Measurement

Bituminous binder and bituminous surface will be measured by the square yard of each completed and accepted.

1.2.8.3 Unit of Measure

Unit of measure: square yard (SY)

1.2.9 Concrete Curb and gutter (Bid Items 0008AF and 0009AE)

1.2.9.1 Payment

Concrete Curb and gutter will be paid for at the contract unit price for Bid Items 0008AF and 0009AE of the Bid Schedule. Payments shall constitute full compensation for all plant, labor, materials, and incidentals necessary for the work.

1.2.9.2 Measurement

Measurement will be made by the linear foot of concrete curb and gutter completed and accepted.

1.2.9.3 Unit of Measurement

Unit of measure: Linear Foot (LF)

1.2.10 Geotextile (Bid Items 0008AE, 0023AB, and 0025AD)

1.2.10.1 Payment

Payment for geotextile shall be made at the contract unit price for Bid Items 0008AE, 0023AB, and 0025AD of the Bid Schedule and shall include full compensation for all plant, labor, and materials necessary for work.

1.2.10.2 Measurement

Measurement will be made by the square yard of geotextile completed and accepted.

1.2.10.3 Unit of Measurement

Unit of measure: square yard (SY)

1.2.11 Clay Embankment (Bid Item 0022AB)

1.2.11.1 Payment

Payment for clay embankment will be made at the contract unit price for Bid Item 0022AB of the Bid Schedule. The contract unit price shall constitute full compensation for all hauling, stockpiling, sub-grade preparation, filling, compacting, grading, finishing, plant, labor, materials, and incidentals necessary for the work. No separate payment will be made for the placement of topsoil and turf. Topsoil and turf required for the swing gate embankment will be incidental to this pay item.

1.2.11.2 Measurement

Clay embankment will be measured by the actual cubic yard of cohesive material placed to the dimension as shown on the plans and cross sections. The basis of measurement will be determined by before and after survey, or as directed by the COR. Pre-placement surveys shall be taken after the necessary stripping, excavation, and other preparation of the area has been performed.

The Contractor shall notify the COR sufficiently on advance of the start of the placing operation and upon completion of the placement operation before the final survey is performed. The contractor shall have the surveys

performed by an independent licensed surveyor.

1.2.11.3 Unit of Measure

Unit of measure: Cubic Yard (CY).

1.2.12 Coarse Aggregate CA-6 (Bid Item 0023AA)

1.2.12.1 Payment

Payment for coarse aggregate shall be made at the contract unit price for Bid Item 0023AA of the Bid Schedule and shall include full compensation for all plant, labor, and materials necessary for work. Payment shall include all costs of furnishing, hauling, placing, and other incidentals necessary for work as described in Section 02938 STONE PATHWAY.

1.2.12.2 Measurement

Coarse aggregate will be measured by the Tons of material placed to the dimensions as shown on the contract drawings. The Contractor shall provide trip tickets indicating the stone weight by a certified vendor scale.

1.2.12.3 Unit of Measurement

Unit of measure: Tons (TN)

1.2.13 Guardrail (Bid Item 0024)

1.2.13.1 Payment

Guardrail shall be paid for at the contract unit price for Bid Item 0024 of the Bid Schedule. Payments shall constitute full compensation for all plant, labor, materials, and incidentals necessary for the work.

1.2.13.2 Measurement

Measurement will be made by the linear foot of guardrail completed and accepted.

1.2.13.3 Unit of Measurement

Unit of measure: Linear Foot (LF)

1.2.14 Riprap and Bedding Stone (Bid Item 0025AA, 0025AB, & 0025AC)

1.2.14.1 Payment

Payment for riprap and bedding stone satisfactorily placed will be made at the contract unit price for Bid Items 0025AA, 0025AB, and 0025AC of the Bid Schedule. The contract unit price shall constitute full compensation for furnishing, hauling, handling, placing, maintaining the riprap and bedding stone until final acceptance by the Government, and incidentals necessary for the work as described in Section 02380, STONE, CHANNEL, SHORELINE/COASTAL PROTECTION FOR STRUCTURES. No separate payment will be made for the stockpiling of riprap and bedding stone.

1.2.14.2 Measurement

Riprap and bedding Stone will be measured for payment by the tons (TN).

Quantities will be computed to the nearest whole Ton. Stone placement shall be done in the presence of the Contracting Officer. The Contractor shall provide trip tickets indicating the stone weight by a certified vendor scale.

1.2.14.3 Unit of Measure

Unit of measure: Ton (TN)

1.2.15 Seeding (Bid Item 0027)

1.2.15.1 Payment

Turf installed and accepted in accordance with Section 02920 SEEDING will be paid for at the contract unit price for Bid Item 0027 of the bidding schedule. Payment shall include furnishing labor, equipments, and materials for placing topsoil, seeds, mulch, water, soil conditioners, fertilizer, required maintenance, and other components appropriate to produce a satisfactory stand of turf. Payment for topsoil shall be incidental to this bid item.

1.2.15.2 Measurement

Measurement will be made of the surface area in acres covered by turf.

1.2.15.3 Unit of Measurement

Unit of measure: Acres (AC)

1.2.16 Tree Protection (Bid Item 0028)

1.2.16.1 Payment

All costs associated with the preparation and implementation of the tree protection plan, including but not limited to, furnishing labor, equipment and materials for the installation and maintenance of the protective fencing, removal, disposal of waste materials, and all associated work as described in Section 02931 TREE PROTECTION shall be paid for at the contract unit price for this bid item of the Bidding Schedule.

1.2.16.2 Measurement

Measurements will be made per linear foot of fence installed around the trees.

1.2.16.3 Units of Measurement

Unit of Measurement: Linear Foot (LF)

1.2.17 Handrail (Bid Item 0033)

1.2.17.1 Payment

All costs associated with manufacturing, furnishing, delivering, and placing as described in Section 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS and as shown on drawings shall be paid shall be made at the contract unit price for this bid item of the Bidding Schedule.

1.2.17.2 Measurement

Handrail will be measured per linear foot of work completed and accepted at locations shown on drawings.

1.2.17.3 Unit of Measure

Unit of measure: linear foot (LF).

1.3 OTHER ITEMS - INCIDENTAL TO CONSTRUCTION

1.3.1 Dewatering

No separate payment will be made for de-watering. This work shall be incidental to the construction, and shall be included in the bid price for the applicable item of work in the Bid Schedule.

1.3.2 Excavations for Structures and Piping

No separate measurements shall be made for excavations for structures or piping. Excavations for structures or piping shall be considered incidental to the applicable item of work in the Bid Schedule.

1.3.3 Backfill

No separate payment shall be made for backfill. All backfill operations, including the cost of preparing foundations, spreading, compacting, drying, and wetting; and all operations incidental to the placement of the backfill shall be included in the bid price per each structure or installation in the Bid Schedule.

1.3.4 Shoring and Bracing

No separate payment will be made for shoring and bracing. This work shall be incidental to the construction, and shall be included in the bid price of the applicable item of work in the Bid Schedule.

1.3.5 Grading

No separate payment shall be made for grading. All grading shall be done to the elevations as shown on the contract drawings. All grading operations, shall be incidental to the construction and shall be included in the bid price of the applicable bid item of work in the Bid Schedule.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

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SECTION 01312

QUALITY CONTROL SYSTEM (QCS)

PART 1 GENERAL

1.1 Contract Administration

The Government will use the Resident Management System for Windows (RMS) to assist in its monitoring and administration of this contract. The Contractor shall use the Government-furnished Construction Contractor Module of RMS, referred to as QCS, to record, maintain, and submit various information throughout the contract period. **The Contractor module, user manuals, updates, and training information can be downloaded from the RMS web site, http://www.rmssupport.com/home.aspx.** This joint Government-Contractor use of RMS and QCS will facilitate electronic exchange of information and overall management of the contract. QCS provides the means for the Contractor to input, track, and electronically share information with the Government in the following areas:

Administration
Finances
Quality Control
Submittal Monitoring
Scheduling
Import/Export of Data

1.1.1 Correspondence and Electronic Communications

For ease and speed of communications, both Government and Contractor will, to the maximum extent feasible, exchange correspondence and other documents in electronic format. Correspondence, pay requests and other documents comprising the official contract record shall also be provided in paper format, with signatures and dates where necessary. Paper documents will govern, in the event of discrepancy with the electronic version.

1.1.2 Other Factors

Particular attention is directed to Contract Clause, "Schedules for Construction Contracts", Contract Clause, "Payments", Section 01320A, PROJECT SCHEDULE, Section 01330, SUBMITTAL PROCEDURES, and Section 01451, CONTRACTOR QUALITY CONTROL, which have a direct relationship to the reporting to be accomplished through QCS. Also, there is no separate payment for establishing and maintaining the QCS database; all costs associated therewith shall be included in the contract pricing for the work.

1.2 QCS SOFTWARE

QCS is a Windows-based program that can be run on a stand-alone personal computer or on a network. The Government will make available the QCS software to the Contractor after award of the construction contract. Prior to the Pre-Construction Conference, the Contractor shall be responsible to download, install and use the latest version of the QCS software from the Government's RMS Internet Website. Upon specific justification and request by the Contractor, the Government can provide QCS on CD-ROM. Any program

updates of QCS will be made available to the Contractor via the Government RMS Website as they become available. Any questions the Contractor encounters while importing, exporting or providing contract-required data in the QCS program can be addressed to the RMS Support Center at (760) 247-0217.

1.3 SYSTEM REQUIREMENTS

The following is the minimum system configuration that the Contractor shall have to run QCS:

QCS and QAS System

Hardware

IBM-compatible PC with 1000 MHz Pentium or higher processor

256+ MB RAM for workstation / 512+ MB RAM for server

1 GB hard drive disk space for sole use by the QCS system

3 1/2 inch high-density floppy drive

Compact Disk (CD) Reader 8x speed or higher

SVGA or higher resolution monitor (1024x768, 256 colors)

Mouse or other pointing device

Windows compatible printer. (Laser printer must have 4 MB+ of RAM)

Connection to the Internet, minimum 56k BPS

Software

MS Windows 2000 or higher

QAS-Word Processing software: MS Word 2000 or newer

Latest version of: Netscape Navigator, Microsoft Internet Explorer, or other browser that supports HTML 4.0 or higher

Electronic mail (E-mail) MAPI compatible

Virus protection software that is regularly upgraded with all issued manufacturer's updates

1.4 RELATED INFORMATION

1.4.1 QCS User Guide

After contract award, the Contractor shall download instructions for the installation and use of QCS from the Government RMS Internet Website. In case of justifiable difficulties, the Government will provide the Contractor with a CD-ROM containing these instructions.

1.4.2 Contractor Quality Control(CQC) Training

The use of QCS will be discussed with the Contractor's QC System Manager

during the mandatory CQC Training class.

1.5 CONTRACT DATABASE

Prior to the pre-construction conference, the Government will provide the Contractor with basic contract award data to use for QCS. The Government will provide data updates to the Contractor as needed, generally by using the Government's SFTP repository built into QCS import/export function. These updates will generally consist of submittal reviews, correspondence status, QA comments, and other administrative and QA data.

1.6 DATABASE MAINTENANCE

The Contractor shall establish, maintain, and update data for the contract in the QCS database throughout the duration of the contract. The Contractor shall establish and maintain the QCS database at the Contractor's site office. Submit data updates to the Government (e.g., daily reports, submittals, RFI's, schedule updates, payment requests, etc.) using the Government's SFTP repository built into QCS export function. If permitted by the Contracting Officer, e-mail or CD-ROM may be used instead of SFTP repository (see Paragraph DATA SUBMISSION VIA CD-ROM). The QCS database typically shall include current data on the following items:

1.6.1 Administration

1.6.1.1 Contractor Information

The database shall contain the Contractor's name, address, telephone numbers, management staff, and other required items. Within 14 calendar days of receipt of QCS software from the Government, deliver Contractor administrative data in electronic format.

1.6.1.2 Subcontractor Information

The database shall contain the name, trade, address, phone numbers, and other required information for all subContractors. A subcontractor must be listed separately for each trade to be performed. Assign each subcontractor/trade a unique Responsibility Code, provided in QCS. Within 14 calendar days of receipt of QCS software from the Government, deliver subcontractor administrative data in electronic format.

1.6.1.3 Correspondence

Identify all Contractor correspondence to the Government with a serial number. Prefix correspondence initiated by the Contractor's site office with "S". Prefix letters initiated by the Contractor's home (main) office with "H". Letters shall be numbered starting from 0001. (e.g., H-0001 or S-0001). The Government's letters to the Contractor will be prefixed with "C".

1.6.1.4 Equipment

The Contractor's QCS database shall contain a current list of equipment planned for use or being used on the jobsite, including the most recent and planned equipment inspection dates.

1.6.1.5 Management Reporting

QCS includes a number of reports that Contractor management can use to

track the status of the project. The value of these reports is reflective of the quality of the data input, and is maintained in the various sections of QCS. Among these reports are: Progress Payment Request worksheet, QA/QC comments, Submittal Register Status, Three-Phase Inspection checklists.

1.6.1.6 Request For Information (RFI)

Exchange all Requests For Information (RFI) using the Built-in RFI generator and tracker in QCS.

1.6.2 Finances

1.6.2.1 Pay Activity Data

The QCS database shall include a list of pay activities that the Contractor shall develop in conjunction with the construction schedule. The sum of all pay activities shall be equal to the total contract amount, including modifications. Group pay activities Contract Line Item Number (CLIN); the sum of the activities shall equal the amount of each CLIN. The total of all CLINs equals the Contract Amount.

1.6.2.2 Payment Requests

Prepare all progress payment requests using QCS. Complete the payment request worksheet, prompt payment certification, and payment invoice in QCS. Update the work completed under the contract, measured as percent or as specific quantities, at least monthly. After the update, generate a payment request report using QCS. Submit the payment request, prompt payment certification, and payment invoice with supporting data using the Government's SFTP repository built into QCS export function. If permitted by the Contracting Officer, e-mail or a CD-ROM may be used. A signed paper copy of the approved payment request is also required, which will govern in the event of discrepancy with the electronic version.

1.6.3 Quality Control (QC)

QCS provides a means to track implementation of the 3-phase QC Control System, prepare daily reports, identify and track deficiencies, document progress of work, and support other Contractor QC requirements. Maintain this data on a daily basis. Entered data will automatically output to the QCS generated daily report. Provide the Government a Contractor Quality Control (CQC) Plan within the time required in Section 01451, CONTRACTOR QUALITY CONTROL. Within seven calendar days of Government acceptance, submit a QCS update reflecting the information contained in the accepted CQC Plan: schedule, pay activities, features of work, submittal register, QC requirements, and equipment list.

1.6.3.1 Daily Contractor Quality Control (CQC) Reports.

QCS includes the means to produce the Daily CQC Report. The Contractor may use other formats to record basic QC data. However, the Daily CQC Report generated by QCS shall be the Contractor's official report. Summarize data from any supplemental reports by the Contractor and consolidate onto the QCS-generated Daily CQC Report. Submit daily CQC Reports as required by Section 01451, CONTRACTOR QUALITY CONTROL. Electronically submit reports to the Government within 24 hours after the date covered by the report. Also provide the Government a signed, printed copy of the daily CQC report.

1.6.3.2 Deficiency Tracking.

The Contractor shall use QCS to track deficiencies. Deficiencies identified by the Contractor will be numerically tracked using QC punch list items. The Contractor shall maintain a current log of its QC punch list items in the QCS database. The Government will log the deficiencies it has identified using its QA punch list items. The Government's QA punch list items will be included in its export file to the Contractor. The Contractor shall regularly update the correction status of both QC and QA punch list items.

1.6.3.3 QC Requirements

Develop and maintain a complete list of QC testing and required structural and life safety special inspections required by the International Code Council (ICC), transferred and installed property, and user training requirements in QCS. Update all data on these QC requirements as work progresses, and promptly provide this information to the Government via QCS.

1.6.3.4 Three-Phase Control Meetings

The Contractor shall maintain scheduled and actual dates and times of preparatory and initial control meetings in QCS.

1.6.3.5 Labor and Equipment Hours

Log labor and equipment exposure hours on a daily basis. This data will be rolled up into a monthly exposure report.

1.6.3.6 Accident/Safety Reporting

The Government will issue safety comments, directions, or guidance whenever safety deficiencies are observed. The Government's safety comments will be included in its export file to the Contractor. Regularly update the correction status of the safety comments. In addition, utilize QCS to advise the Government of any accidents occurring on the jobsite. This brief supplemental entry is not to be considered as a substitute for completion of mandatory reports, e.g., ENG Form 3394 and OSHA Form 300.

1.6.3.7 Features of Work

The Contractor shall include a complete list of the features of work in the QCS database. A feature of work may be associated with multiple pay activities. However, each pay activity (see subparagraph "Pay Activity Data" of paragraph "Finances") will only be linked to a single feature of work.

1.6.3.8 Hazard Analysis

Use QCS to develop a hazard analysis for each feature of work included in the CQC Plan. The hazard analysis shall address any hazards, or potential hazards, that may be associated with the work

1.6.4 Submittal Management

The Government will provide the initial submittal register in electronic format. Thereafter, the Contractor shall maintain a complete list of all submittals, including completion of all data columns. Dates on which submittals are received and returned by the Government will be included in

its export file to the Contractor. The Contractor shall use QCS to track and transmit all submittals. ENG Form 4025, submittal transmittal form, and the submittal register update shall be produced using QCS. QCS and RMS will be used to update, store and exchange submittal registers and transmittals, but will not be used for storage of actual submittals.

1.6.5 Schedule

Develop a construction schedule consisting of pay activities, in accordance with Section 01320A, PROJECT SCHEDULE. This schedule shall be input and maintained in the QCS database either manually or by using the Standard Data Exchange Format (SDEF) (see Section 01320A PROJECT SCHEDULE). The updated schedule data shall be included with each pay request submitted by the Contractor.

1.6.6 Import/Export of Data

QCS includes the ability to export Contractor data to the Government and to import submittal register and other Government-provided data from RMS, and schedule data using SDEF.

1.7 IMPLEMENTATION

Contractor use of QCS as described in the preceding paragraphs is mandatory. Ensure that sufficient resources are available to maintain its QCS database, and to provide the Government with regular database updates. QCS shall be an integral part of the Contractor's management of quality control.

1.8 DATA SUBMISSION VIA CD-ROM

The Government-preferred method for Contractor's submission of QCS data is by using the Government's SFTP repository built into QCS export function. Other data should be submitted using E-mail with file attachment(s). For locations where this is not feasible, the Contracting Officer may permit use of CD-ROM for data transfer. Export data onto CDs using the QCS built-in export function. If used, submit CD-ROMs in accordance with the following:

1.8.1 File Medium

Submit required data on CD-ROM. They shall conform to industry standards used in the United States. All data shall be provided in English.

1.8.2 CD-ROM Labels

Affix a permanent exterior label to each CD-ROM submitted. The label shall indicate in English, the QCS file name, full contract number, contract name, project location, data date, name and telephone number of person responsible for the data.

1.8.3 File Names

The files will be automatically named by the QCS software. The naming convention established by the QCS software shall not be altered in any way by the Contractor.

1.9 MONTHLY COORDINATION MEETING

Update the QCS database each workday. At least monthly, generate and submit an export file to the Government with schedule update and progress payment request. As required in Contract Clause "Payments", at least one week prior to submittal, meet with the Government representative to review the planned progress payment data submission for errors and omissions.

Make all required corrections prior to Government acceptance of the export file and progress payment request. Payment requests accompanied by incomplete or incorrect data submittals will be returned. The Government will not process progress payments until an acceptable QCS export file is received.

1.10 NOTIFICATION OF NONCOMPLIANCE

The Contracting Officer will notify the Contractor of any detected noncompliance with the requirements of this specification. Take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, will be deemed sufficient for the purpose of notification.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

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SECTION 01320

PROJECT SCHEDULE FOR NORTHERN AREA AND MCCOOK FIELD OFFICES

PART 1 GENERAL

1.1 REFERENCES

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

U.S. ARMY CORPS OF ENGINEERS (USACE)

ER 1-1-11	(1995) Progress, Schedules, and Network Analysis Systems

1.2 QUALIFICATIONS

Designate an authorized representative to be responsible for the preparation of the schedule and all required updating (activity status) and preparation of reports. The authorized representative shall be experienced in scheduling projects similar in nature to this project and shall be experienced in the use of the scheduling software that meets the requirements of this specification.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Project Schedule; G,CN

Initial schedule as required by paragraphs 3.4 and 3.5 of this specification section.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

Prepare for approval a Project Schedule, as specified herein, pursuant to the Contract Clause, SCHEDULE FOR CONSTRUCTION CONTRACTS. Show in the schedule the sequence in which the Contractor proposes to perform the work and dates on which the Contractor contemplates starting and completing all schedule activities. The scheduling of the entire project is required. The scheduling of construction is the responsibility of the Contractor. Contractor management personnel shall actively participate in its

development. Subcontractors and suppliers working on the project shall also contribute in developing and maintaining an accurate Project Schedule, as appropriate. The schedule must be a forward planning as well as a project monitoring tool.

3.1.1 Approved Project Schedule

Use the approved Project Schedule to measure the progress of the work and to aid in evaluating time extensions provided under the "Default" clause. Make the schedule cost loaded and activity coded. The schedule will provide basis for all progress payments. If the Contractor fails to submit any schedule within the time prescribed, the Contracting Officer may withhold approval of progress payments until the Contractor submits the required schedule.

3.1.2 Schedule Status Reports

Provide a Updated Schedule Progress Report on at least a monthly basis. If, in the opinion of the Contracting Officer, the Contractor falls behind the approved schedule, the Contractor shall take steps necessary to improve its progress including those that may be required by the Contracting Officer, without additional cost to the Government. In this circumstance, the Contracting Officer may require the Contractor to increase the number of shifts, overtime operations, days of work, and/or the amount of construction plant, and to submit for approval any supplementary schedule or schedules as the Contracting Officer deems necessary to demonstrate how the approved rate of progress will be regained.

3.1.3 Default Terms

Failure of the Contractor to comply with the requirements of the Contracting Officer shall be grounds for a determination by the Contracting Officer that the Contractor is not prosecuting the work with sufficient diligence to ensure completion within the time specified in the contract. Upon making this determination, the Contracting Officer may terminate the Contractor's right to proceed with the work, or any separable part of it, in accordance with the default terms of the contract.

3.2 BASIS FOR PAYMENT AND COST LOADING

Use the schedule as basis for determining contract earnings during each payment period. Lack of an approved schedule update will result in an inability of the Contracting Officer to evaluate contract earned value for the purposes of payment. Failure of the Contractor to provide all required information will result in the disapproval of the initial schedule and subsequent schedule updates. In the event schedule revisions are directed by the Contracting Officer and those revisions have not been included in subsequent revisions or updates, the Contracting Officer may hold retainage up to the maximum allowed by contract, each payment period, until such revisions to the Project Schedule have been made. Activity cost loading shall be reasonable, as determined solely by the Contracting Officer. The aggregate value of all activities coded to a contract CLIN shall equal the value of the CLIN on the Schedule.

3.3 PROJECT SCHEDULE DETAILED REQUIREMENTS

The computer software system utilized to produce and update the Project Schedule shall be capable of meeting all requirements of this specification. Scheduling software that meets the activity coding

structure defined in the Standard Data Exchange Format (SDEF) in ER 1-1-11 are Primavera Project Planner (P3) by Primavera, and Open Plan by Deltek. The Contractor may choose to manually enter the activity schedule in QCS rather than utilize scheduling software. The use of manual updates shall not release the Contractor from providing the necessary detail as described in this section.

3.3.1 Critical Path Method

Use the Critical Path Method (CPM) of network calculation to generate the Project Schedule. Prepare the Project Schedule using the Precedence Diagram Method (PDM).

3.3.2 Level of Detail Required

Develop the Project Schedule to an appropriate level of detail. Failure to develop the Project Schedule to an appropriate level of detail, as determined by the Contracting Officer, will result in its disapproval. The Contracting Officer will consider, but is not limited to, the following characteristics and requirements to determine appropriate level of detail:

3.3.2.1 Activity Durations

Reasonable activity durations are those that allow the progress of ongoing activities to be accurately determined between update periods. Less than 2 percent of all non-procurement activities shall have Original Durations (OD) greater than 20 work days or 30 calendar days. Procurement activities are defined herein.

3.3.2.2 Procurement Activities

The schedule must include activities associated with the submittal, approval, procurement, fabrication and delivery of long lead materials, equipment, fabricated assemblies and supplies. Long lead procurement activities are those with an anticipated procurement sequence of over 60 calendar days. A typical procurement sequence includes the string of activities: submit, approve, procure, fabricate, and deliver.

3.3.2.3 Mandatory Tasks

The following tasks must be included and properly scheduled:

a. Submission, review and acceptance of work plans, safety plan, quality control plan, environmental protection plan, and design packages.

b. Submission of mechanical/electrical/information systems layout drawings.

c. Submission and approval of O & M manuals.

d. Submission and approval of as-built drawings.

e. Submission and approval of mechanical, electrical, and control systems testing and commissioning.

f. Performance Verification testing.

g. Other systems testing and operational training, if required.

h. Contractor's pre-final inspection.

u. Correction of punchlist from Contractor's pre-final inspection.

h. Government's pre-final inspection.

j. Correction of punch list from Government's pre-final inspection.

k. Final inspection.

3.3.2.4 Government Activities

Show Government and other agency activities that could effect progress. These activities include, but are not limited to: approvals, inspections, utility tie-in, and Notice to Proceed (NTP) for phasing requirements.

3.3.2.5 Construction Schedule Constraints

The Contractor shall show the Phasing constraints identified in the Plans and Specifications regarding construction sequencing in the area of IDOT FAP RT 374 (IL ROUTE 374), MILWAUKEE AVE SECTION 3268F-4-1, the anticipated Adverse Weather Days identified in the General Conditions shall be reflected for activities affecting weather.

3.3.2.6 Activity Responsibility Coding (RESP)

Assign responsibility Code for all activities to the Prime Contractor, Subcontractor or Government agency responsible for performing the activity. Activities coded with a Government Responsibility code include, but are not limited to: Government approvals, Government design reviews, environmental permit approvals by State regulators, Government Furnished Equipment (GFE) and Notice to Proceed (NTP) for phasing requirements. Code all activities not coded with a Government Responsibility Code to the Prime Contractor or Subcontractor responsible to perform the work. Activities shall not have more than one Responsibility Code. Examples of acceptable activity code values are: DOR (for the designer of record); ELEC (for the electrical subcontractor); MECH (for the mechanical subcontractor); and GOVT (for USACE). Unacceptable code values are abbreviations of the names of subcontractors.

3.3.2.7 Activity Work Area Coding

Assign Work Area code to activities based upon the work area in which the activity occurs. Define work areas based on resource constraints or space constraints that would preclude a resource, such as a particular trade or craft work crew, from working in more than one work area at a time due to restraints on resources or space. Examples of Work Area Coding include different areas of floodwall based on Phasing requirements. Activities shall not have more than one Work Area Code. Not all activities are required to be Work Area coded. A lack of Work Area coding will indicate the activity is not resource or space constrained.

3.3.2.8 Contract Changes/Requests for Equitable Adjustment (REA) Coding (MODF)

Assign Activity code to any activity or sequence of activities added to the schedule as a result of a Contract Modification, when approved by the Contracting Officer, with a Contract Changes/REA Code. Key all Code values

to the Government's modification numbering system. No activity or sequence of activities may be added to the schedule as a result of alleged constructive changes made by the Government without the expressed written consent of the Contracting Officer. Assign Activity codes for these activities with a Contract Changes/REA Code. Key the code values to the Contractor's numbering system. Approval to add these activities does not necessarily mean the Government accepts responsibility and therefore liability for such activities and any associated impacts to the schedule, but rather the Government recognizes such activities are appropriately added to the schedule for the purposes of maintaining a realistic and meaningful schedule. Such activities shall not be Responsibility Coded to the Government unless approved. An activity shall not have more than one Contract Changes/REA Code.

3.3.2.9 Contract Line Item (CLIN) Coding (BIDI)

Code all activities to the CLIN on the Contract Line Item Schedule to which the activity belongs. An activity shall not contain more than one CLIN Item Code. CLIN Item code all activities, even when an activity is not cost loaded.

3.3.2.10 Phase of Work Coding (PHAS)

Assign Phase of Work Code to all activities based upon the phase of work in which the activity occurs. Code activities to a Construction Phase. If the contract specifies construction phasing with separately defined performance periods, identify a Construction Phase Code to allow filtering and organizing the schedule accordingly. Each activity shall have only one Phase of Work code.

3.3.2.11 Category of Work Coding (CATW)

Assign Category of Work Code to all Activities based upon the category of work to which the activity belongs. Category of Work Code must include, but is not limited to: Construction Submittal approvals, Acceptance, Procurement, Fabrication, Delivery, Weather Sensitive Installation, Non-Weather Sensitive Installation, Start-Up, Test and Turnover. Assign a Category of Work Code to each activity. Each activity shall have only one Category of Work Code.

3.3.2.12 Definable Features of Work Coding (FOW1, FOW2, FOW3)

Assign a Definable Feature of Work Code to appropriate activities based on the definable feature of work to which the activity belongs. Definable Feature of Work is defined in Specification Section 01451 CONTRACTOR QUALITY CONTROL. An activity shall not have more than one Definable Feature of Work Code. Not all activities are required to be Definable Feature of Work Coded.

3.3.3 Scheduled Project Completion and Activity Calendars

The schedule interval shall extend from NTP date to the required contract completion date. The contract completion activity (End Project) shall finish based on the required contract duration in the accepted contract proposal, as adjusted for any approved contract time extensions. The first scheduled work period shall be the day after NTP is acknowledged by the Contractor. Schedule activities on a calendar to which the activity logically belongs. Activities may be assigned to a 7 day calendar when the contract assigns calendar day durations for the activity such as a

Government Acceptance activity. If the Contractor intends to perform physical work less than seven days per week, schedule the associated activities on a calendar with non-work periods identified including weekends and holidays. Assign the Category of Work Code - Weather Sensitive Installation to those activities that are weather sensitive. Original durations must account for anticipated normal adverse weather. The Government will interpret all work periods not identified as non-work periods on each calendar as meaning the Contractor intends to perform work during those periods.

3.3.3.1 Project Start Date

The schedule shall start no earlier than the date on which the NTP was acknowledged. Include as the first activity in the project schedule an activity called "Start Project" (or NTP). The "Start Project" activity shall have an "ES" constraint date equal to the date that the NTP was acknowledged, and a zero day duration.

3.3.3.2 Schedule Constraints and Open Ended Logic

Constrain completion of the last activity in the schedule by the contract completion date. Schedule calculations shall result in a negative float when the calculated early finish date of the last activity is later than the contract completion date. Include as the last activity in the project schedule an activity called "End Project". The "End Project" activity shall have an "LF" constraint date equal to the contract completion date for the project, and with a zero day duration or by using the "project must finish by" date in the scheduling software. The schedule shall have no constrained dates other than those specified in the contract. The use of artificial float constraints such as "zero fee float" or "zero total float" are typically prohibited. There shall only be 2 open ended activities: Start Project (or NTP) with no predecessor logic and End Project with no successor logic.

3.3.3.3 Early Project Completion

In the event the project schedule calculates an early completion date of the last activity prior to the contract completion date, the Contractor shall identify those activities that it intends to accelerate and/or those activities that are scheduled in parallel to support the Contractor's "early" completion. The last activity shall have a late finish constraint equal to the contract completion date and the schedule will calculate positive float. The Government will not approve an early completion schedule with zero float on the longest path. The Government is under no obligation to accelerate activities for which it is responsible to support a proposed early contract completion.

3.3.4 Default Progress Data Disallowed

Do not automatically update Actual Start and Finish dates with default mechanisms that may be included in the scheduling software. Activity Actual Start (AS) and Actual Finish (AF) dates assigned during the updating process shall match those dates provided from Contractor Quality Control Reports. Failure of the Contractor to document the AS and AF dates on the Daily Quality Control report for every in-progress or completed activity, and failure to ensure that the data contained on the Daily Quality Control reports is the sole basis for schedule updating shall result in the disapproval of the Contractor's updated schedule. Updating of the percent complete and the remaining duration of any activity shall be independent

functions. Disable program features which calculate one of these parameters from the other.

3.3.5 Out-of-Sequence Progress

Activities that have progressed before all preceding logic has been satisfied (Out-of-Sequence Progress) will be allowed only on a case-by-case basis subject to approval by the Contracting Officer. Propose logic corrections to eliminate all out of sequence progress or justify not changing the sequencing for approval prior to submitting an updated project schedule. Correct out of sequence progress that continues for more than two update cycles by logic revision, as approved by the Contracting Officer.

3.3.6 Negative Lags and Start to Finish Relationships

Lag durations contained in the project schedule shall not have a negative value. Do not use Start to Finish (SF) relationships.

3.3.7 Calculation Mode

Schedule calculations shall retain the logic between predecessors and successors even when the successor activity starts and the predecessor activity has not finished. Software features that in effect sever the tie between predecessor and successor activities when the successor has started and the predecessor logic is not satisfied ("progress override") will not be allowed.

3.3.8 Milestones

The schedule must include milestone activities for each significant project event including but not limited to: foundation/substructure construction complete; superstructure construction complete; building dry-in or enclosure complete to allow the initiation of finish activities; permanent power complete; and building systems commissioning complete.

3.4 PROJECT SCHEDULE SUBMISSIONS

Provide the submissions as described below. The data CD, reports, and network diagrams required for each submission are contained in paragraph SUBMISSION REQUIREMENTS.

3.4.1 Project Schedule Submissions

An initial baseline Construction Schedule prepared in accordance with paragraph 3.4.2 of this Section shall be submitted within the time specified below. This schedule shall use the date of Notice to Proceed as the start date and shall show the work completed on the Contract Required Completion Date, as indicated in the FAR clause entitled COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK in Section 00700. In addition to the initial baseline schedule, an updated Construction Schedule shall be included with each payment estimate/request for payment. These schedule updates shall compare the initial baseline schedule to an updated schedule showing the actual work progress to date and a projection of the work schedule for the remainder of the Contract. In addition to the submittal requirements listed in paragraph 3.5 of this Section, all schedule submittals shall include a tabulated earnings projection, in a format acceptable to the COR, that lists the estimated earnings for each month of the Contract duration.

3.4.2 Initial Project Schedule Submission

Submit the Initial Project Schedule for approval within 42 calendar days after NTP. The schedule shall demonstrate a reasonable and realistic sequence of activities which represent all work through the entire contract performance period. The Initial Schedule shall be at a reasonable level of detail as determined by the Contracting Officer that could affect the construction schedule. The Project Schedule specified herein must include all of the required Plan and Program preparations, submissions and approvals identified in the contract (for example, Quality Control Plan, Safety Plan, and Environmental Protection Plan) as well as any design activities, permitting activities, conference activities and other non-construction activities that could affect the construction schedule.

3.4.3 Periodic Schedule Updates

Submit periodic schedule updates with each progress payment request. These submissions will enable the Contracting Officer to assess Contractor's progress. If the Contractor fails or refuses to furnish the information and project schedule data, which in the judgment of the Contracting Officer or authorized representative is necessary for verifying the Contractor's progress, the Contractor shall be deemed not to have provided an estimate upon which progress payment may be made.

3.4.4 Standard Activity Coding Dictionary

Use the activity coding structure defined in the Standard Data Exchange Format (SDEF) in ER 1-1-11, Appendix A. This exact structure is mandatory, even if some fields are not used. A template SDEF compatible schedule backup file (sdef.prx) is available on the QCS website: www.rmssupport.com. The SDEF format is as follows:

Field	Activity Code	Length	Description
1	WRKP	3	Workers per Day
2	RESP	4	Responsible Party (e.g. GC, subcontractor, USACE)
3	AREA	4	Area of Work
4	MODF	6	Modification or REA number
5	BIDI	6	Bid Item (CLIN)
6	PHAS	2	Phase of Work
7	CATW	1	Category of Work
8	FOW1	10	Feature of Work (used up to 10 characters in length)
9	FOW2	10	Feature of Work (used up to 20 characters in length)
10	FOW3	10	Feature of Work (used up to 30 characters in length)

3.5 SUBMISSION REQUIREMENTS

Submit the following items for the Initial Schedule, and every Schedule Revision throughout the life of the project:

3.5.1 Data CD's

Provide two sets of data CD's containing the project schedule in the backup format. Each CD shall also contain all previous update backup files. File medium shall be CD. Label each CD indicating the type of schedule (Preliminary, Initial, Update), full contract number, Data Date and file name. Each schedule shall have a unique file name as determined by the Contractor.

3.5.2 Approved Changes Verification

Include only those project schedule changes in the schedule submission that have been previously approved by the Contracting Officer.

3.5.3 Network Diagram

The network diagram is required. The network diagram shall depict and display the order and interdependence of activities and the sequence in which the work is to be accomplished. The Contracting Officer will use, but is not limited to, the following conditions to review compliance with this paragraph:

3.5.3.1 Continuous Flow

Diagrams shall show a continuous flow from left to right with no arrows from right to left. Show the activity number, description, duration, and estimated earned value on the diagram.

3.5.3.2 Project Milestone Dates

Show dates on the diagram for start of project, any contract required interim completion dates, and contract completion dates.

3.5.3.3 Critical Path

Clearly show the critical path.

3.5.3.4 S-Curves

Earnings curves showing projected early and late earnings and earnings to date. Additionally, the Contractor shall submit quarterly, the updated budgeted cost for the bid items in a spreadsheet format reflecting total earnings by month for the project duration.

3.6 REQUESTS FOR TIME EXTENSIONS

In the event the Contractor believes it is entitled to an extension of the contract performance period, completion date, or any interim milestone date, furnish the following for a determination by the Contracting Officer: justification, project schedule data, and supporting evidence as the Contracting Officer may deem necessary. Submission of proof of excusable delay, based on revised activity logic, duration, and costs (updated to the specific date that the delay occurred) is a condition precedent to any approvals by the Government. In response to each Request For Proposal issued by the Government, the Contractor shall submit a schedule impact analysis demonstrating whether or not the change contemplated by the Government impacts the critical path.

3.6.1 Justification of Delay

The project schedule shall clearly display that the Contractor has used, in full, all the float time available for the work involved with this request. The Contracting Officer's determination as to the number of allowable days of contract extension shall be based upon the project schedule updates in effect for the time period in question, and other factual information. Actual delays that are found to be caused by the Contractor's own actions, which result in a calculated schedule delay, will

not be a cause for an extension to the performance period, completion date, or any interim milestone date.

3.6.2 Submission Requirements

Submit a justification for each request for a change in the contract completion date of less than 2 weeks based upon the most recent schedule update at the time of the NTP or constructive direction issued for the change. Such a request shall be in accordance with the requirements of other appropriate Contract Clauses and shall include, as a minimum:

a. A list of affected activities, with their associated project schedule activity number.

b. A brief explanation of the causes of the change.

c. An analysis of the overall impact of the changes proposed.

d. A sub-network of the affected area.

Identify activities impacted in each justification for change by a unique activity code contained in the required data file.

3.6.3 Additional Submission Requirements

The Contracting Officer may request an interim update with revised activities for any requested time extension of over 2 weeks. Provide this disk within 4 days of the Contracting Officer's request.

3.7 DIRECTED CHANGES

If the NTP is issued for changes prior to settlement of price and/or time, submit proposed schedule revisions to the Contracting Officer within 2 weeks of the NTP being issued. The Contracting Officer will approve proposed revisions to the schedule prior to inclusion of those changes within the project schedule. If the Contractor fails to submit the proposed revisions, the Contracting Officer may furnish the Contractor with suggested revisions to the project schedule. The Contractor shall include these revisions in the project schedule until revisions are submitted, and final changes and impacts have been negotiated. If the Contractor has any objections to the revisions furnished by the Contracting Officer, advise the Contracting Officer within 2 weeks of receipt of the revisions. Regardless of the objections, the Contractor shall continue to update the schedule with the Contracting Officer's revisions until a mutual agreement in the revisions is reached. If the Contractor fails to submit alternative revisions within 2 weeks of receipt of the Contracting Officer's proposed revisions, the Contractor will be deemed to have concurred with the Contracting Officer's proposed revisions. The proposed revisions will then be the basis for an equitable adjustment for performance of the work.

3.8 OWNERSHIP OF FLOAT

Float available in the schedule, at any time, shall not be considered for the exclusive use of either the Government or the Contractor.

3.9 TRANSFER OF SCHEDULE DATA INTO RMS/QCS

The Contractor shall download and upload the schedule data into the Resident Management System (RMS)via QCS prior to RMS databases being

transferred to the Government and is considered to be additional supporting data in a form and detail required by the Contracting Officer pursuant to FAR 52.232-5 - Payments under Fixed-Price Construction Contracts. The receipt of a proper payment request pursuant to FAR 52.232-27 - Prompt Payment for Construction Contracts is contingent upon the Government receiving both acceptable and approvable hard copies and electronic export from QCS of the application for progress payment.

-- End of Section --

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DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01330

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SECTION 01330

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SUBMITTAL IDENTIFICATION (SD)

Submittals required are identified by SD numbers and titles as follows:

SD-01 Preconstruction Submittals

Certificates of insurance.
Surety bonds.
List of proposed subcontractors.
List of proposed products.
Construction Progress Schedule.
Submittal schedule.
Schedule of values.
Health and safety plan.
Work plan.
Quality control plan.
Environmental protection plan.

SD-02 Shop Drawings

Drawings, diagrams and schedules specifically prepared to illustrate some portion of the work.

Diagrams and instructions from a manufacturer or fabricator for use in producing the product and as aids to the contractor for integrating the product or system into the project.

Drawings prepared by or for the contractor to show how multiple systems and interdisciplinary work will be coordinated.

SD-03 Product Data

Catalog cuts, illustrations, schedules, diagrams, performance charts, instructions and brochures illustrating size, physical appearance and other characteristics of materials or equipment for some portion of the work.

Samples of warranty language when the contract requires extended product warranties.

SD-04 Samples

Physical examples of materials, equipment or workmanship that illustrate functional and aesthetic characteristics of a material or product and establish standards by which the work can be judged.

Color samples from the manufacturer's standard line (or custom color samples if specified) to be used in selecting or approving colors for the project.

Field samples and mock-ups constructed on the project site establish standards by which the ensuring work can be judged. Includes

assemblies or portions of assemblies which are to be incorporated into the project and those which will be removed at conclusion of the work.

SD-05 Design Data

Calculations, mix designs, analyses or other data pertaining to a part of work.

SD-06 Test Reports

Report signed by authorized official of testing laboratory that a material, product or system identical to the material, product or system to be provided has been tested in accord with specified requirements. (Testing must have been within three years of date of contract award for the project.)

Report which includes findings of a test required to be performed by the contractor on an actual portion of the work or prototype prepared for the project before shipment to job site.

Report which includes finding of a test made at the job site or on sample taken from the job site, on portion of work during or after installation.

Investigation reports

Daily checklists

Final acceptance test and operational test procedure

SD-07 Certificates

Statements signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements. Must be dated after award of project contract and clearly name the project.

Document required of Contractor, or of a supplier, installer or subcontractor through Contractor, the purpose of which is to further quality of orderly progression of a portion of the work by documenting procedures, acceptability of methods or personnel qualifications.

Confined space entry permits.

SD-08 Manufacturer's Instructions

Preprinted material describing installation of a product, system or material, including special notices and Material Safety Data sheets concerning impedances, hazards and safety precautions.

SD-10 Operation and Maintenance Data

Data intended to be incorporated in operations and maintenance manuals.

SD-11 Closeout Submittals

Documentation to record compliance with technical or administrative requirements or to establish an administrative mechanism.

As-built drawings.

Special warranties.

Posted operating instructions.

Training plan.

1.2 SUBMITTAL CLASSIFICATION

Submittals are classified as follows:

1.2.1 Government Approved

Government approval is required for extensions of design, critical materials, deviations, equipment whose compatibility with the entire system must be checked, and other items as designated by the Contracting Officer. Within the terms of the Contract Clause entitled "Specifications and Drawings for Construction," they are considered to be "shop drawings."

1.2.2 Information Only

All submittals not requiring Government approval will be for information only. They are not considered to be "shop drawings" within the terms of the Contract Clause referred to above.

1.3 APPROVED SUBMITTALS

The COR's approval of submittals shall not be construed as a complete check, but will indicate only that the general method of construction, materials, detailing and other information are satisfactory. Approval will not relieve the Contractor of the responsibility for any error which may exist, as the Contractor under the Contractor Quality Control (CQC) requirements of this contract is responsible for dimensions, the design of adequate connections and details, and the satisfactory construction of all work. After submittals have been approved by the Contracting Officer, no resubmittal for the purpose of substituting materials or equipment will be considered unless accompanied by an explanation of why a substitution is necessary.

1.4 DISAPPROVED SUBMITTALS

The Contractor shall make all corrections required by the Contracting Officer or the COR and promptly furnish a corrected submittal in the form and number of copies specified for the initial submittal. If the Contractor considers any correction indicated on the submittals to constitute a change to the contract, a notice in accordance with the Contract Clause "Changes" shall be given promptly to the Contracting Officer.

1.5 WITHHOLDING OF PAYMENT

Payment for materials incorporated in the work will not be made if required approvals have not been obtained.

1.6 GENERAL

The Contractor shall make submittals as required by the specifications. The Contracting Officer may request submittals in addition to those

specified when deemed necessary to adequately describe the work covered in the respective sections. Units of weights and measures used on all submittals shall be the same as those used in the contract drawings. Each submittal shall be complete and in sufficient detail to allow ready determination of compliance with contract requirements. Prior to submittal, all items shall be checked and approved by the Contractor's Quality Control (CQC) System Manager and each item shall be stamped, signed, and dated by the CQC System Manager indicating action taken. Proposed deviations from the contract requirements shall be clearly identified. Submittals shall include items such as: Contractor's, manufacturer's, or fabricator's drawings; descriptive literature including (but not limited to) catalog cuts, diagrams, operating charts or curves; test reports; test cylinders; samples; O&M manuals (including parts list); certifications; warranties; and other such required submittals. Submittals requiring Government approval shall be scheduled and made prior to the acquisition of the material or equipment covered thereby. Samples remaining upon completion of the work shall be picked up and disposed of in accordance with manufacturer's Material Safety Data Sheets (MSDS) and in compliance with existing laws and regulations. Six (6) copies of each submittal shall be sent to the following address:

U.S. Army Corps of Engineers 1-847-688-4431
Northern Area Office, 2417 Paul Jones St., Bldg. No. 837
Great Lakes, IL 60088

1.7 SUBMITTAL REGISTER

At the end of this section is a submittal register showing items for which submittals are required by the specifications; this list may not be all inclusive and additional submittals may be required. The Contractor shall maintain a submittal register for the project.

1.8 SCHEDULING

Submittals covering component items forming a system or items that are interrelated shall be scheduled to be coordinated and submitted concurrently. Certifications to be submitted with the pertinent drawings shall be so scheduled. Adequate time (a minimum of 30 calendar days exclusive of mailing time) shall be allowed and shown on the register for review and approval. No delay damages or time extensions will be allowed for time lost in late submittals.

1.9 TRANSMITTAL FORM (ENG FORM 4025)

The transmittal form (ENG Form 4025) produced by Q.C.AS. software shall b eused for submitting both government approved and information only submittals in accordance with the instruction in Q.C.S. These forms are printed after com;letion in Q..C.S. This form shall be prperly compledted in Q.C.S..

1.10 DEVIATIONS

For submittals which include proposed deviations requested by the Contractor, the column "variation" of ENG Form 4025 shall be checked. The Contractor shall set forth in writing the reason for any deviations and annotate such deviations on the submittal. The Government reserves the right to rescind inadvertent approval of submittals containing unnoted deviations.

1.11 CONTROL OF SUBMITTALS

The Contractor shall carefully control his procurement operations to ensure that each individual submittal is made on or before the Contractor scheduled submittal date shown on the approved "Submittal Register."

1.12 GOVERNMENT APPROVED SUBMITTALS

Upon completion of review of submittals requiring Government approval, the submittals will be identified as having received approval by being so stamped and dated. 4 copies of the submittal will be retained by the Contracting Officer and 2 copies of the submittal will be returned to the Contractor.

1.13 INFORMATION ONLY SUBMITTALS

Normally submittals for information only will not be returned. Approval of the Contracting Officer is not required on information only submittals. The Government reserves the right to require the Contractor to resubmit any item found not to comply with the contract. This does not relieve the Contractor from the obligation to furnish material conforming to the plans and specifications; will not prevent the Contracting Officer from requiring removal and replacement of nonconforming material incorporated in the work; and does not relieve the Contractor of the requirement to furnish samples for testing by the Government laboratory or for check testing by the Government in those instances where the technical specifications so prescribe.

1.14 STAMPS

Stamps used by the Contractor on the submittal data to certify that the submittal meets contract requirements shall be similar to the following:

CONTRACTOR

(Firm Name)

Transmittal No.

_____ Approved

_____ Approved with corrections as noted on submittal data and/or attached sheets(s).

SIGNATURE: _____

TITLE: _____

DATE: _____

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

-- End of Section --

TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE *(Read instructions on the reverse side prior to initiating this form)*	DATE	TRANSMITTAL NO.

SECTION I - REQUEST FOR APPROVAL OF THE FOLLOWING ITEMS *(This section will be initiated by the contractor)*

TO:	FROM:	CONTRACT NO.	CHECK ONE: ☐ THIS IS A NEW TRANSMITTAL ☐ THIS IS A RESUBMITTAL OF TRANSMITTAL _____
SPECIFICATION SEC. NO. *(Cover only one section with each transmittal)*	PROJECT TITLE AND LOCATION		CHECK ONE: THIS TRANSMITTAL IS FOR FIO ☐ GOV'T ☐ APPROVAL

ITEM NO. a.	DESCRIPTION OF ITEM SUBMITTED *(Type size, model number/etc.)* b.	MFG OR CONTR. CAT., CURVE DRAWING OR BROCHURE NO. (See Instruction no. 8) c.	NO. OF COPIES d.	CONTRACT REFERENCE DOCUMENT SPEC. PARA. NO. e.	DRAWING SHEET NO. f.	FOR CONTRACTOR USE CODE g.	VARIATION (See instruction no. 6) h.	FOR CE USE CODE i.

REMARKS	I certify that the above submitted items have been reviewed in detail and are correct and in strict conformance with the contract drawings and specifications except as other wise stated NAME AND SIGNATURE OF CONTRACTOR

SECTION II - APPROVAL ACTION

ENCLOSURES RETURNED *(List by Item No.)*	NAME, TITLE AND SIGNATURE OF APPROVING AUTHORITY	DATE

Instructions

1. Section I will be initiated by the contractor in the required number of copies.

2. Each transmittal shall be numbered consecutively in the space provided for “Transmittal No.”. This number, in addition to the contract number, will form a serial number for identifying each submittal. For new submittals or resubmittals mark the appropriate box; in resubmittals, insert transmittal number of last submission as well as the new submittal number.

3. The “Item No.” will be the same “Item No.” as indicated on ENG FORM 4288-R for each entry on this form.

5. Separate transmittal form will be used for submittals under separate section of the specifications.

6. a check shall be placed in the “Variation” column when a submittal is not in accordance with the plans and specifications—also, a written statement to that effect shall be included in the space provided for “Remarks.

7. Form is self-transmittal, letter of transmittal is not required.

8. When a sample of material or Manufacturer’s Certificate of Compliance is transmitted, indicate “Sample” or “Certificate” in column c, Section I.

9. U.S. Army Corps of Engineers approving authority will assign action codes as indicated below in space provided in Section I columni to each item submitted. In addition they will ensure enclosures are indicated and attached to the form prior to return to the contractor. The Contractor will assign action codes as indicated below in Section I, column g. to each item submitted.

THE FOLLOWING ACTION CODES ARE GIVEN TO ITEMS SUBMITTED

A – Approved as submitted.

B – Approved, except as noted on drawings.

C – Approved, except as noted on drawings. Refer to attached sheet resubmission required.

D – Will be returned by separate correspondence.

E – Disapproved (See attached).

F – Receipt acknowledged.

FX – Receipt acknowledged, does not comply as noted with contract requirements.

G – Other *(Specify)*

10. Approval of items does not relieve the contractor from complying with all the requirements of the contract plans and specifications.

(Reverse of ENG form 4025-R)

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		01100	SD-01 Preconstruction Submittals															
			IDOT Highway Permit Bond	1.14.1	G RE													
			Condition of Existing Structures	1.10	G CN													
			Condition Survey of Existing	1.10.1	G CN													
			RCPs															
			Coordination with Others	1.15	G CN													
			Drug Free Workplace															
			SD-11 Closeout Submittals															
			As-Built Drawings	1.7	G CN													
			Condition Survey of Existing	1.10.1	G CN													
			RCPs															
		01320A	SD-01 Preconstruction Submittals															
			Project Schedule	3.4	G CN													
		01355	SD-01 Preconstruction Submittals															
			Environmental Protection Plan	1.7	G DH													
		01451	SD-01 Preconstruction Submittals															
			Quality Control Plan	3.2	G CN													
		01500	SD-01 Preconstruction Submittals															
			Site Plan		G CN													
		01525	SD-01 Preconstruction Submittals															
			Accident Prevention Plan (APP)	1.6	G SO													
			Activity Hazard Analysis (AHA)	1.7	G SO													
			Crane Critical Lift Plan	1.6.1	G CN													
			Proof of qualification		G CN													
			SD-06 Test Reports															
			Reports	1.11														

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		01525	Accident Reports	1.11.1														
			Monthly Exposure Reports	1.11.3														
			Crane Reports	1.11.4														
			Regulatory Citations and															
			Violations															
			SD-07 Certificates															
			Confined Space Entry Permit	1.8														
			Hot work permit	1.8														
		01550	SD-01 Preconstruction Submittals															
			Traffic Control Plan		G	CN												
		02215	SD-02 Shop Drawings															
			COFFERDAMS	3.1	G	DT												
		02220	SD-07 Certificates															
			Demolition plan	1.9	G	CN												
		02231	SD-01 Preconstruction Submittals															
			Work Plan															
			Access Route and Traffic Control		G	CN												
			Plan															
		02300	SD-01 Preconstruction Submittals															
			Commercial Borrow Source	2.1.1	G	*PL*												
			Soil Sampling Plan for Borrow	2.1.2.1	G	*DH*												
			Source															
			Environmental Soil Sampling	2.1.2.2	G	*DH*												
			Report for Borrow Source															
			Shoring and Excavation	3.3	G	DT												
			Dewatering Work Plan	1.7	G	DG												

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		02300	SD-07 Certificates															
			Testing	3.12														
		02373	SD-03 Product Data															
			Thread															
			Manufacturing Quality Control															
			Sampling and Testing															
			SD-04 Samples															
			Quality Assurance Samples and															
			Tests															
			SD-07 Certificates															
			Geotextile															
		02380	SD-03 Product Data															
			Stone For Erosion Protection	2.1	G	CN												
			Bulk Specific Gravity of Stone															
			and Redesign															
			SD-04 Samples															
			Stone For Erosion Protection	2.1	G	CN												
			SD-06 Test Reports															
			Gradation Test		G	CN												
			Bedding Material		G	CN												
			Bulk Specific Gravity															
			SD-07 Certificates															
			Stone															
			Bedding Material															
			Laboratory		G	CN												
		02464	SD-02 Shop Drawings															

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		02464	Shop Drawings		G	DT												
			Driving Equipment															
			SD-03 Product Data															
			Data															
			SD-06 Test Reports															
			Reports															
			Records															
			SD-07 Certificates															
			Materials test Certificates		G	DT												
		02630	SD-01 Preconstruction Submittals															
			Temporary Outlet Plan															
			SD-03 Product Data															
			Placing Pipe	3.3														
			SD-07 Certificates															
			Resin Certification	2.1.2														
			Pipeline Testing															
			Hydrostatic Test on Watertight															
			Joints															
			Determination of Density	3.7.4														
			Frame and Cover for Gratings	2.3.3														
			SD-08 Manufacturer’s Instructions															
			Manufacturer's Recommendation															
		02741	SD-04 Samples															
			Uncompacted mix	3.3.2.1														
			cores	3.3														
			SD-06 Test Reports															

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		02741	Trial batch	1.3.4														
			Mix design	1.3.5														
			Asphalt concrete	2.1														
			Density	3.3.2.2														
			Density	3.3.2.3														
			Thickness	3.3.2.2														
			Thickness	3.3.2.3														
			Straightedge test	3.3.2.2														
			SD-07 Certificates															
			mix delivery record	1.3.3														
			Asphalt concrete	2.1														
			Asphalt concrete	2.1														
			Curbs															
			Guardrails	2.6														
			Traffic signs	2.7														
		02920	SD-03 Product Data															
			Fertilizer	2.4.1														
			Seed Mixes	2.1.2	G LS													
			Delivery Schedule															
			SD-06 Test Reports															
			Seeds															
			Topsoil composition tests	2.2.3														
			Fertilizer	2.4.1														
			SD-08 Manufacturer’s Instructions															
			Manufacturer's Literature															
			Erosion Control Materials															

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		02920	SD-10 Operation and Maintenance															
			Data															
			Maintenance Instructions															
		02931	SD-01 Preconstruction Submittals															
			Tree Protection Plan	3.1	G	CN												
			SD-07 Certificates															
			Arborist's Qualifications															
		02938	SD-03 Product Data															
			Test Report		G	CN												
			SD-04 Samples															
			Sampling		G	CN												
			SD-07 Certificates															
			Geotextile	2.1.4	G	CN												
		03250	SD-03 Product Data															
			Grout	2.1														
			SD-06 Test Reports															
			MANUFACTURER PULL-TEST		G	TS-D												
			DATA FOR ANCHORS															
		03300	SD-02 Shop Drawings															
			Reinforcing Steel	2.1.5	G	DT												
			SD-03 Product Data															
			Air-Entraining Admixture	2.1.3.1														
			Accelerating Admixture	2.1.3.2														
			Water-Reducing or Retarding	2.1.3.3														
			Admixture															
			Curing Materials	2.1.10														

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		03300	Reinforcing Steel	2.1.5	G	DT												
			Formliners		G	DT												
			Waterstops	2.1.6														
			On-Site Batching and Mixing		G	C												
			Equipment															
			SD-06 Test Reports															
			Aggregates	2.1.2														
			Concrete Mixture Proportions	1.3.2	G	DT												
			Mock Up Report		G	DT												
			SD-07 Certificates															
			Cementitious Materials	2.1.1														
			Aggregates	2.1.2														
			Reinforcing Steel	2.1.5	G	DT												
			SD-11 Closeout Submittals															
			Warranties		G	DT												
		05055	SD-02 Shop Drawings															
			Detail Drawings	1.3	G	DT												
			SD-03 Product Data															
			Welding of Structural Steel	2.2.2.1	G	DT												
			Welding of Aluminum	2.2.2.2	G	DT												
			SD-06 Test Reports															
			Tests, Inspections, and	2.3														
			Verifications															
			SD-07 Certificates															
			Qualification of Welders and	1.4														
			Welding Operators															

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		05055	Application Qualification for Steel	2.2.2.3	G	DT												
			Studs															
			Welding of Aluminum	2.2.2.2	G	DT												
		05502	SD-01 Preconstruction Submittals															
			Miscellaneous Metals and	2.1	G	DT												
			Standard Metal Articles;															
			Shop Fabricated Metal Items	2.2	G	DT												
			SD-02 Shop Drawings															
			Miscellaneous Metal Items		G	DT												
			SD-03 Product Data															
			Miscellaneous Metals and	2.1	G	DT												
			Standard Metal Articles															
			Shop Fabricated Metal Items	2.2	G	DT												
			SD-04 Samples															
			Miscellaneous Metals and	2.1	G	DT												
			Standard Metal Articles															
			Shop Fabricated Metal Items	2.2	G	DT												
			SD-06 Test Reports															
			Miscellaneous Metals and	2.1	G	DT												
			Standard Metal Articles															
			Shop Fabricated Metal Items	2.2	G	DT												
		09964	SD-03 Product Data															
			Safety and Health Provisions	1.5	G	CN												
			Medical Status	1.6	G	CN												
			SD-04 Samples															
			Special Paint Formulas	2.1	G	DM												

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		09964	Paint Formulations	2.2	G	DM												
			Solvent and Thinners	2.3.3	G	DM												
			SD-06 Test Reports															
			Inspection	3.4	G	CN												
			SD-07 Certificates															
			Coating Thickness Gage	1.3.1	G	CN												
			Qualification															
		11280	SD-02 Shop Drawings															
			Sluice Gates and Flap Gates		G	DT												
			SD-03 Product Data															
			a. Sluice gates including stems		G	DT												
			and operating pedestal (lift)and															
			manual gearbox.															
			b. Portable operators and tripod		G	DT												
			support stands.															
			c. Flap gates.		G	DT												
			SD-05 Design Data															
			Gate Stem and Pedestal (lift)		G	DT												
			SD-10 Operation and Maintenance															
			Data															
			Repair Manuals		G	DT												
		11289	SD-02 Shop Drawings															
			Detail Drawings	2.4.1	G	AE												
			SD-03 Product Data															
			Materials	2.1														
			Sequencing and Scheduling	1.5	G	AE												

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		11289	Welding	2.4.3	G	AE												
			Paint Color Chart	3.4.4	G	AE												
			Leak Test Procedures	3.7	G	AE												
			SD-04 Samples															
			Materials	2.1	G	AE												
			Manufactured Units	2.3	G	AE												
			Fabrications	2.4.7	G	AE												
			SD-06 Test Reports															
			Tests, Inspections, and	2.2														
			Verifications															
		11310	SD-02 Shop Drawings															
			Equipment Installation	3.1	G	DT												
			SD-03 Product Data															
			Materials and Equipment	2.1														
			Framed Instructions	3.5														
			Spare Parts	1.6														
			SD-06 Test Reports															
			Field Testing and Adjusting	3.3														
			Equipment															
			SD-10 Operation and Maintenance															
			Data															
			Operating and Maintenance	3.6	G	DT												
			Manuals															
		15060	SD-02 Shop Drawings															
			Drawings		G	CN												
			SD-03 Product Data															

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		15060	Lists of Materials		G	CN												
			Materials and Procedures;		G	CN												
			SD-06 Test Reports															
			Hydrostatic Tests;		G	CN												
		15132	SD-02 Shop Drawings															
			Submersible Pump	2.2	G	DM												
			SD-03 Product Data															
			Materials	2.1														
			Equipment	1.3.9	G	DM												
			Spare Parts	2.6														
			Computations	1.3.4	G	DM												
			Installation Instruction Manual	3.1	G	DM												
			Factory Test	2.10														
			Pump Field Tests	3.3	G	DM												
			SD-06 Test Reports															
			Factory Test Report	2.10.3	G	DM												
			Field Test Report	3.3.3	G	DM												
			Installation and Start-Up	1.7														
			Engineer															
			SD-10 Operation and Maintenance															
			Data															
			Operating and Maintenance	3.3.3	G	DM												
			Instructions															
		16225	SD-03 Product Data															
			Pump Controller and Telemetry		G	DT												
			Units															

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		16225	SD-02 Shop Drawings															
			Shop Drawings		G	DT												
			SD-08 Manufacturer’s Instructions															
			Installation Instructions															
			SD-10 Operation and Maintenance															
			Data															
			Operating and Maintenance		G	DT												
			Instructions for															
			Controller/Telemetry Units															
		16415	SD-02 Shop Drawings															
			Electrical Work Drawings		G	DT												
			Conduits and Cables Installation		G	DT												
			Plan															
			SD-03 Product Data															
			Manufacturer's Catalog		G	DT												
			Material, Equipment, and Fixture		G	DT												
			Lists															
			As-Built Drawings		G	DT												
			Onsite Tests		G	DT												
			SD-06 Test Reports															
			Field Test Plan		G	DT												
			Field Test Reports		G	DT												
			SD-07 Certificates															
			Materials and Equipment Reports		G	DT												
			SD-10 Operation and Maintenance															
			Data															

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W912P6-08-B-0003

TITLE AND LOCATION
Des Plaines River, IL, Local Flood Protection Floodwall 37

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY					REMARKS
							SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		16415	Operation and Maintenance Manuals		G	DT												

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SECTION 01355

ENVIRONMENTAL PROTECTION

PART 1 GENERAL

1.1 REFERENCES

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

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2003) Safety -- Safety and Health Requirements
WETLAND MANUAL	Corps of Engineers Wetlands Delineation Manual Technical Report Y-87-1

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

33 CFR 328	Definitions of Waters of the United States
40 CFR 68	Chemical Accident Prevention Provisions
40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 262	Standards Applicable to Generators of Hazardous Waste
40 CFR 279	Standards for the Management of Used Oil
40 CFR 302	Designation, Reportable Quantities, and Notification
40 CFR 355	Emergency Planning and Notification
40 CFR 68	Chemical Accident Prevention Provisions
49 CFR 171 - 178	Hazardous Materials Regulations

U.S. DEPARTMENT OF AGRICULTURE, NATIONAL RESOURCES CONSERVATION SERVICE (USDA NRCS)

NRCS IL	Illinois Urban Manual, Nov 2002

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY (IEPA)

35 IAC 900-901	Title 35 of Illinois Administrative Code, Subtitle H: Noise, Chapter I: Pollution Control Board

1.2 DEFINITIONS

1.2.1 Environmental Pollution and Damage

Environmental pollution and damage is the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade the environment aesthetically, culturally and/or historically.

1.2.2 Environmental Protection

Environmental protection is the prevention/control of pollution and habitat disruption that may occur to the environment during construction. The control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

1.2.3 Contractor Generated Hazardous Waste

Contractor generated hazardous waste means materials that, if abandoned or disposed of, may meet the definition of a hazardous waste. These waste streams would typically consist of material brought on site by the Contractor to execute work, but are not fully consumed during the course of construction. Examples include, but are not limited to, excess paint thinners (i.e. methyl ethyl ketone, toluene etc.), waste thinners,excess paints, excess solvents, waste solvents, and excess pesticides, and contaminated pesticide equipment rinse water.

1.2.4 Land Application for Discharge Water

The term "Land Application" for discharge water implies that the Contractor shall discharge water at a rate which allows the water to percolate into the soil. No sheeting action, soil erosion, discharge into storm sewers, discharge into defined drainage areas, or discharge into the "waters of the United States" shall occur without the necessary permits. Land Application shall be in compliance with all applicable Federal, State, and local laws and regulations.

1.2.5 Hazardous Waste

Wastes designated by the U.S. Environmental Protection Agency as hazardous, as defined in 40 CFR 261.

1.2.6 Surface Discharge

The term "Surface Discharge" implies that the water is discharged with possible sheeting action and subsequent soil erosion may occur. Waters that are surface discharged may terminate in drainage ditches, storm sewers, creeks, and/or "waters of the United States" and would require a permit to discharge water from the governing agency. All projects with land disturbances greater than or equal to one acre in total area must have a National Pollution Discharge Elimination System (NPDES) Construction Site Activity Storm Water Permit, issued by the Illinois Environmental Protection Agency. All projects with surface discharge of dredged or fill material to waters of the United States must have a Section 401 Water Quality Certification issued by the Illinois Environmental Protection

Agency.

1.2.7 Waters of the United States

All waters which are under the jurisdiction of the Clean Water Act, as defined in 33 CFR 328.

1.2.8 Wetlands

Wetlands means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, and bogs. Official determination of whether or not an area is classified as a wetland must be done in accordance with WETLAND MANUAL.

1.3 GENERAL REQUIREMENTS

The Contractor shall minimize environmental pollution and damage that may occur as the result of construction operations. The environmental resources within the project boundaries and those affected outside the limits of permanent work shall be protected during the entire duration of this contract. The Contractor shall comply with all applicable environmental Federal, State, and local laws and regulations. The Contractor shall be responsible for any delays resulting from failure to comply with environmental laws and regulations.

1.4 SUBCONTRACTORS

The Contractor shall ensure compliance with this section by subcontractors.

1.5 PAYMENT

No separate payment will be made for work covered under this section. The Contractor shall be responsible for payment of fees associated with environmental permits, application, and/or notices obtained by the Contractor. All costs associated with this section shall be included in the contract price. The Contractor shall be responsible for payment of all fines/fees for violation or non-compliance with Federal, State, Regional and local laws and regulations.

1.6 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Environmental Protection Plan; G,DH

The environmental protection plan. Requirements for this plan are given in paragraph 1.7.

1.7 ENVIRONMENTAL PROTECTION PLAN

Prior to commencing construction site activities or delivery of materials to the site, the Contractor shall submit an Environmental Protection Plan for review and approval by the Contracting Officer. The purpose of the Environmental Protection Plan is to present a comprehensive overview of known or potential environmental issues which the Contractor must address during construction. Issues of concern shall be defined within the Environmental Protection Plan as outlined in this section. The Contractor shall address each topic at a level of detail commensurate with the environmental issue and required construction task(s). Topics or issues which are not identified in this section, but which the Contractor considers necessary, shall be identified and discussed after those items formally identified in this section. Prior to submittal of the Environmental Protection Plan, the Contractor shall meet with the Contracting Officer for the purpose of discussing the implementation of the initial Environmental Protection Plan; possible subsequent additions and revisions to the plan including any reporting requirements; and methods for administration of the Contractor's Environmental Plan. The Environmental Protection Plan shall be current and maintained onsite by the Contractor.

1.7.1 Compliance

No requirement in this Section shall be construed as relieving the Contractor of any applicable Federal, State, and local environmental protection laws and regulations. During construction, the Contractor shall be responsible for identifying, implementing, and submitting for approval any additional requirements to be included in the Environmental Protection Plan. Contactor shall note that the ILR10 general permit (attached at the end of this section) expires in May 2008. Contractor shall revisit the permit requirements and resubmit the environmental protection plan and storm water pollution prevention plan within 30 days of issuance of the new permit. The revised plans must address any new permit requirements.

1.7.2 Contents

The environmental protection plan shall include, but shall not be limited to, the following:

a. Name(s) of person(s) within the Contractor's organization who is(are) responsible for ensuring adherence to the Environmental Protection Plan.

b. Name(s) and qualifications of person(s) responsible for manifesting hazardous waste to be removed from the site, if applicable.

c. Name(s) and qualifications of person(s) responsible for training the Contractor's environmental protection personnel.

d. Description of the Contractor's environmental protection personnel training program, including training for subcontractors.

e. A map of the site, showing site boundaries, waterways on or adjacent to the site, 100 year flood plains, soil types, location of vegetative cover, location and dimensions of storm water drainage systems and natural drainage patterns on and adjacent to the site, locations of utilities structures and roads, site topography (existing and planned), and any potential areas where point sources may enter the groundwater.

f. A Stormwater Pollution Prevention Plan (SWPPP) which identifies the type and location of the erosion and sediment controls to be provided. The plan must meet the requirements of the Illinois NPDES Permit No. ILR10 (included at the end of this section). The management practices, controls, and other provisions contained in the plan must be as protective as the requirements in the Illinois Urban Manual, NRCS IL. Work areas under this contract may be co-extensive with worksite areas under construction by IDOT Contractors. If Contractor chooses to conduct construction activities in areas where IDOT Contractors are actively working and temporary erosion control features are in-place, Contractor shall coordinate with IDOT Contractors to ensure activities are conducted in compliance with NPDES permit ILR10 in areas where work limits are shared.

The contents of the SWPPP shall include all items listed in Part IV of NPDES permit ILR10, including but not limited to:

1. Site description, controls, maintenance, inspections, and non-stormwater discharges.

2. A map of the final site conditions.

3. A site construction plan that includes the locations and dimensions of land disturbing activities, locations of soil stockpiles, locations and dimensions of erosion control measures, and a schedule with the start and finish dates of each land disturbing activity, including the installation of erosion control measures. Provisions and a schedule for maintenance of the erosion control measures during construction shall also be included in the plan. Measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather, shall be included. Plan shall include measures to minimize the amount of mud transported onto paved public roads by vehicles or runoff.

4. The plan shall contain the certification statement contained in Part IV(F) of NPDES Permit No. ILR10.

5. Contractor shall include documentation of coordination meetings with IDOT Contractors and subsequent agreements made between parties to ensure NPDES ILR10 compliance in areas where work limits are shared. A pre-construction meeting with the IDOT Contractors shall be held and results of discussion shall be documented in the EPP.

g. Drawings showing locations of proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on the site.

h. Work area plan showing the proposed activity in each portion of the area and identifying the areas of limited use or nonuse. Plan should include measures for marking the limits of use areas including methods for protection of features to be preserved within authorized work areas.

i. Drawing showing the location of borrow areas.

j. The Spill Control Plan shall include the procedures, instructions, and reports to be used in the event of an unforeseen spill of a substance regulated by 40 CFR 68, 40 CFR 302, 40 CFR 355, and/or regulated under State or Local laws and regulations. The Spill Control Plan supplements the requirements of EM 385-1-1. This plan shall include as a minimum:

1. The name of the individual who will report any spills or hazardous substance releases and who will follow up with complete documentation. This individual shall immediately notify the Contracting Officer and the local fire department or emergency response agency in addition to the legally required Federal, State, and local reporting channels (including the National Response Center 1-800-424-8802) if a reportable quantity is released to the environment. The plan shall contain a list of the required reporting channels and telephone numbers.

2. The name and qualifications of the individual who will be responsible for implementing and supervising the containment and cleanup.

3. Training requirements for Contractor's personnel and any subcontractors, and methods of accomplishing the training.

4. A list of materials and equipment to be immediately available at the job site, tailored to cleanup work of the potential hazard(s) identified.

5. The names and locations of suppliers of containment materials and locations of additional fuel oil recovery, cleanup, restoration, and material-placement equipment available in case of an unforeseen spill emergency.

6. The methods and procedures to be used for expeditious contaminant cleanup.

k. A non-hazardous solid waste disposal plan identifying methods and locations for solid waste disposal, including clearing and demolition debris. Specific information shall be provided on the proposed disposal of solid waste, clearing debris, and demolition debris. The plan shall include schedules for disposal. The Contractor shall identify any subcontractors responsible for the transportation and disposal of waste. Licenses or permits shall be submitted for solid waste disposal sites that are not a commercial operating facility. Evidence of the disposal facility's acceptance of the waste shall be attached to this plan during the construction. The Contractor shall attach a copy of each of the Non-hazardous Solid Waste Diversion Reports to the disposal plan. The report shall be submitted on the first working day after the first quarter that non-hazardous solid waste has been disposed and/or diverted and shall be for the previous quarter (e.g. the first working day of January, April, July, and October). The report shall indicate the total amount of waste generated and total amount of waste diverted in cubic yards or tons along with the percent that was diverted.

l. An air pollution control plan detailing provisions to assure that dust, debris, materials, trash, etc., do not become air borne and travel off the project site. The air pollution control plan shall include a dust control plan.

m. A contaminant prevention plan that: identifies potentially hazardous substances to be used on the job site; identifies the intended actions to prevent introduction of such materials into the air, water, or ground; and details provisions for compliance with Federal, State, and local laws and regulations for storage and handling of these materials. In accordance with EM 385-1-1, a copy of the Material Safety Data Sheets (MSDS) and the maximum quantity of each hazardous material to be on site at any given time shall be included in the contaminant prevention plan. As new hazardous materials are brought on site or removed from the site, the plan shall be updated.

n. A waste water management plan that identifies the methods and procedures for management, disposal, and/or discharge of all waste waters in accordance with paragraph "Waste Water" of this section. If a settling/retention pond or other BMP is required, the plan shall include the design of the pond including drawings, removal plan, and testing requirements for possible pollutants. If land application will be the method of disposal for the waste water, the plan shall include a sketch showing the location for land application along with a description of the pretreatment methods to be implemented. If surface discharge will be the method of disposal, a copy of the permit and associated documents shall be included as an attachment prior to discharging the waste water. If disposal is to a sanitary sewer, the plan shall include documentation that the Waste Water Treatment Plant Operator has approved the flow rate, volume, and type of discharge.

o. A sediment and river spoil management and disposal plan that complies with paragraph "Sediment and River Spoils" in this section. The sediment management and disposal plan shall identify the methods and procedures for sediment and river spoil removal activities that will be conducted for construction of features shown on the project drawings. The plan shall include a map noting temporary onsite storage area(s) and material containment devices that will be used in those areas; a list of equipment that will be used to remove and haul materials; the proposed truck loading method including procedures to prevent spilling sediment; truck cleaning plan to prevent sediment from being tracked from the project area to public roads; final sediment and river spoil disposal locations; and permits obtained for operations at the disposal site(s).

p. A historical, archaeological, cultural resources, biological resources, and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands known to be on the project site: and/or identifies procedures to be followed if historical archaeological, cultural resources, biological resources and wetlands not previously known to be onsite or in the area are discovered during construction. The plan shall include methods to assure the protection of known or discovered resources and shall identify lines of communication between Contractor personnel and the Contracting Officer.

1.7.3 Implementation

The Government will review the Environmental Protection Plan, including the Stormwater Pollution Prevention Plan, and then will submit the Notice of Intent (NOI) for the Construction Site Stormwater Runoff NPDES Permit to the Illinois Environmental Protection Agency, after the plan has been approved. No construction will take place before the submission of the

NOI; approval of the NPDES permit requires 30 days after the submission of the NOI. The Contractor may NOT begin earthmoving activities until 30 days after the submission of the NOI. Approval of the Contractor's plan will not relieve the Contractor of his responsibility for adequate and continuing control of pollutants and other environmental protection measures.

1.7.4 Appendix

Copies of all environmental permits, permit application packages, approvals to construct, notifications, certifications, reports, and termination documents shall be attached,as an appendix, to the Environmental Protection Plan.

1.8 PROTECTION FEATURES

This paragraph supplements the Contract Clause PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS. Prior to the start of any onsite construction activities, the Contractor and the Contracting Officer shall make a joint condition survey. Immediately following the survey, the Contractor shall prepare a brief report including a plan describing the features requiring protection under the provisions of the Contract Clauses, which are not specifically identified on the drawings as environmental features requiring protection along with the condition of trees, shrubs and grassed areas immediately adjacent to the site of work and adjacent to the Contractor's assigned storage area and access route(s), as applicable. This survey report shall be signed by both the Contractor and the Contracting Officer upon mutual agreement as to its accuracy and completeness. The Contractor shall protect those environmental features included in the survey report and any indicated on the drawings, regardless of interference which their preservation may cause to the Contractor's work under the contract.

1.9 ENVIRONMENTAL ASSESSMENT OF CONTRACT DEVIATIONS

Any deviations, requested by the Contractor, from the drawings,plans and specifications which may have an environmental impact will be subject to approval by the Contracting Officer and may require an extended review, processing, and approval time. The Contracting Officer reserves the right to disapprove alternate methods, even if they are more cost effective, if the Contracting Officer determines that the proposed alternate method will have an adverse environmental impact.

1.10 NOTIFICATION

The Contracting Officer will notify the Contractor in writing of any observed noncompliance with Federal, State or local environmental laws or regulations, permits, and other elements of the Contractor's Environmental Protection plan. The Contractor shall, after receipt of such notice, inform the Contracting Officer of the proposed corrective action and take such action when approved by the Contracting Officer. The Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No time extensions shall be granted or equitable adjustments allowed to the Contractor for any such suspensions. This is in addition to any other actions the Contracting Officer may take under the contract, or in accordance with the Federal Acquisition Regulation or Federal Law.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 ENVIRONMENTAL PERMITS AND COMMITMENTS

This paragraph supplements the Contractor's responsibility under the contract clause "PERMITS AND RESPONSIBILITIES" to the extent that the Government has obtained the Section 401 Water Quality Certification and Floodway Construction Permit. The Contractor shall comply with the terms and conditions of the 401 Water Quality Certification attached to this section. The Contractor shall comply with the terms and conditions of the Indiana Department of Natural Resources floodway construction permit attached to this section.

The Contractor shall be responsible for obtaining and complying with all environmental permits and commitments required by Federal, State, Regional, and local environmental laws and regulations. Contractor shall be responsible for obtaining permits for any proposed construction features not shown on the project drawings.

3.2 LAND RESOURCES

The Contractor shall confine all activities to areas defined by the drawings and specifications. Prior to the beginning of any construction, the Contractor shall identify any land resources to be preserved within the work area. Except in areas indicated on the drawings or specified to be cleared, the Contractor shall not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, topsoil, and land forms without approval. No ropes, cables, or guys shall be fastened to or attached to any trees for anchorage unless specifically authorized. The Contractor shall provide effective protection for land and vegetation resources at all times as defined in the following subparagraphs. Stone, soil, or other materials displaced into uncleared areas shall be removed by the Contractor.

3.2.1 Work Area Limits

Prior to commencing construction activities, the Contractor shall mark the areas that need not be disturbed under this contract. Isolated areas within the general work area which are not to be disturbed shall be marked or fenced. Monuments and markers shall be protected before construction operations commence. Where construction operations are to be conducted during darkness, any markers shall be visible in the dark. The Contractor's personnel shall be knowledgeable of the purpose for marking and/or protecting particular objects.

3.2.2 Landscape

Trees, shrubs, vines, grasses, land forms and other landscape features indicated and defined on the drawings to be preserved shall be clearly identified by marking, fencing, or wrapping with boards, or any other approved techniques. The Contractor shall restore landscape features damaged or destroyed during construction operations outside the limits of the approved work area.

3.2.3 Erosion and Sediment Controls

The Contractor shall be responsible for providing erosion and sediment

control measures in accordance with Federal, State, and local laws and regulations. The erosion and sediment controls selected and maintained by the Contractor shall be such that water quality standards are not violated as a result of the Contractor's construction activities. The area of bare soil exposed at any one time by construction operations should be kept to a minimum. The Contractor shall construct or install temporary and permanent erosion and sediment control best management practices (BMPs). BMPs may include, but not be limited to, vegetation cover, stream bank stabilization, slope stabilization, silt fences, construction of terraces, interceptor channels, sediment traps, inlet and outfall protection, diversion channels, and sedimentation basins. The Contractor's best management practices shall also be in accordance with the State of Illinois National Pollutant Discharge Elimination System (NPDES) Storm Water Pollution Prevention requirements and the Illinois Urban Manual, NRCS IL. All temporary measures shall be removed after final stabilization has occurred on the site.

3.2.4 Contractor Facilities and Work Areas

The Contractor's field offices, staging areas, stockpile storage, and temporary buildings shall be placed in areas designated on the drawings or as directed by the Contracting Officer. Temporary movement or relocation of Contractor facilities shall be made only when approved. Erosion and sediment controls shall be provided for on-site borrow and spoil areas to prevent sediment from entering nearby waters and from being tracked off site. Temporary excavation and embankments for plant and/or work areas shall be controlled to protect adjacent areas.

3.3 WATER RESOURCES

The Contractor shall monitor construction activities to prevent pollution of surface and ground waters. Toxic or hazardous chemicals shall not be applied to soil or vegetation unless otherwise indicated. All water areas affected by construction activities shall be monitored by the Contractor. For construction activities immediately adjacent to impaired surface waters, the Contractor shall be capable of quantifying sediment or pollutant loading to that surface water when required by a Clean Water Act permit.

3.3.1 Cofferdams, Diversions, and Dewatering Operations

Construction operations for dewatering, placement and removal of cofferdams, tailrace excavation, and tunnel closures shall be controlled at all times to maintain compliance with existing State water quality standards and designated uses of the surface water body. The Contractor shall comply with the State of Illinois water quality standards and anti-degradation provisions, Section 401 of the Clean Water Act, and Section 404 the Clean Water Act. The Contractor shall obtain all necessary permits and certifications from the State of Illinois for dewatering operations, discharge of groundwater, placement and removal of temporary cofferdams, tailrace excavation, and tunnel closures.

3.3.2 Stream Crossings

Stream crossings shall allow movement of materials or equipment without violating water pollution control standards of the Federal, State, and local governments. Construction of stream crossing structures shall comply with the State of Illinois water quality standards and anti-degradation provisions, Section 401 of the Clean Water Act, and Section 404 the Clean

Water Act. The Contractor shall obtain all appropriate permits and certifications from the State of Illinois for any proposed stream crossings.

3.3.3 Wetlands

The Contractor shall not enter, disturb, destroy, or allow discharge of contaminants into any wetlands. The Contractor shall be responsible for the protection of wetlands shown on the drawings in accordance with paragraph ENVIRONMENTAL PERMITS AND COMMITMENTS. Authorization to enter specific wetlands identified shall not relieve the Contractor from any obligation to protect other wetlands within, adjacent to, or in the vicinity of the construction site and associated boundaries.

3.4 AIR RESOURCES

Equipment operation, activities, or processes performed by the Contractor shall be in accordance with all Federal, State, and local air emission and performance laws and standards.

3.4.1 Particulates

Dust particles; aerosols and gaseous by-products from construction activities; and processing and preparation of materials, such as from asphaltic batch plants; shall be controlled at all times, including weekends, holidays and hours when work is not in progress. The Contractor shall maintain excavations, stockpiles, haul roads, permanent and temporary access roads, plant sites, spoil areas, borrow areas, and other work areas within or outside the project boundaries free from particulates which would cause the Federal, State, and local air pollution standards to be exceeded or which would cause a hazard or a nuisance. Sprinkling, chemical treatment of an approved type, baghouse, scrubbers, electrostatic precipitators or other methods will be permitted to control particulates in the work area. Sprinkling, to be efficient, must be repeated to keep the disturbed area damp at all times. The Contractor must have sufficient, competent equipment available to accomplish these tasks. Particulate control shall be performed as the work proceeds and whenever a particulate nuisance or hazard occurs. The Contractor shall comply with all State and local visibility regulations.

3.4.2 Odors

Odors from construction activities shall be controlled at all times. The odors shall not cause a health hazard and shall be in compliance with State regulations and/or local ordinances.

3.4.3 Sound Intrusions

The Contractor shall keep construction activities under surveillance and control to minimize environment damage by noise. The Contractor shall comply with the provisions of the State of Illinois rules given in 35 IAC 900-901.

3.4.4 Burning

Burning will not be allowed on the project site unless specified in other sections of the specifications or authorized in writing by the Contracting Officer. The specific time, location, and manner of burning shall be subject to approval.

3.5 CHEMICAL MATERIALS MANAGEMENT AND WASTE DISPOSAL

Disposal of wastes shall be as directed below, unless otherwise specified in other sections and/or shown on the drawings.

3.5.1 Solid Wastes

Solid wastes (including clearing and demolition debris) shall be placed in containers which are emptied on a regular schedule. Handling, storage, and disposal shall be conducted to prevent contamination. Segregation measures shall be employed so that no hazardous or toxic waste will become co-mingled with solid waste. The Contractor shall transport solid waste off Government property and dispose of it in compliance with Federal, State, and local requirements for solid waste disposal. A Subtitle D RCRA permitted landfill shall be the minimum acceptable off-site solid waste disposal option. The Contractor shall verify that the selected transporters and disposal facilities have the necessary permits and licenses to operate. The Contractor shall comply with Federal, State, and local laws and regulations pertaining to the use of landfill areas.

3.5.2 Chemicals and Chemical Wastes

Chemicals shall be dispensed ensuring no spillage to the ground or water. Periodic inspections of dispensing areas to identify leakage and initiate corrective action shall be performed and documented. This documentation will be periodically reviewed by the Government. Chemical waste shall be collected in corrosion resistant, compatible containers. Collection drums shall be monitored and removed to a staging or storage area when contents are within 6 inches of the top. Wastes shall be classified, managed, stored, and disposed of in accordance with Federal, State, and local laws and regulations.

3.5.3 Contractor Generated Hazardous Wastes/Excess Hazardous Materials

Hazardous wastes are defined in 40 CFR 261, or are as defined by applicable State and local regulations. Hazardous materials are defined in 49 CFR 171 - 178. The Contractor shall, at a minimum, manage and store hazardous waste in compliance with 40 CFR 262. The Contractor shall take sufficient measures to prevent spillage of hazardous and toxic materials during dispensing. The Contractor shall segregate hazardous waste from other materials and wastes, shall protect it from the weather by placing it in a safe covered location, and shall take precautionary measures such as berming or other appropriate measures against accidental spillage. The Contractor shall be responsible for storage, describing, packaging, labeling, marking, and placarding of hazardous waste and hazardous material in accordance with 49 CFR 171 - 178, State, and local laws and regulations. The Contractor shall transport Contractor generated hazardous waste off Government property within 60 days in accordance with the Environmental Protection Agency and the Department of Transportation laws and regulations. The Contractor shall dispose of hazardous waste in compliance with Federal, State and local laws and regulations. Spills of hazardous or toxic materials shall be immediately reported to the Contracting Officer. Cleanup and cleanup costs due to spills shall be the Contractor's responsibility. The disposition of Contractor generated hazardous waste and excess hazardous materials are the Contractor's responsibility.

3.5.4 Fuel and Lubricants

Storage, fueling and lubrication of equipment and motor vehicles shall be conducted in a manner that affords the maximum protection against spill and evaporation. Fuel, lubricants and oil shall be managed and stored in accordance with all Federal, State, Regional, and local laws and regulations. Used lubricants and used oil to be discarded shall be stored in marked corrosion-resistant containers and recycled or disposed in accordance with 40 CFR 279, State, and local laws and regulations. Storage of fuel on the project site shall be accordance with all Federal, State, and local laws and regulations, and must have the approval of the Contracting Officer.

3.5.5 Waste Water

Disposal of waste water shall be as specified below.

a. Waste water generated from construction activities, such as onsite material processing (including sediment dewatering), concrete curing, foundation and concrete clean-up, and water used in concrete trucks, forms, etc. shall not be allowed to enter the Des Plaines River or any other water ways. The Contractor shall dispose of construction related waste water off-Government property in accordance with all Federal, State, Regional and Local laws and regulations.

b. For discharge of ground water: the Contractor shall obtain all necessary permits for pumping and discharging ground water prior to surface discharging to the Des Plaines River or any other water way. Surface discharge of ground water shall comply with all Federal, State, Regional, and local laws and regulations. Land application of ground water shall be in accordance with all Federal, State, Regional, and Local laws and regulations for pumping and land applying ground water; Contractor shall obtain all necessary permits for land applying ground water. If disposal of ground water is to a sanitary sewer, the Contractor shall coordinate disposal of ground water with the Waste Water Treatment Plant (WWTP) operator. Contractor shall document the flow rate, volume, and type of discharge, and obtain written approval of disposal from the WWTP operator.

3.5.6 Sediment and River Spoils

All material excavated, dredged, or otherwise removed from the Des Plaines river bed and banks, including spoils and sediment, shall be deposited in a contained upland area and disposed of in accordance will all Federal, State, and Local laws and regulations. Removed sediment and spoils, and any entrained water, shall not be disposed of or discharged to the Des Plaines River or any other water way.

3.6 RECYCLING AND WASTE MINIMIZATION

The Contractor shall participate in State and local government sponsored recycling programs. The Contractor is further encouraged to minimize solid waste generation throughout the duration of the project.

3.7 NON-HAZARDOUS SOLID WASTE DIVERSION REPORT

The Contractor shall maintain an inventory of non-hazardous solid waste

diversion and disposal of clearing and demolition debris. The Contractor shall submit a report to the Contracting Officer on the first working day after each fiscal year quarter, starting the first quarter that non-hazardous solid waste has been generated. The following shall be included in the report:

a. Clearing and Demolition (C&D) Debris Disposed = _____ in cubic yards or tons, as appropriate.

b. Clearing and Demolition (C&D) Debris Recycled = _____ in cubic yards or tons, as appropriate.

c. Total C&D Debris Generated = _____ in cubic yards or tons, as appropriate.

d. Waste Sent to Waste-To-Energy Incineration Plant (This amount should not be included in the recycled amount) = _____ in cubic yards or tons, as appropriate.

3.8 HISTORICAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

Any identified existing historical, archaeological, and cultural resources within the Contractor's work area are shown on the drawings. The Contractor shall protect these resources and shall be responsible for their preservation during the life of the Contract. If during excavation or other construction activities any previously unidentified or unanticipated historical, archaeological, and cultural resources are discovered or found, all activities that may damage or alter such resources shall be temporarily suspended. Resources covered by this paragraph include but are not limited to: any human skeletal remains or burials; artifacts; shell, midden, bone, charcoal, or other deposits; rock or coral alignments, pavings, wall, or other constructed features; and any indication of agricultural or other human activities. Upon such discovery or find, the Contractor shall immediately notify the Contracting Officer so that the appropriate authorities may be notified and a determination made as to their significance and what, if any, special disposition of the finds should be made. The Contractor shall cease all activities that may result in impact to or the destruction of these resources. The Contractor shall secure the area and prevent employees or other persons from trespassing on, removing, or otherwise disturbing such resources.

3.9 BIOLOGICAL RESOURCES

The Contractor shall minimize interference with, disturbance to, and damage to fish, wildlife, and plants including their habitat. The Contractor shall be responsible for the protection of threatened and endangered animal and plant species including their habitat in accordance with Federal, State, Regional, and local laws and regulations.

3.10 PREVIOUSLY USED EQUIPMENT

The Contractor shall clean all previously used construction equipment prior to bringing it onto the project site. The Contractor shall ensure that the equipment is free from soil residuals, egg deposits from plant pests, noxious weeds, and plant seeds.

3.11 MAINTENANCE OF POLLUTION FACILITIES

The Contractor shall maintain permanent and temporary pollution control

facilities and devices for the duration of the contract or for that length of time construction activities create the particular pollutant.

3.12 TRAINING OF CONTRACTOR PERSONNEL

The Contractor's personnel and subcontractor personnel shall be trained in all phases of environmental protection and pollution control. The Contractor shall conduct environmental protection/pollution control meetings for all Contractor personnel prior to commencing construction activities. Additional meetings shall be conducted for new personnel and when site conditions change. The training and meeting agenda shall include: methods of detecting and avoiding pollution; familiarization with statutory and contractual pollution standards; installation and care of devices, vegetative covers, and instruments required for monitoring purposes to ensure adequate and continuous environmental protection/pollution control; anticipated hazardous or toxic chemicals or wastes, and other regulated contaminants; recognition and protection of archaeological sites, artifacts, wetlands, and endangered species and their habitat that are known to be in the area.

3.13 POST CONSTRUCTION CLEANUP

The Contractor shall clean up all areas used for construction in accordance with Contract Clause: "Cleaning Up". The Contractor shall, unless otherwise instructed in writing by the Contracting Officer, obliterate all signs of temporary construction facilities such as haul roads, work area, structures, foundations of temporary structures, stockpiles of excess or waste materials, and other vestiges of construction prior to final acceptance of the work. The disturbed area shall be graded, filled and the entire area seeded unless otherwise indicated.

-- End of Section --

VS 5 cp copy Kirksey (Schalenberg)

Rcv'd 16 Apr 08 VS

Illinois Department of
Natural Resources

Rod R. Blagojevich, Governor

One Natural Resources Way • Springfield, Illinois 62702-1271
http://dnr.state.il.us

Sam Flood, Acting Director

April 11, 2008

SUBJECT: Permit No. NE2008013
Levee 37
Des Plaines River
Cook County
Application No. 2007145

Honorable Irvana K. Wilks
Mayor
Village of Mount Prospect
50 S. Emerson Street
Mount Prospect, Illinois 60056

&

Honorable Patrick Ludvigsen
Acting Mayor
City of Prospect Heights
8 North Elmhurst Road
Prospect Heights, Illinois 60070

Dear Mayor Wilks and Acting Mayor Ludvigsen:

We are enclosing Permit No. NE2008013 authorizing the subject project.

Upon receipt and review of this permit and all conditions included therein, please properly execute and return the attached acceptance slip within sixty (60) days from the date of this permit.

If any changes of the permitted work are found necessary, revised plans should be submitted promptly to this office for review and approval. Also, this permit expires on the date indicated in Condition (13). If unable to complete the work by that date, the permittee may make a written request for a time extension.

When the work is completed, please my office at 847/608-3100 extension 2025, so we may schedule a final inspection

Sincerely,

Gary W. Jereb

Gary W. Jereb, P.E., Chief by crw
Northeastern Illinois Regulatory Programs Section

GJ:crw
Enclosure
cc: Chicago District Corps of Engineers (Chic. COE)
Joseph Schmidt, Chicago District - U.S. Army Corps of Engineers
Arlan Juhl, IDNR/OWR - Division of Water Resource Planning
Jeffrey Wulbecker, Village of Mount Prospect
Adam Boeche, City of Prospect Heights

PERMIT NO. NE2008013
DATE: April 11, 2008

State of Illinois

Department of Natural Resources, Office of Water Resources

Permission is hereby granted to:

Village of Mount Prospect
50 S. Emerson Street
Mount Prospect, Illinois 60056

City of Prospect Heights
8 North Elmhurst Road
Prospect Heights, Illinois 60070

to construct a levee system partially within the floodway of the Des Plaines River in the East Half of Section 24 and the Northeast Quarter of Section 25, Township 42 North, Range 11 East, and the West Half of Section 19, Township 42 North, Range 12 East of the Third Principal Meridian in Cook County,

in accordance with an application dated July 6, 2007, and the plans and specifications entitled:

DES PLAINES RIVER, ILLINOIS, LOCAL FLOOD PROTECTION, FLOODWALL 37, RIVER RD./MILWAUKEE AVE., SHEETS G-01, C-21 TO C-37A, AND C-43 TO C-50, DATED SEPTEMBER 2006, RECEIVED JULY 9, 2007.

Examined and Recommended:

Gary W. Jereb, Chief
Northeastern Illinois Regulatory
Programs Section

Approval Recommended:

Gary R. Clark, Director
Office of Water Resources

Approved:

Sam Flood, Acting Director
Department of Natural Resources

This PERMIT is subject to the terms and special conditions contained herein.

PERMIT NO. NE2008013

THIS PERMIT IS SUBJECT TO THE FOLLOWING CONDITIONS:

1) This permit is granted in accordance with the Rivers, Lakes and Streams Act "615 ILCS 5."

2) This permit does not convey title to the permittee or recognize title of the permittee to any submerged or other lands, and furthermore, does not convey, lease or provide any right or rights of occupancy or use of the public or private property on which the activity or any part thereof will be located, or otherwise grant to the permittee any right or interest in or to the property, whether the property is owned or possessed by the State of Illinois or by any private or public party or parties.

3) This permit does not release the permittee from liability for damage to persons or property resulting from the work covered by this permit, and does not authorize any injury to private property or invasion of private rights.

4) This permit does not relieve the permittee of the responsibility to obtain other federal, state or local authorizations required for the construction of the permitted activity; and if the permittee is required by law to obtain approvals from any federal or state agency to do the work, this permit is not effective until the federal and state approvals are obtained.

5) The permittee shall, at the permittee's own expense, remove all temporary piling, cofferdams, false work, and material incidental to the construction of the project. If the permittee fails to remove such structures or materials, the Department may have removal made at the expense of the permittee.

6) In public waters, if future need for public navigation or other public interest by the state or federal government necessitates changes in any part of the structure or structures, such changes shall be made by and at the expense of the permittee or the permittee's successors as required by the Department or other properly constituted agency, within sixty (60) days from receipt of written notice of the necessity from the Department or other agency, unless a longer period of time is specifically authorized.

7) The execution and details of the work authorized shall be subject to the review and approval of the Department. Department personnel shall have the right of access to accomplish this purpose.

8) Starting work on the activity authorized will be considered full acceptance by the permittee of the terms and conditions of the permit.

9) The Department in issuing this permit has relied upon the statements and representations made by the permittee; if any substantive statement or representation made by the permittee is found to be false, this permit will be revoked; and when revoked, all rights of the permittee under the permit are voided.

10) In public waters, the permittee and the permittee's successors shall make no claim whatsoever to any interest in any accretions caused by the activity.

11) In issuing this permit, the Department does not ensure the adequacy of the design or structural strength of the structure or improvement.

12) Noncompliance with the conditions of this permit will be considered grounds for revocation.

13) If the construction activity permitted is not completed on or before December 31, 2011, this permit shall cease and be null and void. When all work is constructed, the permittee shall notify the Department so that a final inspection can be completed.

THIS PERMIT IS SUBJECT TO THE FOLLOWING SPECIAL CONDITION:

a) Prior to completion of construction of the levee herein authorized, flood stage increases on the Des Plaines River due to the levee must be effectively mitigated by the construction of additional floodwater storage at Buffalo Creek Reservoir or an alternate site. Otherwise, flood easements must be acquired on all properties affected by the stage increases.

General NPDES Permit No. ILR10

Illinois Environmental Protection Agency
Division of Water Pollution Control
1021 North Grand Avenue East
Post Office Box 19276
Springfield, Illinois 62794-9276
www.epa.state.il.us

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

General NPDES Permit
For
Storm Water Discharges From Construction Site Activities

Expiration Date: May 31, 2008

Issue Date: May 30, 2003

Effective Date: June 1, 2003

In compliance with the provisions of the Illinois Environmental Protection Act, the Illinois Pollution Control Board Rules and Regulations (35 Ill. Adm. Code, Subtitle C, Chapter I), and the Clean Water Act, and the regulations thereunder the following discharges are authorized by this permit, in accordance with the conditions and attachments herein:

Permit Signed May 30, 2003

Toby Frevert, P.E.
Manager
Division of Water Pollution Control

Part I. COVERAGE UNDER THIS PERMIT

A. **Permit Area**. The permit covers all areas of the State of Illinois with discharges to any waters of the State.

B. **Eligibility**.

1. This permit shall authorize all discharges of storm water associated with industrial activity from construction sites that will result in the disturbance of one or more acres total land area, construction sites less than one acre of total land that is part of a larger common plan of development or sale if the larger common plan will ultimately disturb one or more acres total land area or construction sites that are designated by the Agency that have the potential for contribution to a violation of water quality standard or significant contribution of pollutants to waters of the State, occurring after the effective date of this permit (including discharges occurring after the effective date of this permit where the construction activity was initiated before the effective date of this permit), except for discharges identified under paragraph I.B.3 (Limitations on Coverage).

2. This permit may only authorize a storm water discharge associated with industrial activity from a construction site that is mixed with a storm water discharge from an industrial source other than construction, where:

   a. the industrial source other than construction is located on the same site as the construction activity;

   b. storm water discharges associated with industrial activity from the areas of the site where construction activities are occurring are in compliance with the terms of this permit; and

   c. storm water discharges associated with industrial activity from the areas of the site where industrial activity other than construction are occurring (including storm water discharges from dedicated asphalt plants and dedicated concrete plants) are covered by a different NPDES general permit or individual permit authorizing such discharges.

3. **Limitations on Coverage**. The following storm water discharges from construction sites are not authorized by this permit:

   a. storm water discharges associated with industrial activity that originate from the site after construction activities have been completed and the site has undergone final stabilization;

   b. discharges that are mixed with sources of non-storm water other than discharges identified in Part III.A (Prohibition on Non-Storm Water Discharges) of this permit and in compliance with paragraph IV.D.5 (Non-Storm Water Discharges) of this permit;

   c. storm water discharges associated with industrial activity that are subject to an existing NPDES individual or general permit or which are issued a permit in accordance with Part VI.N (Requiring an Individual Permit or an Alternative General Permit) of this permit. Such discharges may be authorized under this permit after an existing permit expires provided the existing permit did not establish numeric limitations for such discharges;

d. storm water discharges from construction sites that the Agency has determined to be or may reasonably be expected to be contributing to a violation of a water quality standard; and

e. Storm water discharges that the Agency, at its discretion, determines are not appropriately authorized or controlled by this general permit.

f. Storm water discharges to any receiving water identified under 35 Ill. Adm. Code 302.105(d)(6).

C. **Authorization**.

1. In order for storm water discharges from construction sites to be authorized to discharge under this general permit a discharger must submit a Notice of Intent (NOI) in accordance with the requirements of Part II below, using an NOI form provided by the Agency, or be covered by a valid Illinois General NPDES Construction Site Activities Permit.

2. Where a new operator (contractor) is selected after the submittal of an NOI under Part II below, a new Notice of Intent (NOI) must be submitted by the owner in accordance with Part II.

3. For projects that have complied with State law on historic preservation and endangered species prior to submittal of the NOI, through coordination with the Illinois Historic Preservation Agency and the Illinois Department of Natural Resources or through fulfillment of the terms of interagency agreements with those agencies, the NOI shall indicate that such compliance has occurred.

   Unless notified by the Agency to the contrary, dischargers who submit an NOI in accordance with the requirements of this permit are authorized to discharge storm water from construction sites under the terms and conditions of this permit in 30 days after the date the NOI is post marked.

   The Agency may deny coverage under this permit and require submittal of an application for an individual NPDES permit based on a review of the NOI or other information.

Part II. NOTICE OF INTENT REQUIREMENTS

A. **Deadlines for Notification**.

1. To receive authorization under this general permit, a discharge must either be covered by a valid Illinois General NPDES Construction Site Permit, or a completed Notice of Intent (NOI) in accordance with Part VI.G (Signatory Requirements) and the requirements of this part must be submitted prior to the commencement of construction. The NOI must be submitted at least 30 days prior to the commencement of construction.

2. Discharges that are covered by a valid Illinois General NPDES Construction Site Activities Permit as of May 31, 2003 are automatically covered by this permit.

3. A discharger may submit an NOI in accordance with the requirements of this part after the start of construction. In such instances, the Agency may bring an enforcement action for any discharges of storm water associated with industrial activity from a construction site that have occurred on or after the start of construction.

B. **Failure to Notify**. Dischargers who fail to notify the Agency of their intent to be covered, and discharge storm water associated with construction site activity to Waters of the State without an NPDES permit, are in violation of the Environmental Protection Act and Clean Water Act.

C. **Contents of Notice of Intent**. The Notice of Intent shall be signed in accordance with Part VI.G (Signatory Requirements) of this permit by all of the entities identified in paragraph 2 below and shall include the following information:

1. The mailing address, and location of the construction site for which the notification is submitted. Where a mailing address for the site is not available, the location can be described in terms of the latitude and longitude of the approximate center of the facility to the nearest 15 seconds, or the nearest quarter section (if the section, township and range is provided) that the construction site is located in;

2. The owner's name, address, telephone number, and status as Federal, State, private, public or other entity;

3. The name, address and telephone number of the general contractor(s) that have been identified at the time of the NOI submittal;

4. The name of the receiving water(s), or if the discharge is through a municipal separate storm sewer, the name of the municipal operator of the storm sewer and the ultimate receiving water(s);

5. The number of any NPDES permit for any discharge (including non-storm water discharges) from the site that is currently authorized by an NPDES permit;

6. A yes or no indication of whether the owner or operator has existing quantitative data which describes the concentration of pollutants in storm water discharges (existing data should not be included as part of the NOI); and

7. A brief description of the project, estimated timetable for major activities, estimates of the number of acres of the site on which soil will be disturbed, and a certification that a storm water pollution prevention plan has been or will be prepared for the facility in accordance with Part IV of this permit prior to the start of construction, and such plan provides compliance with local sediment and erosion plans or permits and/or storm water management plans or permits in accordance with paragraph VI.G.1 (Signatory Requirements) of this permit. **(A copy of the plans or permits <u>should not</u> be included with the NOI submission).**

D. **Where to Submit**.

1. Facilities which discharge storm water associated with construction site activity must use an NOI form provided by the Agency. NOIs must be signed in accordance with Part VI.G (Signatory Requirements) of this permit. NOIs are to be submitted certified mail to the Agency at the following address:

Illinois Environmental Protection Agency
Division of Water Pollution Control
Attention: Permit Section
1021 North Grand Avenue East
Post Office Box 19276
Springfield, Illinois 62794-9276

2. A copy of the letter of notification of coverage or other indication that storm water discharges from the site are covered under an NPDES permit shall be posted at the site in a prominent place for public viewing (such as alongside a building permit).

E. **Additional Notification**. Facilities which are operating under approved local sediment and erosion plans, grading plans, or storm water management plans, in addition to filing copies of the Notice of Intent in accordance with Part D above, shall also submit signed copies of the Notice of Intent to the local agency approving such plans in accordance with the deadlines in Part A above. See Part IV.D.2.d (Approved State or Local Plans).

F. **Notice of Termination**. Where a site has been finally stabilized and all storm water discharges from construction sites that are authorized by this permit are eliminated, the permittee of the facility must submit a completed Notice of Termination that is signed in accordance with Part VI.G (Signatory Requirements) of this permit.

1. The Notice of Termination shall include the following information:

a. The mailing address, and location of the construction site for which the notification is submitted. Where a mailing address for the site is not available, the location can be described in terms of the latitude and longitude of the approximate center of the facility to the nearest 15 seconds, or the nearest quarter section (if the section, township and range is provided) that the construction site is located in;

b. The owner's name, address, telephone number, and status as Federal, State, private, public or other entity;

c. The name, address and telephone number of the general contractor(s); and

d. The following certification signed in accordance with Part VI.G (Signatory Requirements) of this permit:

"I certify under penalty of law that all storm water discharges associated with construction site activity from the identified facility that are authorized by NPDES general permit ILR10 have otherwise been eliminated. I understand that by submitting this notice of termination, that I am no longer authorized to discharge storm water associated with construction site activity by the general permit, and that discharging pollutants in storm water associated with construction site activity to Waters of the State is unlawful under the Environmental Protection Act and Clean Water Act where the discharge is not authorized by a NPDES permit. I also understand that the submittal of this notice of termination does not release an operator from liability for any violations of this permit or the Clean Water Act."

For the purposes of this certification, elimination of storm water discharges associated with industrial activity means that all disturbed soils at the identified facility have been finally stabilized and temporary erosion and sediment control measures have been removed or will be removed at an appropriate time, or that all storm water discharges associated with construction activities from the identified site that are authorized by a NPDES general permit have otherwise been eliminated.

2. All Notices of Termination are to be sent, using the form provided by the Agency, to the address in paragraph II.D.1.

Part III. SPECIAL CONDITIONS, MANAGEMENT PRACTICES, AND OTHER NON-NUMERIC LIMITATIONS

A. **Prohibition on Non-Storm Water Discharges**.

1. Except as provided in paragraph I.B.2 and 2 below, all discharges covered by this permit shall be composed entirely of storm water.

2. a. Except as provided in paragraph b below, discharges of materials other than storm water must be in compliance with a NPDES permit (other than this permit) issued for the discharge.

b. The following non-storm water discharges may be authorized by this permit provided the non-storm water component of the discharges is in compliance with paragraph IV.D.5 (Non-Storm Water Discharges): discharges from fire fighting activities; fire hydrant flushings; waters used to wash vehicles where detergents are not used; waters used to control dust; potable water sources including uncontaminated waterline flushings; irrigation drainages; routine external building washdown which does not use detergents; pavement washwaters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used; air conditioning condensate; springs; uncontaminated ground water; and foundation or footing drains where flows are not contaminated with process materials such as solvents.

B. Discharges into Receiving Waters With an Approved Total Maximum Daily Load (TMDL):

Discharges to waters for which there is a TMDL allocation for sediment or a parameter that addressed sediment (such as total suspended solids, turbidity, or siltation) are not eligible for coverage under this permit unless you develop and certify a SWPPP that is consistent with the assumptions and requirements in the approved TMDL. To be eligible for coverage under this general permit, operators must incorporate into their SWPPP any conditions applicable to their discharges necessary for consistency with the assumptions and requirements of the TMDL within any timeframes established in the TMDL. If a specific numeric wasteload allocation has been established that would apply to the project's discharges, the operator must incorporate that allocation into its SWPPP and implement necessary steps to meet that allocation.

C. Discharges covered by this permit, alone or in combination with other sources, shall not cause or contribute to a violation of any applicable water quality standard.

Part IV. STORM WATER POLLUTION PREVENTION PLANS

A storm water pollution prevention plan shall be developed for each construction site covered by this permit. Storm water pollution prevention plans shall be prepared in accordance with good engineering practices. The plan shall identify potential sources of pollution which may reasonably be expected to affect the quality of storm water discharges associated with construction site activity from the facility. In addition, the plan shall describe and ensure the implementation of practices which will be used to reduce the pollutants in storm water discharges associated with construction site activity and to assure compliance with the terms and conditions of this permit. Facilities must implement the provisions of the storm water pollution prevention plan required under this part as a condition of this permit.

A. **Deadlines for Plan Preparation and Compliance**.

The plan shall:

1. Be completed prior to the start of the construction to be covered under this permit and updated as appropriate; and

2. Provide for compliance with the terms and schedule of the plan beginning with the initiation of construction activities.

B. **Signature, Plan Review and Notification**.

1. The plan shall be signed in accordance with Part VI.G (Signatory Requirements), and be retained on-site at the facility which generates the storm water discharge in accordance with Part VI.E (Duty to Provide Information) of this permit.

2. Prior to commencement of construction, the permittee shall provide written notification to the Agency of completion of the SWPPP and that said plan is available at the site.

3. The permittee shall make plans available upon request from this Agency or a local agency approving sediment and erosion plans, grading plans, or storm water management plans; or in the case of a storm water discharge associated with industrial activity which discharges through a municipal separate storm sewer system with an NPDES permit, to the municipal operator of the system.

4. The Agency may notify the permittee at any time that the plan does not meet one or more of the minimum requirements of this Part. Such notification shall identify those provisions of the permit which are not being met by the plan, and identify which provisions of the plan requires modifications in order to meet the minimum requirements of this part. Within 7 days from receipt of notification from the Agency, the permittee shall make the required changes to the plan and shall submit to the Agency a written certification that the requested changes have been made. Failure to comply shall terminate authorization under this permit.

5. All storm water pollution prevention plans required under this permit are considered reports that shall be available to the public at any reasonable time upon request. However, the permittee may claim any portion of a storm water pollution prevention plan as confidential in accordance with 40 CFR Part 2.

C. **Keeping Plans Current**. The permittee shall amend the plan whenever there is a change in design, construction, operation, or maintenance, which has a significant effect on the potential for the discharge of pollutants to the Waters of the State and which has not otherwise been addressed in the plan or if the storm water pollution prevention plan proves to be ineffective in eliminating or significantly minimizing pollutants from sources identified under paragraph D.2 below, or in otherwise achieving the general objectives of controlling pollutants in storm water discharges associated with construction site activity. In addition, the plan shall be amended to identify any new contractor and/or subcontractor that will implement a measure of the storm water pollution prevention plan. Amendments to the plan may be reviewed by the Agency in the same manner as Part IV.B above.

D. **Contents of Plan**. The storm water pollution prevention plan shall include the following items:

1. **Site Description**. Each plan shall, provide a description of the following:

   a. A description of the nature of the construction activity;

   b. A description of the intended sequence of major activities which disturb soils for major portions of the site (e.g. grubbing, excavation, grading);

   c. Estimates of the total area of the site and the total area of the site that is expected to be disturbed by excavation, grading, or other activities;

   d. An estimate of the runoff coefficient of the site after construction activities are completed and existing data describing the soil or the quality of any discharge from the site;

   e. A site map indicating drainage patterns and approximate slopes anticipated before and after major grading activities, locations where vehicles enter or exit the site and controls to prevent offsite sediment tracking, areas of soil disturbance, the location of major structural and nonstructural controls identified in the plan, the location of areas where stabilization practices are expected to occur, surface waters (including wetlands), and locations where storm water is discharged to a surface water; and

   f. The name of the receiving water(s) and the ultimate receiving water(s), and areal extent of wetland acreage at the site.

2. **Controls**. Each plan shall include a description of appropriate controls that will be implemented at the construction site. The plan will clearly describe for each major activity identified in paragraph D.1 above, appropriate controls and the timing during the construction process that the controls will be implemented. (For example, perimeter controls for one portion of the site will be installed after the clearing and grubbing necessary for installation of the measure, but before the clearing and grubbing for the remaining portions of the site. Perimeter controls will be actively maintained until final stabilization of those portions of the site upward of the perimeter control. Temporary perimeter controls will be removed after final stabilization). The description of controls shall address as appropriate the following minimum components:

a. **Erosion and Sediment Controls**.

(i) **Stabilization Practices**. A description of interim and permanent stabilization practices, including site-specific scheduling of the implementation of the practices. Site plans should ensure that existing vegetation is preserved where attainable and that disturbed portions of the site are stabilized. Stabilization practices may include: temporary seeding, permanent seeding, mulching, geotextiles, sod stabilization, vegetative buffer strips, protection of trees, preservation of mature vegetation, and other appropriate measures. A record of the dates when major grading activities occur, when construction activities temporarily or permanently cease on a portion of the site, and when stabilization measures are initiated shall be included in the plan. Except as provided in paragraphs (A) and (B) below, stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than 14 days after the construction activity in that portion of the site has temporarily or permanently ceased.

(A) Where the initiation of stabilization measures by the 14th day after construction activity temporary or permanently cease is precluded by snow cover, stabilization measures shall be initiated as soon as practicable.

(B) Where construction activity will resume on a portion of the site within 21 days from when activities ceased, (e.g. the total time period that construction activity is temporarily ceased is less than 21 days) then stabilization measures do not have to be initiated on that portion of site by the 14th day after construction activity temporarily ceased.

(ii) **Structural Practices**. A description of structural practices to the degree attainable, to divert flows from exposed soils, store flows or otherwise limit runoff and the discharge of pollutants from exposed areas of the site. Such practices may include silt fences, earth dikes, drainage swales, sediment traps, check dams, subsurface drains, pipe slope drains, level spreaders, storm drain inlet protection, rock outlet protection, reinforced soil retaining systems, gabions, and temporary or permanent sediment basins. Structural practices should be placed on upland soils to the degree attainable. The installation of these devices may be subject to Section 404 of the CWA.

(iii) **Best Management Practices for Impaired Waters**. For any site which discharges directly to an impaired water identified in the Agency's 303(d) listing for suspended solids, turbidity, or siltation the storm water pollution prevention plan shall be designed for a storm event equal to or greater than a 25-year 24-hour rainfall event. If required by federal regulations or the Illinois Environmental Protection Agency's Illinois Urban Manual, the storm water pollution prevention plan shall adhere to a more restrictive design criteria.

b. **Storm Water Management**. A description of measures that will be installed during the construction process to control pollutants in storm water discharges that will occur after construction operations have been completed. Structural measures should be placed on upland soils to the degree attainable. The installation of these devices may be subject to Section 404 of the CWA. This permit only addresses the installation of storm water management measures, and not the ultimate operation and maintenance of such structures after the construction activities have been completed and the site has undergone final stabilization. Permittees are responsible for only the installation and maintenance of storm water management measures prior to final stabilization of the site, and are not responsible for maintenance after storm water discharges associated with industrial activity have been eliminated from the site.

(i) Such practices may include: storm water detention structures (including wet ponds); storm water retention structures; flow attenuation by use of open vegetated swales and natural depressions; infiltration of runoff onsite; and sequential systems (which combine several practices). The pollution prevention plan shall include an explanation of the technical basis used to select the practices to control pollution where flows exceed predevelopment levels.

(ii) Velocity dissipation devices shall be placed at discharge locations and along the length of any outfall channel as necessary to provide a non-erosive velocity flow from the structure to a water course so that the natural physical and biological characteristics and functions are maintained and protected (e.g. maintenance of hydrologic conditions, such as the hydroperiod and hydrodynamics present prior to the initiation of construction activities).

(iii) Unless otherwise specified in the Illinois Environmental Protection Agency's Illinois Urban Manual, the storm water pollution prevention plan shall be designed for a storm event equal to or greater than a 25-year 24-hour rainfall event.

c. **Other Controls**.

(i) **Waste Disposal**. No solid materials, including building materials, shall be discharged to Waters of the State, except as authorized by a Section 404 permit.

(ii) The plan shall ensure and demonstrate compliance with applicable State and/or local waste disposal, sanitary sewer or septic system regulations.

d. **Approved State or Local Plans**.

(i) The management practices, controls and other provisions contained in the storm water pollution prevention plan must be at least as protective as the requirements contained in Illinois Environmental Protection Agency's Illinois Urban Manual, 2002. Facilities which discharge storm water associated with construction site activities must include in their storm water pollution prevention plan procedures and requirements specified in applicable sediment and erosion site plans or storm water management plans approved by local officials. Requirements specified in sediment and erosion site plans or site permits or storm water management site plans or site permits approved by local officials that are applicable to protecting surface water resources are, upon submittal of an NOI to be authorized to discharge under this permit, incorporated by reference and are enforceable under this permit even if they are not specifically included in a storm water pollution prevention plan required under this permit. This provision does not apply to provisions of master plans, comprehensive plans, non-enforceable guidelines or technical guidance documents that are not identified in a specific plan or permit that is issued for the construction site.

(ii) Dischargers seeking alternative permit requirements are not authorized by this permit and shall submit an individual permit application in accordance with 40 CFR 122.26 at the address indicated in Part II.D (Where to Submit) of this permit, along with a description of why requirements in approved local plans or permits should not be applicable as a condition of an NPDES permit.

3. **Maintenance**. A description of procedures to maintain in good and effective operating conditions vegetation, erosion and sediment control measures and other protective measures identified in the site plan.

4. **Inspections**. Qualified personnel (provided by the permittee) shall inspect disturbed areas of the construction site that have not been finally stabilized, structural control measures, and locations where vehicles enter or exit the site at least once every seven calendar days and within 24 hours of the end of a storm that is 0.5 inches or greater or equivalent snowfall. Qualified personnel means a person knowledgeable in the principles and practice of erosion and sediment controls, such as a licensed professional engineer or other knowledgeable person who possesses the skills to assess conditions at the construction site that could impact storm water quality and to assess the effectiveness of any sediment and erosion control measures selected to control the quality of storm water discharges from the construction activities.

   a. Disturbed areas and areas used for storage of materials that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the drainage system. Erosion and sediment control measures identified in the plan shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Locations where vehicles enter or exit the site shall be inspected for evidence of offsite sediment tracking.

   b. Based on the results of the inspection, the description of potential pollutant sources identified in the plan in accordance with paragraph IV.D.1 (Site Description) of this permit and pollution prevention measures identified in the plan in accordance with paragraph IV.D.2 (Controls) of this permit shall be revised as appropriate as soon as practicable after such inspection. Such modifications shall provide for timely implementation of any changes to the plan within 7 calendar days following the inspection.

   c. A report summarizing the scope of the inspection, name(s) and qualifications of personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the storm water pollution prevention plan, and actions taken in accordance with paragraph b above shall be made and retained as part of the storm water pollution prevention plan for at least three years from the date that the permit coverage expires or is terminated. The report shall be signed in accordance with Part VI.G (Signatory Requirements) of this permit.

   d. The permittee shall complete and submit within 5 days an "Incidence of Noncompliance" (ION) report for any violation of the storm water pollution prevention plan observed during an inspection conducted, including those not required by the Plan. Submission shall be on forms provided by the Agency and include specific information on the cause of noncompliance, actions which were taken to prevent any further causes of noncompliance, and a statement detailing any environmental impact which may have resulted from the noncompliance.

   e. All reports of noncompliance shall be signed by a responsible authority as defined in Part VI.G (Signatory Requirements).

   f. All reports of noncompliance shall be mailed to the Agency at the following address:

      Illinois Environmental Protection Agency
      Division of Water Pollution Control
      Compliance Assurance Section
      1021 North Grand Avenue East
      Post Office Box 19276
      Springfield, Illinois 62794-9276

5. **Non-Storm Water Discharges** - Except for flows from fire fighting activities, sources of non-storm water listed in paragraph III.A.2 of this permit that are combined with storm water discharges associated with industrial activity must be identified in the plan. The plan shall identify and insure the implementation of appropriate pollution prevention measures for the non-storm water component(s) of the discharge.

E. **Additional requirements for storm water discharge from industrial activities other than construction, including dedicated asphalt plants, and dedicated concrete plants**. - This permit may only authorize a storm water discharge associated with industrial activity from a construction site that is mixed with a storm water discharge from an industrial source other than construction, where:

1. The industrial source other than construction is located on the same site as the construction activity;

2. Storm water discharges associated with industrial activity from the areas of the site where construction activities are occurring are in compliance with the terms of this permit; and

3. Storm water discharges associated with industrial activity from the areas of the site where industrial activity other than construction are occurring (including storm water discharges from dedicated asphalt plants (other than asphalt emulsion facilities) and dedicated concrete plants) are in compliance with the terms, including applicable NOI or application requirements, of a different NPDES general permit or individual permit authorizing such discharges.

F. **Contractors**.

1. The storm water pollution prevention plan must clearly identify for each measure identified in the plan, the contractor(s) or subcontractor(s) that will implement the measure. All contractors and subcontractors identified in the plan must sign a copy of the certification statement in paragraph 2 below in accordance with Part VI.G (Signatory Requirements) of this permit. All certifications must be included in the storm water pollution prevention plan except for owners that are acting as contractor.

3. **Certification Statement**. All contractors and subcontractors identified in a storm water pollution prevention plan in accordance with paragraph 1 above shall sign a copy of the following certification statement before conducting any professional service at the site identified in the storm water pollution prevention plan:

   "I certify under penalty of law that I understand the terms and conditions of the general National Pollutant Discharge Elimination System (NPDES) permit (ILR10) that authorizes the storm water discharges associated with industrial activity from the construction site identified as part of this certification."

   The certification must include the name and title of the person providing the signature in accordance with Part VI.G of this permit; the name, address and telephone number of the contracting firm; the address (or other identifying description) of the site; and the date the certification is made.

Part V. RETENTION OF RECORDS

A. The permittee shall retain copies of storm water pollution prevention plans and all reports and notices required by this permit, and records of all data used to complete the Notice of Intent to be covered by this permit, for a period of at least three years from the date that the permit coverage expires or is terminated. This period may be extended by request of the Agency at any time.

B. The permittee shall retain a copy of the storm water pollution prevention plan required by this permit at the construction site from the date of project initiation to the date of final stabilization.

Part VI. STANDARD PERMIT CONDITIONS

A. **Duty to Comply**.

The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of Illinois Environmental Protection Act and the CWA and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.

B. **Continuation of the Expired General Permit**. This permit expires five years from the date of issuance. An expired general permit continues in force and effect until a new general permit or an individual permit is issued. Only those facilities authorized to discharge under the expiring general permit are covered by the continued permit.

C. **Need to halt or reduce activity not a defense**. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

D. **Duty to Mitigate**. The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

E. **Duty to Provide Information**. The permittee shall furnish within a reasonable time to the Agency or local agency approving sediment and erosion plans, grading plans, or storm water management plans; or in the case of a storm water discharge associated with industrial activity which discharges through a municipal separate storm sewer system with an NPDES permit, to the municipal operator of the system, any information which is requested to determine compliance with this permit. Upon request, the permittee shall also furnish to the Agency or local agency approving sediment and erosion plans, grading plans, or storm water management plans; or in the case of a storm water discharge associated with industrial activity which discharges through a municipal separate storm sewer system with an NPDES permit, to the municipal operator of the system, copies of records required to be kept by this permit.

F. **Other Information**. When the permittee becomes aware that he or she failed to submit any relevant facts or submitted incorrect information in the Notice of Intent or in any other report to the Agency, he or she shall promptly submit such facts or information.

G. **Signatory Requirements**. All Notices of Intent, storm water pollution prevention plans, reports, certifications or information either submitted to the Agency or the operator of a large or medium municipal separate storm sewer system, or that this permit requires be maintained by the permittee, shall be signed.

1. All Notices of Intent shall be signed as follows:

   a. For a corporation: by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means: (1) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or (2) the manager of one or more manufacturing, production or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25,000,000 (in second-quarter 1980 dollars) if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

   b. For a partnership or sole proprietorship: by a general partner or the proprietor, respectively; or

   c. For a municipality, State, Federal, or other public agency: by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes (1) the chief executive officer of the agency, or (2) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency.

2. All reports required by the permit and other information requested by the Agency shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

   a. The authorization is made in writing by a person described above and submitted to the Agency.

   b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of manager, operator, superintendent, or position of equivalent responsibility or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position).

   c. **Changes to authorization**. If an authorization under paragraph I.C (Authorization) is no longer accurate because a different individual or position has responsibility for the overall operation of the construction site, a new authorization satisfying the requirements of paragraph I.C must be submitted to the Agency prior to or together with any reports, information, or applications to be signed by an authorized representative.

   d. **Certification**. Any person signing documents under this Part shall make the following certification:

      "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for

submitting false information, including the possibility of fine and imprisonment for knowing violations."

H. **Penalties for Falsification of Reports**. Section 309(c)(4) of the Clean Water Act provides that any person who knowingly makes any false material statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including reports of compliance or noncompliance shall, upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than 2 years, or by both. Section 44(j)(4) and (5) of the Environmental Protection Act provides that any person who knowingly makes any false statement, representation, or certification in an application form, or form pertaining to a NPDES permit commits a Class A misdemeanor, and in addition to any other penalties provided by law is subject to a fine not to exceed $10,000 for each day of violation.

I. **Penalties for Falsification of Monitoring Systems**. The CWA provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by fines and imprisonment described in Section 309 of the CWA. The Environmental Protection Act provides that any person who knowingly renders inaccurate any monitoring device or record required in connection with any NPDES permit or with any discharge which is subject to the provisions of subsection (f) of Section 12 of the Act commits a Class A misdemeanor, and in addition to any other penalties provided by law is subject to a fine not to exceed $10,000 for each day of violation.

J. **Oil and Hazardous Substance Liability**. Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under section 311 of the CWA.

K. **Property Rights**. The issuance of this permit does not convey any property rights of any sort, nor any exclusive privileges, nor does it authorize any injury to private property nor any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations.

L. **Severability**. The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit shall not be affected thereby.

M. **Transfers**. This permit is not transferable to any person except after notice to the Agency. The Agency may require the discharger to apply for and obtain an individual NPDES permit as stated in Part I.C (Authorization).

N. **Requiring an Individual Permit or an Alternative General Permit**.

1. The Agency may require any person authorized by this permit to apply for and/or obtain either an individual NPDES permit or an alternative NPDES general permit. Any interested person may petition the Agency to take action under this paragraph. Where the Agency requires a discharger authorized to discharge under this permit to apply for an individual NPDES permit, the Agency shall notify the discharger in writing that a permit application is required. This notification shall include a brief statement of the reasons for this decision, an application form, a statement setting a deadline for the discharger to file the application, and a statement that on the effective date of the individual NPDES permit or the alternative general permit as it applies to the individual permittee, coverage under this general permit shall automatically terminate. Applications shall be submitted to the Agency indicated in Part II.D (Where to Submit) of this permit. The Agency may grant additional time to submit the application upon request of the applicant. If a discharger fails to submit in a timely manner an individual NPDES permit application as required by the Agency under this paragraph, then the applicability of this permit to the individual NPDES permittee is automatically terminated at the end of the day specified by the Agency for application submittal. The Agency may require an individual NPDES permit based on:

   a. information received which indicates the receiving water may be of particular biological significance pursuant to 35 Ill. Adm. Code 302.105(d)(6);

   b. whether the receiving waters are impaired waters for suspended solids, turbidity or siltation as identified by the Agency's 303(d) listing;

   c. size of construction site, proximity of site to the receiving stream, etc.

   The Agency may also require monitoring of any storm water discharge from any site to determine whether an individual permit is required.

2. Any discharger authorized by this permit may request to be excluded from the coverage of this permit by applying for an individual permit. In such cases, the permittee shall submit an individual application in accordance with the requirements of 40 CFR 122.26(c)(1)(ii), with reasons supporting the request, to the Agency at the address indicated in Part II.D (Where to Submit) of this permit. The request may be granted by issuance of any individual permit or an alternative general permit if the reasons cited by the permittee are adequate to support the request.

3. When an individual NPDES permit is issued to a discharger otherwise subject to this permit, or the discharger is authorized to discharge under an alternative NPDES general permit, the applicability of this permit to the individual NPDES permittee is automatically terminated on the effective date of the individual permit or the date of authorization of coverage under the alternative general permit, whichever the case may be. When an individual NPDES permit is denied to a discharger otherwise subject to this permit, or the discharger is denied for coverage under an alternative NPDES general permit, the applicability of this permit to the individual NPDES permittee remains in effect, unless otherwise specified by the Agency.

O. **State/Environmental Laws**. No condition of this permit shall release the permittee from any responsibility or requirements under other environmental statutes or regulations.

P. **Proper Operation and Maintenance**. The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit and with the requirements of storm water pollution prevention plans. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. Proper operation and maintenance requires the operation of backup or auxiliary facilities or similar systems, installed by a permittee only when necessary to achieve compliance with the conditions of the permit.

Q. **Inspection and Entry**. The permittee shall allow the IEPA, or an authorized representative upon presentation of credentials and other documents as may be required by law, to:

1. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

2. Have access to and copy at reasonable times, any records that must be kept under the conditions of this permit;

3. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and

4. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act, any substances or parameters at any location.

R. **Permit Actions**. This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

Part VII. REOPENER CLAUSE

A. If there is evidence indicating potential or realized impacts on water quality due to any storm water discharge associated with industrial activity covered by this permit, the discharger may be required to obtain an individual permit or an alternative general permit in accordance with Part I.C (Authorization) of this permit or the permit may be modified to include different limitations and/or requirements.

B. Permit modification or revocation will be conducted according to provisions of 35 Ill. Adm. Code, Subtitle C, Chapter I and the provisions of 40 CFR 122.62, 122.63, 122.64 and 124.5 and any other applicable public participation procedures.

C. The Agency will reopen and modify this permit under the following circumstances:

1. the U.S. EPA amends its regulations concerning public participation;

2. a court of competent jurisdiction binding in the State of Illinois or the 7th Circuit issues an order necessitating a modification of public participation for general permits; or

3. to incorporate federally required modifications to the substantive requirements of this permit.

Part VIII. DEFINITIONS

"Agency" means the Illinois Environmental Protection Agency.

"Best Management Practices" ("BMPs") means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the United States. BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

"Commencement of Construction" - The initial disturbance of soils associated with clearing, grading, or excavating activities or other construction activities.

"CWA" means Clean Water Act (formerly referred to as the Federal Water Pollution Control Act or Federal Water Pollution Control Act Amendments of 1972) Pub.L. 92-500, as amended Pub. L. 95-217, Pub. L. 95-576, Pub. L. (96-483 and Pub. L. 97-117, 33 U.S.C. 1251 et.seq.)

"Dedicated portable asphalt plant" - A portable asphalt plant that is located on or contiguous to a construction site and that provides asphalt only to the construction site that the plant is located on or adjacent to. The term dedicated portable asphalt plant does not include facilities that are subject to the asphalt emulsion effluent limitation guideline at 40 CFR 443.

"Dedicated portable concrete plant" - A portable concrete plant that is located on or contiguous to a construction site and that provides concrete only to the construction site that the plant is located on or adjacent to.

"Dedicated sand or gravel operation" - An operation that produces sand and/or gravel for a single construction project.
"Director" means the Director of the Illinois Environmental Protection Agency or an authorized representative.

"Final Stabilization" means that all soil disturbing activities at the site have been completed, and that a uniform perennial vegetative cover with a density of 70% the cover for unpaved areas and areas not covered by permanent structures has been established or equivalent stabilization measures (such as the use of riprap, gabions or geotextiles) have been employed.

"Large and Medium municipal separate storm sewer system" means all municipal separate storm sewers that are either:

(i) Located in an incorporated place (city) with a population of 100,000 or more as determined by the latest Decennial Census by the Bureau of Census (these cities are listed in Appendices F and G of 40 CFR Part 122); or

(ii) Located in the counties with unincorporated urbanized populations of 100,000 or more, except municipal separate storm sewers that are located in the incorporated places, townships or towns within such counties (these counties are listed in Appendices H and I of 40 CFR Part 122); or

(iii) Owned or operated by a municipality other than those described in paragraph (i) or (ii) and that are designated by the Director as part of the large or medium municipal separate storm sewer system.

"NOI" means notice of intent to be covered by this permit (see Part II of this permit.)

"Point Source" means any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel or other floating craft from which pollutants are or may be discharges. This term does not include return flows from irrigated agriculture or agricultural storm water runoff.

"Runoff coefficient" means the fraction of total rainfall that will appear at the conveyance as runoff.

"Storm Water" means storm water runoff, snow melt runoff, and surface runoff and drainage.

"Storm Water Associated with Industrial Activity" means the discharge from any conveyance which is used for collecting and conveying storm water and which is directly related to manufacturing, processing or raw materials storage areas at an industrial plant. The term does not include discharges from facilities or activities excluded from the NPDES program. For the categories of industries identified in subparagraphs (i) through (x) of this subsection, the term includes, but is not limited to, storm water discharges from industrial plant yards; immediate access roads and rail lines used or traveled by carriers of raw materials, manufactured products, waste material, or by-products used or created by the facility; material handling sites; refuse sites; sites used for the application or disposal of process waste waters (as defined at 40 CFR 401); sites used for the storage and maintenance of material handling equipment; sites used for residual treatment, storage, or disposal; shipping and receiving areas; manufacturing buildings; storage areas (including tank farms) for raw materials, and intermediate and finished products; and areas where industrial activity has taken place in the past and significant materials remain and are exposed to storm water. For the categories of industries identified in subparagraph (xi), the term includes only storm water discharges from all areas listed in the previous sentence (except access roads) where material handling equipment or activities, raw materials, intermediate products, final products, waste materials, by-products, or industrial machinery are exposed to storm water. For the purposes of this paragraph, material handling activities include the: storage, loading and unloading, transportation, or conveyance of any raw material, intermediate product, finished product, by-product or waste product. The term excludes areas located on plant lands separate from the plant's industrial activities, such as office buildings and accompanying parking lots as long as the drainage from the excluded areas is not mixed with storm water drained from the above described areas. Industrial facilities (including industrial facilities that are Federally or municipally owned or operated that meet the description of the facilities listed in this paragraph (i)- (xi)) include those facilities designated under 40 CFR 122.26(a)(1)(v). The following categories of facilities are considered to be engaging in "industrial activity" for purposes of this subsection:

(i) Facilities subject to storm water effluent limitations guidelines, new source performance standards, or toxic pollutant effluent standards under 40 CFR Subchapter N (except facilities with toxic pollutant effluent standards which are exempted under category (xi) of this paragraph);

(ii) Facilities classified as Standard Industrial Classifications 24 (except 2434), 26 (except 265 and 267), 28, 29, 311, 32, 33, 3441, 373;

(iii) Facilities classified as Standard Industrial Classifications 10 through 14 (mineral industry) including active or inactive mining operations (except for areas of coal mining operations meeting the definition of a reclamation area under 40 CFR 434.11(l)) and oil and gas exploration, production, processing, or treatment operations, or transmission facilities that discharge storm water contaminated by contact with or that has come into contact with, any overburden, raw material, intermediate products, finished products, byproducts or waste products located on the site of such operations; inactive mining operations are mining sites that are not being actively mined, but which have an identifiable owner/operator;

(iv) Hazardous waste treatment, storage, or disposal facilities, including those that are operating under interim status or a permit under Subtitle C of RCRA;

(v) Landfills, land application sites, and open dumps that have received any industrial wastes (waste that is received from any of the facilities described under this subsection) including those that are subject to regulation under Subtitle D of RCRA;

(vi) Facilities involved in the recycling of materials, including metal scrapyards, battery reclaimers, salvage yards, and automobile junkyards, including but limited to those classified as Standard Industrial Classification 5015 and 5093;

(vii) Steam electric power generating facilities, including coal handling sites;

(viii) Transportation facilities classified as Standard Industrial Classifications 40, 41, 42, 44, and 45 which have vehicle maintenance shops, equipment cleaning operations, or airport deicing operations. Only those portions of the facility that are either involved in vehicle maintenance (including vehicle rehabilitation, mechanical repairs, painting, fueling, and lubrication), equipment cleaning operations, airport deicing operations, or which are otherwise identified under subparagraphs (i)-(vii) or (ix)-(xi) of this subsection are associated with industrial activity;

(ix) Treatment works treating domestic sewage or any other sewage sludge or wastewater treatment device or system, used in the storage treatment, recycling, and reclamation of municipal or domestic sewage, including land dedicated to the disposal of sewage sludge that are located within the confines of the facility, with a design flow of 1.0 mgd or more, or required to have an approved pretreatment program under 40 CFR 403. Not included are farm lands, domestic gardens or lands used for sludge management where sludge is beneficially reused and which are not physically located in the confines of the facility, or areas that are in compliance with 40 CFR 503;

(x) Construction activity including clearing, grading and excavation activities except: operations that result in the disturbance of less than one acre of total land area which are not part of a larger common plan of development or sale unless otherwise designated by the Agency pursuant to **Part I.**B.1.

(xi) Facilities under Standard Industrial Classifications 20, 21, 22, 23, 2434, 25, 265, 267, 27, 283, 31 (except 311), 34 (except 3441), 35, 36, 37 (except 373), 38, 39, 4221-25, (and which are not otherwise included within categories (i)-(x)).

"Waters" mean all accumulations of water, surface and underground, natural, and artificial, public and private, or parts thereof, which are wholly or partially within, flow through, or border upon the State of Illinois, except that sewers and treatment works are not included except as specially mentioned; provided, that nothing herein contained shall authorize the use of natural or otherwise protected waters as sewers or treatment works except that in-stream aeration under Agency permit is allowable.

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ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276 – (217) 782-3397
JAMES R. THOMPSON CENTER, 100 WEST RANDOLPH, SUITE 11-300, CHICAGO, IL 60601 – (312) 814-6026

ROD R. BLAGOJEVICH, GOVERNOR DOUGLAS P. SCOTT, DIRECTOR

217/782-3362

OCT 16 2007

RAG –
RLC –

Chicago District
Corps of Engineers
111 North Canal Street
Chicago, IL 60606

Re: Illinois Department of Natural Resources (Cook County)
Construct floodwall - Des Plaines River
Log # C-0409-06

Gentlemen:

This Agency received a request on May 17, 2006 from Illinois Department of Natural Resources requesting necessary comments concerning the construction of a concrete floodwall and earthen berm at site 37 for flood control. We offer the following comments.

Based on the information included in this submittal, it is our engineering judgment that the proposed project may be completed without causing water pollution as defined in the Illinois Environmental Protection Act, provided the project is carefully planned and supervised.

These comments are directed at the effect on water quality of the construction procedures involved in the above described project and are not an approval of any discharge resulting from the completed facility, nor an approval of the design of the facility. These comments do not supplant any permit responsibilities of the applicant toward the Agency.

This Agency hereby issues certification under Section 401 of the Clean Water Act (PL 95-217), subject to the applicant's compliance with the following conditions:

1. The applicant shall not cause:
   a. violation of applicable water quality standards of the Illinois Pollution Control Board, Title 35, Subtitle C: Water Pollution Rules and Regulation;
   b. water pollution defined and prohibited by the Illinois Environmental Protection Act; or
   c. interference with water use practices near public recreation areas or water supply intakes.

2. The applicant shall provide adequate planning and supervision during the project construction period for implementing construction methods, processes and cleanup procedures necessary to prevent water pollution and control erosion.

3. Any spoil material excavated, dredged or otherwise produced must not be returned to the waterway but must be deposited in a self-contained area in compliance with all state statutes, regulations and permit requirements with no discharge to waters of the State unless a permit has been issued by this Agency. Any backfilling must be done with clean material and placed in a manner to prevent violation of applicable water quality standards.

4. All areas affected by construction shall be mulched and seeded as soon after construction as possible. The applicant shall undertake necessary measures and procedures to reduce erosion during construction. Interim measures to prevent erosion during construction shall be taken and may include the installation of staked straw bales, sedimentation basins and temporary mulching. All construction within the waterway shall be constructed during zero or low flow conditions. The applicant shall be responsible for obtaining an NPDES Storm Water Permit prior to initiating construction if the construction activity associated with the project will result in the disturbance of 1 (one) or more acres, total land area on or after March 10, 2003. An NPDES Storm Water Permit may be obtained by submitting a properly completed Notice of Intent (NOI) form by certified mail to the Agency's Division of Water Pollution Control, Permit Section.

5. The applicant shall implement erosion control measures consistent with the "Illinois Urban Manual" (IEPA/USDA, NRCS; 2002).

6. The proposed work shall be constructed with adequate erosion control measures (i.e., silt fences, straw bales, etc.) to prevent transport of sediment and materials downstream.

This certification becomes effective when the Department of the Army, Corps of Engineers, includes the above condition # 1 through # 6 as conditions of the requested permit issued pursuant to Section 404 of PL 95-217.

This certification does not grant immunity from any enforcement action found necessary by this Agency to meet its responsibilities in prevention, abatement, and control of water pollution.

Very truly yours,

Alan Keller

Alan Keller, P.E.
Manager, Permit Section
Division of Water Pollution Control

SAK:DLH:JRA\

cc: IEPA, Records Unit
IEPA, DWPC, FOS, DesPlaines
IDNR, OWR, Bartlett
USEPA, Region 5
Illinois Department of Natural Resources ✓
U.S. Army Corps of Engineers, Chicago District (Ryder)

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SECTION 01420

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1.1 REFERENCES
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SECTION 01420

SOURCES FOR REFERENCE PUBLICATIONS

1.1 REFERENCES

Various publications are referenced in other sections of the specifications to establish requirements for the work. These references are identified in each section by document number, date and title. The document number used in the citation is the number assigned by the standards producing organization, (e.g. ASTM B 564 Nickel Alloy Forgings). However, when the standards producing organization has not assigned a number to a document, an identifying number has been assigned for reference purposes.

1.2 ORDERING INFORMATION

The addresses of the standards publishing organizations whose documents are referenced in other sections of these specifications are listed below, and if the source of the publications is different from the address of the sponsoring organization, that information is also provided. Documents listed in the specifications with numbers which were not assigned by the standards producing organization should be ordered from the source by title rather than by number.

ACI INTERNATIONAL (ACI)
P.O. Box 9094
Farmington Hills, MI 48333-9094
Ph: 248-848-3700
Fax: 248-848-3701
E-mail: bkstore@concrete.org
Internet: http://www.aci-int.org

ALUMINUM ASSOCIATION (AA)
900 19th Street N.W., Suite 300
Washington, DC 20006
Ph: 202-862-5100
Fax: 202-862-5164
Internet: http://www.aluminum.org

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)
444 North Capital Street, NW, Suite 249
Washington, DC 20001
Ph: 202-624-5800
Fax: 202-624-5806
E-Mail: info@aashto.org
Internet: http://www.aashto.org

AMERICAN BEARING MANUFACTURERS ASSOCIATION (ABMA)
2025 M Street, NW, Suite 800
Washington, DC 20036
Ph: 202-367-1155
Fax: 202-367-2155
E-mail: info.abma@smithbucklin.com

Internet: http://www.abma-dc.org

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)
One East Wacker Drive, Suite 3100
Chicago, IL 60601-2001
Ph: 312-670-2400
Fax: 312-670-5403
Publications: 800-644-2400
E-mail: pubs@aisc.org
Internet: http://www.aisc.org

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)
1819 L Street, NW, 6th Floor
Washington, DC 20036
Ph: 202-293-8020
Fax: 202-293-9287
E-mail: info@ansi.org
Internet: http://www.ansi.org/

Note --- ANSI documents beginning with the letter "S" can be ordered from:

Acoustical Society of America (ASA)
2 Huntington Quadrangle, Suite 1NO1
Melville, NY 11747-4502
Ph: 516-576-2360
Fax: 516-576-2377
E-mail: asa@aip.org
Internet: http://asa.aip.org

AMERICAN SOCIETY OF SANITARY ENGINEERING (ASSE)
901 Canterbury, Suite A
Westlake, OH 44145
Ph: 440-835-3040
Fax: 440-835-3488
E-mail: info@asse-plumbing.org
Internet: http://www.asse-plumbing.org

AMERICAN WATER WORKS ASSOCIATION(AWWA)
6666 West Quincy Avenue
Denver, CO 80235
Ph: 303-794-7711
Fax: 303-347-0804
Internet: http://www.awwa.org

AMERICAN WELDING SOCIETY (AWS)
550 N.W. LeJeune Road
Miami, FL 33126
Ph: 800-443-9353 - 305-443-9353
Fax: 305-443-7559
E-mail: info@aws.org
Internet: http://www.aws.org

APA - THE ENGINEERED WOOD ASSOCIATION (APA)
7011 South 19th
Tacoma, WA 98466
Ph: 253-565-6600
Fax: 253-565-7265
E-mail: help@apawood.org

Internet: http://www.apawood.org

ASME INTERNATIONAL (ASME)
Three Park Avenue
New York, NY 10016-5990
Ph: 212-591-7722
Fax: 212-591-7674
E-mail: infocentral@asme.org
Internet: http://www.asme.org

ASTM INTERNATIONAL (ASTM)
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959
Ph: 610-832-9500
Fax: 610-832-9555
E-mail: service@astm.org
Internet: http://www.astm.org

CONCRETE REINFORCING STEEL INSTITUTE (CRSI)
933 North Plum Grove Road
Schaumburg, IL 60173-4758
Ph: 847-517-1200
Fax: 847-517-1206
Internet: http://www.crsi.org/

HYDRAULIC INSTITUTE (HI)
9 Sylvan Way
Parsippany, NJ 07054-3802
Ph: 973-267-9700
Fax: 973-267-9055
E-mail: webmaster@pumps.org
Internet: http://www.pumps.org

ILLINOIS DEPARTMENT OF TRANSPORTATION (IDOT)
MANUAL SALES - RULES
2300 SOUTH DIRKSEN PARKWAY
SPRINGFIELD, IL 62764
Internet: http://www.dot.state.il.us/desenv/hwyspecs.html

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)
445 Hoes Lane
Piscataway, NJ 08855-1331
Ph: 732-981-0060
Fax: 732-981-1712
E-mail: customer-services@ieee.org
Internet: http://www.ieee.org

ISA - THE INSTRUMENTATION, SYSTEMS AND AUTOMATION SOCIETY (ISA)
67 Alexander Drive
P.O. Box 12277
Research Triangle Park, NC 27709
Ph: 919-549-8411
Fax: 919-549-8288
E-mail: info@isa.org
Internet: http://www.isa.org

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)
1300 North 17th Street, Suite 1847
Rosslyn, VA 22209

Ph: 703-841-3200
Fax: 703-841-5900
E-mail: webmaster@nema.org
Internet: http://www.nema.org/

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
1 Batterymarch Park
Quincy, MA 02169-7471
Ph: 617-770-3000
Fax: 617-770-0700
E-mail: webmaster@nfpa.org
Internet: http://www.nfpa.org

THE SOCIETY FOR PROTECTIVE COATINGS (SSPC)
40 24th Street, 6th Floor
Pittsburgh, PA 15222-4656
Ph: 412-281-2331
Fax: 412-281-9992
E-mail: info@sspc.org
Internet: http://www.sspc.org

UNDERWRITERS LABORATORIES (UL)
333 Pfingsten Road
Northbrook, IL 60062-2096
Ph: 847-272-8800
Fax: 847-272-8129
E-mail: northbrook@us.ul.com
Internet: http://www.ul.com/

U.S. ARMY CORPS OF ENGINEERS (USACE)
Order CRD-C DOCUMENTS from:
U.S. Army Engineer Waterways Experiment Station
ATTN: Technical Report Distribution Section, Services Branch, TIC
3909 Halls Ferry Road
Vicksburg, MS 39180-6199
Ph: 601-634-2664
Fax: 601-634-2388
E-mail: mtc-info@erdc.usace.army.mil
Internet: http://www.wes.army.mil/SL/MTC/handbook.htm

Order Other Documents from:
USACE Publications Depot
Attn: CEIM-IM-PD
2803 52nd Avenue
Hyattsville, MD 20781-1102
Ph: 301-394-0081
Fax: 301-394-0084
E-mail: pubs-army@usace.army.mil
Internet: http://www.usace.army.mil/publications
or http://www.hnd.usace.army.mil/techinfo/engpubs.htm

U.S. DEPARTMENT OF AGRICULTURE (USDA)
Order AMS Publications from:
AGRICULTURAL MARKETING SERVICE (AMS)
Seed Regulatory and Testing Branch
801 Summit Crossing Place, Suite C
Gastonia, NC 28054-2193
Ph: 704-810-8870

Fax: 704-852-4189
Internet: http://www.ams.usda.gov/lsg/seed.htm
E-mail: seed.ams@usda.gov

Order Other Publications from:
U.S. Department of Agriculture, Rural Utilities Service
14th and Independence Avenue, SW, Room 4028-S
Washington, DC 20250
Ph: 202-720-2791
Fax: 202-720-2166
Internet: http://www.usda.gov/rus

U.S. FEDERAL HIGHWAY ADMINISTRATION (FHWA)
Office of Highway Safety (HHS-31)
400 Seventh Street, SW
Washington, DC 20590-0001
Ph: 202-366-0411
Fax: 202-366-2249
Internet: http://www.fhwa.dot.gov
Order from:

Superintendent of Documents
U. S. Government Printing Office (GPO)
732 North Capitol Street, NW
Washington, DC 20401
Ph: 888-293-6498 or 202-512-1530
Fax: 202-512-1262
E-mail: gpoaccess.gpo
Internet: http://www.gpoaccess.gov

U.S. GENERAL SERVICES ADMINISTRATION (GSA)
General Services Administration
1800 F Street, NW
Washington, DC 20405
Ph: 202-501-1021

Order from:
General Services Administration
Federal Supply Service Bureau
1941 Jefferson Davis Highway
Arlington, VA 22202
Ph: 703-605-5400
Internet: http://apps.fss.gsa.gov/pub/fedspecs/indexcfm

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)
8601 Adelphi Road
College Park, MD 20740-6001
Ph: 866-272-6272
Fax: 301-837-0483
Internet: http://www.archives.gov

Order documents from:
Superintendent of Documents
U.S.Government Printing Office (GPO)
732 North Capitol Street, NW
Washington, DC 20401
Ph: 888-293-6498 or 202-512-1530
Fax: 202-512-1262
E-mail: gpoaccess.gov

Internet: http://www.gpoaccess.gov

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SECTION 01451

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SECTION 01451

CONTRACTOR QUALITY CONTROL

PART 1 GENERAL

1.1 MEASUREMENT AND PAYMENT

Separate or direct payment will not be made for providing and maintaining an effective quality control program, and all costs associated therewith shall be included in the applicable unit prices or lump sum prices contained in the Bidding Schedule.

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Quality Control Plan; G,CN

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL

The Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with the Contract Clause entitled "Inspection of Construction." The quality control system shall consist of plans, procedures, and organization necessary to produce an end product that complies with the contract requirements. The system shall cover all construction operations, both on-site and off-site, and shall be keyed to the proposed construction sequence.

3.2 QUALITY CONTROL PLAN

3.2.1 General

The Contractor shall furnish for review by the Government, not later than fifteen (15) days after receipt of notice to proceed, the Contractor Quality Control (CQC) Plan proposed to implement the requirements of the Contract Clause entitled "Inspection of Construction." The plan shall identify personnel, procedures, control, instructions, test, records, and forms to be used. The Government will consider an interim plan for the first fifteen-(15) calendar days of operation. Construction will be permitted to begin only after acceptance of the CQC Plan or acceptance of an interim plan applicable to the particular feature of work to be started. Work outside of the features of work included in an accepted interim plan will not be permitted to begin until acceptance of a CQC Plan or another interim plan containing the additional features of work to be started.

3.2.2 Content of the CQC Plan

The CQC plan shall include, as a minimum, the following to cover all construction operations, both on-site and off-site, including work by subcontractors, fabricators, suppliers and purchasing agents:

a. A description of the quality control organization, including a chart showing lines of authority and acknowledgment that the CQC staff shall implement the three phase control system for all aspects of the work specified. The staff shall include a CQC system manager who shall report to the project manager or someone higher in the Contractor's organization. Project manager in this context shall mean the individual with responsibility for the overall management of the project including quality and production.

b. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQC function.

c. A copy of the letter to the CQC System Manager signed by an authorized official of the firm which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the CQC System Manager including authority to stop work which is not in compliance with the contract. The CQC System Manager shall issue letters of direction to all other various quality control representatives outlining duties, authorities and responsibilities. Copies of these letters will also be furnished to the Contracting Officer in the Quality Control Plan.

d. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, off-site fabricators, suppliers and purchasing agents. These procedures shall be in accordance with Section 01330, SUBMITTAL PROCEDURES.

e. Control, verification and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test. The Contracting Officer will approve laboratory facilities in accordance with paragraph 3.7, TESTS.

f. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests including documentation.

g. Procedures for tracking construction deficiencies from identification through acceptable corrective action. These procedures will establish verification that identified deficiencies have been corrected.

h. Reporting procedures, including proposed reporting formats.

i. A list of the definable features of work. A definable feature of work is a task that is separate and distinct from other tasks and has separate control requirements. Different trades or disciplines could identify it, or it could be work by the same trade in a different environment. Although each section of the specifications may generally be considered as a definable feature

of work, there is frequently more than one definable feature under a particular section. This list will be agreed upon during the coordination meeting.

3.2.3 Acceptance of Plan

Acceptance of the Contractor's plan is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction. The Government reserves the right to require the Contractor to make changes in his CQC plan and operations including removal of personnel, as necessary, to obtain the quality specified.

3.2.4 Notification of Changes

After acceptance of the CQC plan, the Contractor shall notify the Contracting Officer in writing a minimum of seven calendar days prior to any proposed change. Proposed changes are subject to acceptance by the Contracting Officer.

3.3 COORDINATION MEETING

After the Pre-construction Conference, before start of construction, and prior to acceptance by the Government of the Quality Control Plan, the Contractor shall meet with the Contracting Officer and discuss the Contractor's quality control system. During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording the CQC operations, control activities, testing, administration of the system for both on-site and off-site work, and the interrelationship of Contractor's Management and control with the Government's Quality Assurance and the Construction Documentation Report. Minutes of the meeting shall be prepared by the Contracting Officer and signed by both the Contractor and the Contracting Officer. The minutes shall become a part of the contract file. There may be occasions when subsequent conferences will be called by either party to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures which may require corrective action by the Contractor.

3.4 QUALITY CONTROL ORGANIZATION

3.4.1 CQC System Manager

The Contractor shall identify an individual within his organization at the site of the work who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. This CQC System Manager shall be on the site at all times during construction and will be employed by the Contractor, except as noted in the following. An alternate for the CQC System Manager will be identified in the plan to serve in the event of the system manager's absence. Period of absence may not exceed two (2) weeks at any one time, and not more than thirty (30) workdays during a calendar year without designating a new CQC manager. The requirements for the alternate will be the same as for the designated CQC manager.

3.4.2 CQC Organizational Staffing

The Contractor shall provide a CQC staff that shall be at the site of work at all times during progress, with complete authority to take any action necessary to ensure compliance with the contract.

3.4.2.1 CQC Staff

Following are the minimum requirements for the CQC staff. These minimum requirements will not necessarily assure an adequate staff to meet the CQC requirements at all times during construction. The actual strength of the CQC staff may vary during any specific work period to cover the needs of the work period. When necessary for a proper CQC organization, the Contractor will add additional staff at no cost to the Government. This listing of minimum staff in no way relieves the Contractor of meeting the basic requirements of quality construction in accordance with contract requirements. All CQC staff members shall be subject to acceptance by the Contracting Officer.

3.4.2.2 CQC System Manager

The CQC system manager shall be an experienced construction person with a minimum of five years experience in related work. The CQC system manager shall be assigned as system manager and shall have no other duties in addition to quality control.

3.4.2.3 Supplemental Personnel

A staff shall be maintained under the direction of the CQC system manager to perform all QC activities. The staff must be of sufficient size to ensure adequate QC coverage of all work phases, work shifts, and work crews involved in the construction. These personnel may perform other duties, but must be fully qualified by experience and technical training to perform their assigned QC responsibilities and must be allowed sufficient time to carry out these responsibilities. The QC plan will clearly state the duties and responsibilities of each staff member.

3.4.3 Organizational Changes

The Contractor shall obtain Contracting Officer's acceptance before replacing any member of the CQC staff. Requests shall include the names, qualifications, duties, and responsibilities of each proposed replacement.

3.4.4 Construction Quality Management for Contractors

If the contract award is in excess of one million dollars ($1,000,000.00), the CQC system manager is required to have a current certificate of completion for the Corps of Engineers course, "Construction Quality Management for Contractors". If the CQC manager does not have a current training certificate, then he/she will be required to obtain the training within 60 days of the contract "Notice to Proceed". The training will take about 16 hours to complete. This course will be offered at the U.S. Army Corps of Engineers, Chicago District Office, 111 N. Canal Street, Suite 600, Chicago, Illinois. It is the Contractor's responsibility to arrange a time with the Construction/Operation Division for the training. Point of contact for arranging this training will be Kent Smith at 312-846-5493 or Dick Albert at 312-846-5490.

3.5 SUBMITTALS

Submittals shall be as specified in Section 01330 SUBMITTAL PROCEDURES. The CQC organization shall be responsible for certifying that all submittals are in compliance with the contract requirements.

3.6 CONTROL

Contractor Quality Control is the means by which the Contractor ensures that the construction, to include that of subcontractors and suppliers, complies with the requirements of the contract. The controls shall be adequate to cover all construction operations, including both on-site and off-site fabrication, and will be keyed to the proposed construction sequence. The controls shall include at least three phases of control to be conducted by the CQC system manager for all definable features of work, as follows:

3.6.1 Preparatory Phase

This phase shall be performed prior to beginning work on each definable feature of work and shall include:

a. A review of each paragraph of applicable specifications.

b. A review of the contract plans.

c. A check to assure that all materials and/or equipment have been tested, submitted, and approved.

d. A check to assure that provisions have been made to provide required control inspection and testing.

e. Examination of the work area to assure that all required preliminary work has been completed and is in compliance with the contract.

f. A physical examination of required materials, equipment, and sample work to assure that they are on hand, conform to approved shop drawing or submitted data, and are properly stored.

g. A review of the appropriate activity hazard analysis to assure safety requirements are met.

h. Discussion of procedures for constructing the work including repetitive deficiencies. Document construction tolerances and workmanship standards for that phase of work.

i. A check to ensure that the portion of the plan for the work to be performed has been accepted by the Contracting Officer.

j. The Government shall be notified at least forty-eight (48) hours in advance of beginning any of the required action of the preparatory phase. This phase shall include a meeting conducted by the CQC system manager and attended by the superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature. The results of the preparatory phase actions shall be documented by separate minutes prepared by the CQC system manager and attached to the daily QC report. The Contractor shall complete the attached Preparatory Phase Checklist. The Contractor shall instruct applicable workers as to the acceptable level of workmanship required in order to meet contract specifications.

3.6.2 Initial Phase

This phase shall be accomplished at the beginning of a definable feature of work. The following shall be accomplished

a. A check of completed work to ensure that it is in compliance with contract requirements. Review minutes of the preparatory meeting.

b. Verification of full contract compliance. Verify required control inspection and testing.

c. Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare with sample panels if appropriate.

d. Resolve all differences.

e. Check safety to include compliance with and upgrading of the safety plan and activity hazard analysis. Review the activity analysis with each worker.

f. The Government shall be notified at least twenty-four (24) hours in advance of conducting the initial phase. Separate minutes of this phase shall be prepared by the CQC system manager and attached to the daily QC report. The Contractor shall complete the attached Initial Phase Checklist. Exact location of initial phase shall be indicated for future reference and comparison with follow-up phases

g. The initial phase should be repeated for each new crew to work on-site, or any time acceptable specified quality standards are not being met.

3.6.3 Follow-up Phase

Daily checks shall be performed to assure continuing compliance with contract requirements, including control testing, until completion of the particular feature of work. The checks shall be made a matter of record in the CQC documentation. Final follow-up checks shall be conducted and all deficiencies corrected prior to the start of additional features of work that may be affected by the deficient work. The Contractor shall not build upon or conceal non-conforming work.

3.6.4 Additional Preparatory and Initial Phases

Additional preparatory and initial phases may be conducted on the same definable features of work as determined by the Contracting Officer if the quality of on-going work is unacceptable; or if there are changes in the applicable QC staff or in the on-site production supervision or work crew; or if work on a definable feature is resumed after a substantial period of inactivity, or if other problems develop.

3.7 TESTS

3.7.1 Testing Procedure

The Contractor shall perform tests specified or required to verify that control measures are adequate to provide a product that conforms to contract requirements. Testing includes operation and/or acceptance tests

when specified. The Contractor shall procure the services of a Corps of Engineers approved testing laboratory or establish an approved testing laboratory at the project site. A list of tests to be performed shall be furnished as a part of the CQC plan. The list shall give the test name, frequency, specification paragraph containing the test requirements, the personnel and laboratory responsible for each type of test, and an estimate of the number of tests required. The Contractor shall perform the following activities and record and provide the following data:

a. Verify that testing procedures comply with contract requirements.

b. Verify that facilities and testing equipment are available and comply with testing standards.

c. Check test instrument calibration data against certified standards.

d. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.

e. Results of all tests taken, both passing and failing tests, will be recorded on the Quality Control report for the date taken. Specification paragraph reference, location where tests were taken, and the sequential control number identifying the test will be given. Actual test reports may be submitted later, if approved by the Contracting Officer, with a reference to the test number and date taken. An information copy of tests performed by an off-site or commercial test facility will be provided directly to the Contracting Officer. Failure to submit timely test reports, as stated, may result in nonpayment for related work performed and disapproval of the test facility for this contract.

3.7.2 Testing Laboratories

3.7.2.1 Capability Check

The Government reserves the right to check laboratory equipment in the proposed laboratory for compliance with the standards set forth in the contract specifications and to check the laboratory technician's testing procedures and techniques.

3.7.2.2 Capability Recheck

If the selected laboratory fails the capability check, the Contractor will be assessed a minimum charge of $2,500 to reimburse the Government for each succeeding recheck of the laboratory or the checking of a subsequently selected laboratory. Such costs will be deducted from the contract amount due the Contractor.

3.7.3 On-Site Laboratory

The Government reserves the right to utilize the Contractor's control testing laboratory and equipment to make assurance tests and to check the Contractor's testing procedures, techniques, and test results at no additional cost to the Government.

3.7.4 Furnishing or Transportation of Samples for Testing

Costs incidental to the transportation of samples or materials will be

borne by the Contractor. Samples of materials for test verification and acceptance testing by the Government shall be delivered to the Contracting Officer, unless otherwise specified or directed.

3.8 COMPLETION INSPECTION

At the completion of all work or any increment thereof established by a completion time stated in the Special Clause entitled "Commencement, Prosecution, and Completion of Work," or stated elsewhere in the specifications, the CQC system manager shall conduct an inspection of the work and develop a "punch list" of items which do not conform to the approved plans and specifications. Such a list of deficiencies shall be included in the CQC documentation, as required by paragraph, DOCUMENTATION below, and shall include the estimated date by which the deficiencies will be corrected. The CQC system manager or staff shall make a second inspection to ascertain that all deficiencies have been corrected and so notify the Government. These inspections and any deficiency corrections required by this paragraph will be accomplished within the time stated for completion of the entire work or any particular increment thereof if the project is divided into increments by separate completion dates.

3.9 DOCUMENTATION

The Contractor shall maintain current records of quality control operations, activities, and tests performed, including the work of subcontractors and suppliers. These records shall be on an acceptable form and shall include factual evidence that required quality control activities and/or tests have been performed, including but not limited to the following:

a. Contractor/subcontractor and their area of responsibility.

b. Operating plant/equipment with hours worked, idle, or down for repair.

c. Work performed to date, giving location, description, and by whom. When Network Analysis (NAS) is used, identify each phase of work performed each day by NAS activity number.

d. Test and/or control activities performed with results and references to specifications/plan requirements. The control phase should be identified (Preparatory, Initial, Follow-up). List deficiencies noted along with corrective action.

e. Material received with statement as to its acceptability and storage.

f. Identify submittals reviewed, with contract reference, by whom, and action taken.

g. Off-site surveillance activities, including actions taken.

h. Job safety evaluations stating what was checked, results, and instructions or corrective actions.

i. List instructions given/received and conflicts in plans and/or specifications.

j. Contractor's verification statement.

k. As-built contract drawings consisting of two (2) full size sets of contract drawings marked in red to depict all conditions differing from the original plans.

l. Shop drawings consisting of three (3) complete sets of prints as finally approved.

m. These records shall indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in the work and workmanship comply with the contract. The original and one copy of these records in report form shall be furnished to the Government daily within twenty-four (24) hours after the date(s) covered by the report, except that reports need not be submitted for days on which no work is performed unless no work was performed as a result of adverse weather. As a minimum, one report shall be prepared and submitted for every seven days of no work and on the last day of a no work period. All calendar days shall be accounted for throughout the life of the contract. The first report following a day of no work shall be for that day only. Reports shall be signed and dated by the CQC system manager. The report from the CQC system manager shall include copies of test reports and copies of reports prepared by all subordinate quality control personnel.

3.10 SAMPLE FORMS

The web-based Quality Control System (QCS) will generate the CQC Daily Report and other forms needed to track and manage the project.

3.11 NOTIFICATION OF NONCOMPLIANCE

The Contracting Officer will notify the Contractor of any detected noncompliance with the foregoing requirements. The Contractor shall, after receipt of such notice, immediately take corrective action. Such notice, when delivered to the Contractor at the site of the work, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

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SECTION 01500

TEMPORARY CONSTRUCTION FACILITIES

PART 1 GENERAL

1.1 APPLICABLE PUBLICATIONS

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

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2003) Safety and Health Requirements Manual

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Site Plan; G, CN

The Contractor shall prepare a site plan indicating the proposed location and dimensions of any area to be fenced and used by the Contractor, the number of trailers to be used, avenues of ingress/egress to the fenced area and details of the fence installation. Any areas which may have to be graveled to prevent the tracking of mud shall also be identified. The Contractor shall also indicate if the use of a supplemental or other staging area is desired.

1.3 USE OF UTILITY SERVICES

1.3.1 Sanitation

The Contractor shall provide and maintain within the construction area minimum field-type sanitary facilities approved by the Contracting Officer.

1.3.2 Telephone, Water and Electricity

The Contractor shall make arrangements and connect, maintain, and pay all costs for telephone, water and electricity use.

1.4 BULLETIN BOARD, PROJECT SIGN, AND PROJECT SAFETY SIGN

1.4.1 Bulletin Board

Immediately upon beginning of work, the Contractor shall provide a

weatherproof glass-covered bulletin board not less than 36 by 48 inches in size for displaying the Equal Employment Opportunity poster, a copy of the wage decision contained in the contract, Wage Rate Information poster, and other information approved by the Contracting Officer. The bulletin board shall be located at the project site in a conspicuous place easily accessible to all employees, as approved by the Contracting Officer. Legible copies of the aforementioned data shall be displayed until work is completed. Upon completion of work the bulletin board shall be removed by and remain the property of the Contractor.

1.4.2 Project and Safety Signs

The requirements for the signs, their content, and location shall be as specified in SECTION 01580, PROJECT SIGN AND SAFETY SIGN.

1.5 PROTECTION AND MAINTENANCE OF TRAFFIC

Protection and maintenance of traffic of all affected roads during construction shall be in accordance to Section 01550 MAINTENANCE OF TRAFFIC.

1.5.1 Haul Roads

The Contractor shall, at its own expense, construct access and haul roads necessary for proper prosecution of the work under this contract. Haul roads shall be constructed with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic shall be avoided. The Contractor shall provide necessary lighting, signs, barricades, and distinctive markings for the safe movement of traffic. The method of dust control, although optional, shall be adequate to ensure safe operation at all times. Location, grade, width, and alignment of construction and hauling roads shall be subject to approval by the Contracting Officer. Lighting shall be adequate to assure full and clear visibility for full width of haul road and work areas during any night work operations. Upon completion of the work, haul roads designated by the Contracting Officer shall be removed.

1.5.2 Barricades

The Contractor shall erect and maintain temporary barricades to limit public access to hazardous areas. Such barricades shall be required whenever safe public access to paved areas such as roads, parking areas or sidewalks is prevented by construction activities or as otherwise necessary to ensure the safety of both pedestrian and vehicular traffic. Barricades shall be securely placed, clearly visible with adequate illumination to provide sufficient visual warning of the hazard during both day and night.

1.6 CONTRACTOR'S TEMPORARY FACILITIES

1.6.1 Administrative Field Offices

The Contractor shall provide and maintain administrative field office facilities within the construction area.

1.6.2 Storage Area

The contractor shall construct a temporary 6 foot high chain link fence around trailers and materials. Fence posts may be driven, in lieu of concrete bases, where soil conditions permit. Trailers, materials, or equipment shall not be placed or stored outside the fenced area unless such

trailers, materials, or equipment are assigned a separate and distinct storage area by the Contracting Officer. Materials shall not be stockpiled outside the fence in preparation for the next day's work. Mobile equipment, such as tractors, wheeled lifting equipment, cranes, trucks, and like equipment, shall be parked within the fenced area at the end of each work day.

1.6.3 Appearance of Trailers

Trailers utilized by the Contractor for administrative or material storage purposes shall present a clean and neat exterior appearance and shall be in a state of good repair. Trailers which, in the opinion of the Contracting Officer, require exterior painting or maintenance will not be allowed on site.

1.6.4 Maintenance of Storage Area

Fencing shall be kept in a state of good repair and proper alignment. Should the Contractor elect to traverse, with construction equipment or other vehicles, grassed or unpaved areas which are not established roadways, such areas shall be covered with a layer of gravel as necessary to prevent rutting and the tracking of mud onto paved or established roadways; gravel gradation shall be at the Contractor's discretion. Grass located within the boundaries of the construction site shall be mowed for the duration of the project. Grass and vegetation along fences, buildings, under trailers, and in areas not accessible to mowers shall be edged or trimmed neatly.

1.6.5 Security Provisions

Adequate outside security lighting shall be provided at the Contractor's temporary facilities. The Contractor shall be responsible for the security of its own equipment; in addition, the Contractor shall notify the appropriate law enforcement agency requesting periodic security checks of the temporary project field office.

1.7 GOVERNMENT FIELD OFFICE

The Contractor shall provide a temporary field office, at a location to be coordinated with the COR, for use by the Government. The Contractor shall have the option of either constructing a new building for use as the temporary field office, or providing such facilities in an existing building or trailer.

1.7.1 Facility Requirements

The temporary field office shall be approximately 12 feet in width, 30 feet in length and have a minimum headroom of 7 feet. It shall be provided with a work table (minimum size 42" x 72"), two free standing desks with locking drawers, a touchtone telephone with auto redial, telephone answering machine, plain paper fax machine, desk top plain paper/low volume photocopy machine (with all supplies including paper) capable of making 8 1/2" x 11", 8 1/2" x 14" and 11" x 17" copies, two swivel chairs with casters, four side chairs, one four drawer, steel, legal size "Class D" fire resistant file cabinet complete with lock, one reference table with stool, two 36" wide x 60" high five shelf bookcases, and one combination plan rack. The facility shall be weatherproof, and be supplied with heat in season. It shall have a minimum of one door, electric lights, a sufficient number of adjustable windows for adequate light and ventilation, indoor toilet

facilities with an exterior holding tank, washing facilities, and a supply of approved drinking water and cups. The windows and doors shall be provided with locking devices. The windows shall be arranged to open and to be securely fastened from the inside. Glass panels in the windows shall be equipped with bars or heavy mesh screens which will prevent easy access to the building or trailer through these panels. The door shall be equipped with a dead bolt lock keyed from the outside of the door only. In warm weather, air conditioning shall be furnished which will maintain the office at 50 percent relative humidity and a room temperature 20 degree F below the outside temperature when the outside temperature is 95 degree F. Any new building erected by the Contractor for a temporary field office will remain the property of the Contractor and shall be removed when directed by the Contracting Officer.

1.7.2 Trailer-Type Mobile Office

The Contractor may, at its option, furnish and maintain a trailer-type mobile office acceptable to the Contracting Officer and providing as a minimum the facilities specified above. This temporary field office shall be constructed in accordance with EM 385-1-1.

1.7.3 Existing facility

In the event the temporary field office is provided in an existing building or trailer, the Contractor shall furnish space, facilities, and services equivalent to those specified.

1.7.4 Telephone, Utilities, and Insurance

The Contractor shall pay for all costs for utilities, hauling, insurance and rental for the temporary field office for the entire duration of this contract. The Contractor shall be responsible for the arrangement, installation and removal of one telephone unit including hookup and phone bills for both local and long distance calls for up to $100.00 per month at no additional cost to the Government.

1.7.5 Janitorial Services

The Contractor shall furnish daily janitorial services for the office, deemed necessary by the COR during the entire life of the contract. Toilet facilities shall be kept clean and sanitary at all times. Services shall be performed at such a time and in such a manner to minimize interference with the operations but will be accomplished during normal working hours. Services shall be accomplished to the satisfaction of the COR. The Contractor shall also provide daily trash collection and cleanup of the buildings and adjacent outside areas, snow removal in season, and shall dispose of all discarded debris in a manner approved by the COR.

1.7.6 Security

1.7.6.1 Lighting

Security lighting shall be installed around and 6 inches below the top of the temporary field office as directed by the Contracting Officer. The light fixtures shall be wall mounted, raintight, and weather resistant. The security lighting shall be controlled by a photo control switch.

1.7.6.2 Temporary Fencing

Temporary chain-link security fencing shall be installed around the perimeter of the field office. The height of the fence shall be 10 feet. Barb wire shall be installed along the top of the fence which will be properly grounded as needed. The location of the gate and layout of the fencing shall be shown on the Contractor's site plan. The safety fencing shall be maintained by the Contractor during the life of the contract and, upon completion and acceptance of the work, shall become the property of the Contractor and shall be removed from the work site.

1.8 CLEANUP

Construction debris, waste materials, packaging material and the like shall be removed from the work site daily. Any dirt or mud which is tracked onto paved or surfaced roadways shall be cleaned away. Materials resulting from demolition activities which are salvageable shall be stored within the fenced area described above. Stored material not in trailers, whether new or salvaged, shall be neatly stacked when stored.

1.9 RESTORATION OF STORAGE AREA

Upon completion of the project and after removal of trailers, materials, and equipment from within the fenced area, the fence shall be removed and will become the property of the Contractor. Areas used by the Contractor for the storage of equipment or material, or other use, shall be restored to the original or better condition. Gravel used to traverse grassed areas shall be removed and the area restored to its original condition, including top soil and seeding as necessary.

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SECTION 01525

SAFETY AND OCCUPATIONAL HEALTH REQUIREMENTS

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN SOCIETY OF SANITARY ENGINEERING (ASSE)

ASSE A10.32	(2004) Personal Fall Protection - Safety Requirements for Construction and Demolition Operations
ASSE A10.34	(2001; R 2005) Protection of the Public on or Adjacent to Construction Sites
ASSE Z359.1	(1992; Errata 1994; R 1999) Safety Requirements for Personal Fall Arrest Systems, Subsystems and Components

ASME INTERNATIONAL (ASME)

ASME B30.22	(2000) Articulating Boom Cranes
ASME B30.3	(2004) Construction Tower Cranes
ASME B30.5	(2004) Mobile and Locomotive Cranes
ASME B30.8	(2004) Floating Cranes and Floating Derricks

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 10	(2006; Errata 2006) Standard for Portable Fire Extinguishers
NFPA 241	(2004) Safeguarding Construction,Alteration, and Demolition Operations
NFPA 51B	(2003) Fire Prevention During Welding, Cutting, and Other Hot Work
NFPA 70	(2007) National Electrical Code
NFPA 70E	(2004; AMD 2004) Electrical Safety in the Workplace

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2003) Safety -- Safety and Health

Requirements

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910.146	Permit-required Confined Spaces
29 CFR 1926	Safety and Health Regulations for Construction
29 CFR 1926.500	Fall Protection

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

Government acceptance is required for submittals with a "G, A" designation.

SD-01 Preconstruction Submittals

Accident Prevention Plan (APP); G, SO

Activity Hazard Analysis (AHA); G, SO

Crane Critical Lift Plan; G, CN

Proof of qualification for Crane Operators; G, CN

SD-06 Test Reports

Reports

Submit reports as their incidence occurs, in accordance with the requirements of the paragraph entitled, "Reports."

Accident Reports

Monthly Exposure Reports

Crane Reports

Regulatory Citations and Violations

SD-07 Certificates

Confined Space Entry Permit

Hot work permit

1.3 DEFINITIONS

a. High Visibility Accident. Any mishap which may generate publicity and/or high visibility.

b. Medical Treatment. Treatment administered by a physician or by registered professional personnel under the standing orders of a

physician. Medical treatment does not include first aid treatment even through provided by a physician or registered personnel.

f. Recordable Injuries or Illnesses. Any work-related injury or illness that results in:

(1) Death, regardless of the time between the injury and death, or the length of the illness;

(2) Days away from work (any time lost after day of injury/illness onset);

(3) Restricted work;

(4) Transfer to another job;

(5) Medical treatment beyond first aid;

(6) Loss of consciousness; or

(7) A significant injury or illness diagnosed by a physician or other licensed health care professional, even if it did not result in (1) through (6) above.

g. "USACE" property and equipment specified in USACE EM 385-1-1 should be interpreted as Government property and equipment.

1.4 REGULATORY REQUIREMENTS

In addition to the detailed requirements included in the provisions of this contract, work performed shall comply with USACE EM 385-1-1, and the applicable federal, state, and local, laws, ordinances, criteria, rules and regulations. Submit matters of interpretation of standards to the appropriate administrative agency for resolution before starting work. Where the requirements of this specification, applicable laws, criteria, ordinances, regulations, and referenced documents vary, the most stringent requirements shall apply.

1.5 SITE QUALIFICATIONS, DUTIES AND MEETINGS

1.5.1 Personnel Qualifications

1.5.1.1 Site Safety and Health Officer (SSHO)

Site Safety and Health Officer (SSHO) shall be provided at the work site at all times to perform safety and occupational health management, surveillance, inspections, and safety enforcement for the Contractor. The Contractor Quality Control (QC) person and the Superintendent cannot be the SSHO on this project, even though the QC has safety inspection responsibilities as part of the QC duties. The SSHO shall meet the following requirements:

Level 3:
A minimum of 5 years safety work on similar projects.
30-hour OSHA construction safety class or equivalent within the last 5 years.
An average of at least 24 hours of formal safety training each year for the past 5 years.

Competent person training as needed.

1.5.1.2 Crane Operators

Crane operators shall meet the requirements in USACE EM 385-1-1, Section 16 and Appendix G. In addition, for mobile cranes with Original Equipment Manufacturer (OEM) rated capacitates of 50,000 pounds or greater, crane operators shall be designated as qualified by a source that qualifies crane operators (i.e., union, a government agency, or and organization that tests and qualifies crane operators). Proof of current qualification shall be provided.

1.5.2 Personnel Duties

1.5.2.1 Site Safety and Health Officer (SSHO)/Superintendent

a. Conduct daily safety and health inspections and maintain a written log which includes area/operation inspected, date of inspection, identified hazards, recommended corrective actions, estimated and actual dates of corrections. Safety inspection logs shall be attached to the Contractors' daily quality control report.

b. Conduct mishap investigations and complete required reports. Maintain the OSHA Form 300 and Daily Production reports for prime and sub-contractors.

c. Maintain applicable safety reference material on the job site.

d. Attend the pre-construction conference, pre-work meetings including preparatory inspection meeting, and periodic in-progress meetings.

e. Implement and enforce accepted APPS and AHAs.

f. Maintain a safety and health deficiency tracking system that monitors outstanding deficiencies until resolution. A list of unresolved safety and health deficiencies shall be posted on the safety bulletin board.

g. Ensure sub-contractor compliance with safety and health requirements.

Failure to perform the above duties will result in dismissal of the superintendent and/or SSHO, and a project work stoppage. The project work stoppage will remain in effect pending approval of a suitable replacement.

1.5.3 Meetings

1.5.3.1 Preconstruction Conference

a. Contractor representatives who have a responsibility or significant role in accident prevention on the project shall attend the preconstruction conference. This includes the project superintendent, site safety and health officer, quality control supervisor, or any other assigned safety and health professionals who participated in the development of the APP (including the Activity Hazard Analyses (AHAs) and special plans, program and procedures associated with it).

b. The Contractor shall discuss the details of the submitted APP to include incorporated plans, programs, procedures and a listing of

anticipated AHAs that will be developed and implemented during the performance of the contract. This list of proposed AHAs will be reviewed at the conference and an agreement will be reached between the Contractor and the Contracting Officer's representative as to which phases will require an analysis. In addition, a schedule for the preparation, submittal, review, and acceptance of AHAs shall be established to preclude project delays.

c. Deficiencies in the submitted APP will be brought to the attention of the Contractor at the preconstruction conference, and the Contractor shall revise the plan to correct deficiencies and re-submit it for acceptance. Work shall not begin until there is an accepted APP.

d. The functions of a Preconstruction conference may take place at the Post-Award Kickoff meeting for Design Build Contracts.

1.5.3.2 Safety Meetings

Shall be conducted and documented as required by EM 385-1-1. Minutes showing contract title, signatures of attendees and a list of topics discussed shall be attached to the Contractors' daily quality control report.

1.6 ACCIDENT PREVENTION PLAN (APP)

The Contractor shall use a qualified person to prepare the written site-specific APP. Prepare the APP in accordance with the format and requirements of USACE EM 385-1-1 and as supplemented herein. Cover all paragraph and subparagraph elements in USACE EM 385-1-1, Appendix A, "Minimum Basic Outline for Accident Prevention Plan". Specific requirements for some of the APP elements are described below. The APP shall be job-specific and shall address any unusual or unique aspects of the project or activity for which it is written. The APP shall interface with the Contractor's overall safety and health program. Any portions of the Contractor's overall safety and health program referenced in the APP shall be included in the applicable APP element and made site-specific. The Government considers the Prime Contractor to be the "controlling authority" for all work site safety and health of the subcontractors. Contractors are responsible for informing their subcontractors of the safety provisions under the terms of the contract and the penalties for noncompliance, coordinating the work to prevent one craft from interfering with or creating hazardous working conditions for other crafts, and inspecting subcontractor operations to ensure that accident prevention responsibilities are being carried out. The APP shall be signed by the person and firm (senior person) preparing the APP, the Contractor, the on-site superintendent, the designated site safety and health officer and any designated CSP and/or CIH.

Submit the APP to the Contracting Officer 15 calendar days prior to the date of the preconstruction conference for acceptance. Work cannot proceed without an accepted APP.

Once accepted by the Contracting Officer, the APP and attachments will be enforced as part of the contract. Disregarding the provisions of this contract or the accepted APP will be cause for stopping of work, at the discretion of the Contracting Officer, until the matter has been rectified.

Once work begins, changes to the accepted APP shall be made with the knowledge and concurrence of the Contracting Officer, project

superintendent, SSHO and quality control manager. Should any hazard become evident, stop work in the area, secure the area, and develop a plan to remove the hazard. Notify the Contracting Officer within 24 hours of discovery. Eliminate/remove the hazard. In the interim, all necessary action shall be taken to restore and maintain safe working conditions in order to safeguard onsite personnel, visitors, the public (as defined by ASSE A10.34,) and the environment.

Copies of the accepted plan will be maintained at the Contracting Officer's office and at the job site.
The APP shall be continuously reviewed and amended, as necessary, throughout the life of the contract. Unusual or high-hazard activities not identified in the original APP shall be incorporated in the plan as they are discovered.

1.6.1 EM 385-1-1 Contents

Crane Critical Lift Plan. Prepare and sign weight handling critical lift plans for lifts over 75 percent of the capacity of the crane or hoist (or lifts over 50 percent of the capacity of a barge mounted mobile crane's hoists) at any radius of lift; lifts involving more than one crane or hoist; lifts of personnel; and lifts involving non-routine rigging or operation, sensitive equipment, or unusual safety risks. The plan shall be submitted 15 calendar days prior to on-site work and include the requirements of USACE EM 385-1-1, paragraph 16.C.18. and the following:

(1) For lifts of personnel, the plan shall demonstrate compliance with the requirements of 29 CFR 1926.550(g).

(2) For barge mounted mobile cranes, barge stability calculations identifying barge list and trim based on anticipated loading; and load charts based on calculated list and trim. The amount of list and trim shall be within the crane manufacturer's requirements.

1.7 ACTIVITY HAZARD ANALYSIS (AHA)

The Activity Hazard Analysis (AHA) format shall be in accordance with USACE EM 385-1-1. Submit the AHA for review at least 15 calendar days prior to the start of each phase. Format subsequent AHAs as amendments to the APP. The analysis should be used during daily inspections to ensure the implementation and effectiveness of the activity's safety and health controls.

The AHA list will be reviewed periodically (at least monthly) at the Contractor supervisory safety meeting and updated as necessary when procedures, scheduling, or hazards change.

The activity hazard analyses shall be developed using the project schedule as the basis for the activities performed. Any activities listed on the project schedule will require an AHA. The AHAs will be developed by the contractor, supplier or subcontractor and provided to the prime contractor for submittal to the Contracting Officer.

1.8 DISPLAY OF SAFETY INFORMATION

Within 1 calendar days after commencement of work, erect a safety bulletin board at the job site. The safety bulletin board shall include information

and be maintained as required by EM 385-1-1, section 01.A.06. Additional items required to be posted include:

a. Confined space entry permit.

b. Hot work permit.

1.9 SITE SAFETY REFERENCE MATERIALS

Maintain safety-related references applicable to the project, including those listed in the article "References." Maintain applicable equipment manufacturer's manuals.

1.10 EMERGENCY MEDICAL TREATMENT

Contractors will arrange for their own emergency medical treatment. Government has no responsibility to provide emergency medical treatment.

1.11 REPORTS

1.11.1 Accident Reports

a. For recordable injuries and illnesses, and property damage accidents resulting in at least $2,000 in damages, the Prime Contractor shall conduct an accident investigation to establish the root cause(s) of the accident, complete the USACE Accident Report Form 3394 and provide the report to the Contracting Officer within 5 calendar day(s) of the accident. The Contracting Officer will provide copies of any required or special forms.

1.11.2 Accident Notification

Notify the Contracting Officer as soon as practical, but not later than four hours, after any accident meeting the definition of Recordable Injuries or Illnesses or High Visibility Accidents, property damage equal to or greater than $2,000, or any weight handling equipment accident. Information shall include contractor name; contract title; type of contract; name of activity, installation or location where accident occurred; date and time of accident; names of personnel injured; extent of property damage, if any; extent of injury, if known, and brief description of accident (to include type of construction equipment used, PPE used, etc.). Preserve the conditions and evidence on the accident site until the Government investigation team arrives on-site and Government investigation is conducted.

1.11.3 Monthly Exposure Reports

Monthly exposure reporting to the Contracting Officer is required to be attached to the monthly billing request. This report is a compilation of employee-hours worked each month for all site workers, both prime and subcontractor. The Contracting Officer will provide copies of any special forms.

1.11.4 Crane Reports

Submit crane inspection reports required in accordance with USACE EM 385-1-1, Appendix H and as specified herein with Daily Reports of Inspections.

1.12 HOT WORK

Prior to performing "Hot Work" (welding, cutting, etc.) or operating other flame-producing/spark producing devices, a written permit shall be requested from the Fire Department. CONTRACTORS ARE REQUIRED TO MEET ALL CRITERIA BEFORE A PERMIT IS ISSUED. The Contractor will provide at least two (2) twenty (20) pound 4A:20 BC rated extinguishers for normal "Hot Work". All extinguishers shall be current inspection tagged, approved safety pin and tamper resistant seal. It is also mandatory to have a designated FIRE WATCH for any "Hot Work" done at this activity. The Fire Watch shall be trained in accordance with NFPA 51B and remain on-site for a minimum of 30 minutes after completion of the task or as specified on the hot work permit.

When starting work in the facility, Contractors shall require their personnel to familiarize themselves with the location of the nearest fire alarm boxes and place in memory the emergency Fire Department phone number. ANY FIRE, NO MATTER HOW SMALL, SHALL BE REPORTED TO THE RESPONSIBLE FIRE DEPARTMENT IMMEDIATELY.

PART 2 PRODUCTS

PART 3 EXECUTION

3.1 CONSTRUCTION AND/OR OTHER WORK

The Contractor shall comply with USACE EM 385-1-1, NFPA 241, the APP, the AHA, Federal and/or State OSHA regulations, and other related submittals and activity fire and safety regulations. The most stringent standard shall prevail.

3.1.1 Hazardous Material Exclusions

Notwithstanding any other hazardous material used in this contract, radioactive materials or instruments capable of producing ionizing/non-ionizing radiation (with the exception of radioactive material and devices used in accordance with USACE EM 385-1-1 such as nuclear density meters for compaction testing and laboratory equipment with radioactive sources) as well as materials which contain asbestos, mercury or polychlorinated biphenyls, di-isocynates, lead-based paint are prohibited. The Contracting Officer, upon written request by the Contractor, may consider exceptions to the use of any of the above excluded materials.

3.2 PRE-OUTAGE COORDINATION MEETING

Contractors are required to apply for utility outages at least 15 days in advance. As a minimum, the request should include the location of the outage, utilities being affected, duration of outage and any necessary sketches. Special requirements for electrical outage requests are contained elsewhere in this specification section. Once approved, and prior to beginning work on the utility system requiring shut down, the Contractor shall attend a pre-outage coordination meeting with the Contracting Officer and the Public Utilities representative to review the scope of work and the lock-out/tag-out procedures for worker protection. No work will be performed on energized electrical circuits unless proof is provided that no other means exist.

3.3 FALL HAZARD PROTECTION AND PREVENTION PROGRAM

The Contractor shall establish a fall protection and prevention program, for the protection of all employees exposed to fall hazards. The program shall include company policy, identify responsibilities, education and training requirements, fall hazard identification, prevention and control measures, inspection, storage, care and maintenance of fall protection equipment and rescue and evacuation procedures.

3.3.1 Training

The Contractor shall institute a fall protection training program. As part of the Fall Hazard Protection and Prevention Program, the Contractor shall provide training for each employee who might be exposed to fall hazards. A competent person for fall protection shall provide the training. Training requirements shall be in accordance with USACE EM 385-1-1, section 21.A.16.

3.3.2 Fall Protection Equipment and Systems

The Contractor shall enforce use of the fall protection equipment and systems designated for each specific work activity in the Fall Protection and Prevention Plan and/or AHA at all times when an employee is exposed to a fall hazard. Employees shall be protected from fall hazards as specified in EM 385-1-1, section 21. In addition to the required fall protection systems, safety skiff, personal floatation devices, life rings etc., are required when working above or next to water in accordance with USACE EM 385-1-1, paragraphs 05.H. and 05.I. Personal fall arrest systems are required when working from an articulating or extendible boom, swing stages, or suspended platform. In addition, personal fall arrest systems are required when operating other equipment such as scissor lifts if the work platform is capable of being positioned outside the wheelbase. The need for tying-off in such equipment is to prevent ejection of the employee from the equipment during raising, lowering, or travel. Fall protection must comply with 29 CFR 1926.500, Subpart M, USACE EM 385-1-1 and ASSE A10.32.

3.3.2.1 Personal Fall Arrest Equipment

Personal fall arrest equipment, systems, subsystems, and components shall meet ASSE Z359.1. Only a full-body harness with a shock-absorbing lanyard or self-retracting lanyard is an acceptable personal fall arrest body support device. Body belts may only be used as a positioning device system (for uses such as steel reinforcing assembly and in addition to an approved fall arrest system). Harnesses shall have a fall arrest attachment affixed to the body support (usually a Dorsal D-ring) and specifically designated for attachment to the rest of the system. Only locking snap hooks and carabiners shall be used. Webbing, straps, and ropes shall be made of synthetic fiber. The maximum free fall distance when using fall arrest equipment shall not exceed 1.8 m (6 feet). The total fall distance and any swinging of the worker (pendulum-like motion) that can occur during a fall shall always be taken into consideration when attaching a person to a fall arrest system.

3.3.3 Fall Protection for Roofing Work

Fall protection controls shall be implemented based on the type of roof being constructed and work being performed. The roof area to be accessed shall be evaluated for its structural integrity including weight-bearing capabilities for the projected loading.

a. Low Sloped Roofs:

(1) For work within 1.8 m (6 feet) of an edge, on low-slope roofs, personnel shall be protected from falling by use of personal fall arrest systems, guardrails, or safety nets.

(2) For work greater than 1.8 m (6 feet) from an edge, warning lines shall be erected and installed in accordance with 29 CFR 1926.500 and USACE EM 385-1-1.

b. Steep-Sloped Roofs: Work on steep-sloped roofs requires a personal fall arrest system, guardrails with toe-boards, or safety nets. This requirement also includes residential or housing type construction.

3.3.4 Existing Anchorage

Existing anchorages, to be used for attachment of personal fall arrest equipment, shall be certified (or re-certified) by a qualified person for fall protection in accordance with ASSE Z359.1. Exiting horizontal lifeline anchorages shall be certified (or re-certified) by a registered professional engineer with experience in designing horizontal lifeline systems.

3.3.5 Horizontal Lifelines

Horizontal lifelines shall be designed, installed, certified and used under the supervision of a qualified person for fall protection as part of a complete fall arrest system which maintains a safety factor of 2 (29 CFR 1926.500).

3.3.6 Guardrails and Safety Nets

Guardrails and safety nets shall be designed, installed and used in accordance with EM 385-1-1 and 29 CFR 1926 Subpart M.

3.3.7 Rescue and Evacuation Procedures

When personal fall arrest systems are used, the contractor must ensure that the mishap victim can self-rescue or can be rescued promptly should a fall occur. A Rescue and Evacuation Plan shall be prepared by the contractor and include a detailed discussion of the following: methods of rescue; methods of self-rescue; equipment used; training requirement; specialized training for the rescuers; procedures for requesting rescue and medical assistance; and transportation routes to a medical facility. The Rescue and Evacuation Plan shall be included in the Activity Hazard Analysis (AHA) for the phase of work, in the Fall Protection and Prevention (FP&P) Plan, and the Accident Prevention Plan (APP).

3.4 SCAFFOLDING

Employees shall be provided with a safe means of access to the work area on the scaffold. Climbing of any scaffold braces or supports not specifically designed for access is prohibited. Access to scaffold platforms greater than 6 m (20 feet) in height shall be accessed by use of a scaffold stair system. Vertical ladders commonly provided by scaffold system manufacturers shall not be used for accessing scaffold platforms greater than 6 m (20 feet) in height. The use of an adequate gate is required. Contractor shall ensure that employees are qualified to perform scaffold

erection and dismantling. Do not use scaffold without the capability of supporting at least four times the maximum intended load or without appropriate fall protection as delineated in the accepted fall protection and prevention plan. Stationary scaffolds must be attached to structural building components to safeguard against tipping forward or backward. Special care shall be given to ensure scaffold systems are not overloaded. Side brackets used to extend scaffold platforms on self-supported scaffold systems for the storage of material is prohibited. The first tie-in shall be at the height equal to 4 times the width of the smallest dimension of the scaffold base. Work platforms shall be placed on mud sills. Scaffold or work platform erectors shall have fall protection during the erection and dismantling of scaffolding or work platforms that are more than six feet. Delineate fall protection requirements when working above six feet or above dangerous operations in the Fall Protection and Prevention (FP&P) Plan and Activity Hazard Analysis (AHA) for the phase of work.

3.4.1 Stilts

The use of stilts for gaining additional height in construction, renovation, repair or maintenance work is prohibited.

3.5 EQUIPMENT

3.5.1 Material Handling Equipment

a. Material handling equipment such as forklifts shall not be modified with work platform attachments for supporting employees unless specifically delineated in the manufacturer's printed operating instructions.

b. The use of hooks on equipment for lifting of material must be in accordance with manufacturer's printed instructions.

c. Operators of forklifts or power industrial trucks shall be licensed in accordance with OSHA.

3.5.2 Weight Handling Equipment

a. Cranes and derricks shall be equipped as specified in EM 385-1-1, section 16.

c. The Contractor shall comply with the crane manufacturer's specifications and limitations for erection and operation of cranes and hoists used in support of the work. Erection shall be performed under the supervision of a designated person (as defined in ASME B30.5). All testing shall be performed in accordance with the manufacturer's recommended procedures.

d. The Contractor shall comply with ASME B30.5 for mobile and locomotive cranes, ASME B30.22 for articulating boom cranes, ASME B30.3 for construction tower cranes, and ASME B30.8 for floating cranes and floating derricks.

e. Under no circumstance shall a Contractor make a lift at or above 90% of the cranes rated capacity in any configuration.

f. When operating in the vicinity of overhead transmission lines, operators and riggers shall be alert to this special hazard and shall follow the requirements of USACE EM 385-1-1 section 11 and ASME B30.5

or ASME B30.22 as applicable.

g. Crane suspended personnel work platforms (baskets) shall not be used unless the Contractor proves that using any other access to the work location would provide a greater hazard to the workers or is impossible. Personnel shall not be lifted with a line hoist or friction crane.

h. Portable fire extinguishers shall be inspected, maintained, and recharged as specified in NFPA 10, Standard for Portable Fire Extinguishers.

i. All employees shall be kept clear of loads about to be lifted and of suspended loads.

j. The Contractor shall use cribbing when performing lifts on outriggers.

k. The crane hook/block must be positioned directly over the load. Side loading of the crane is prohibited.

l. A physical barricade must be positioned to prevent personnel from entering the counterweight swing (tail swing) area of the crane.

m. Certification records which include the date of inspection, signature of the person performing the inspection, and the serial number or other identifier of the crane that was inspected shall always be available for review by Contracting Officer personnel.

n. Written reports listing the load test procedures used along with any repairs or alterations performed on the crane shall be available for review by Contracting Officer personnel.

o. Certify that all crane operators have been trained in proper use of all safety devices (e.g. anti-two block devices).

3.6 EXCAVATIONS

The competent person shall perform soil classification in accordance with 29 CFR 1926.

3.6.1 Utility Locations

Prior to digging, the appropriate digging permit must be obtained. All underground utilities in the work area must be positively identified by a private utility locating service in addition to any station locating service and coordinated with the station utility department. Any markings made during the utility investigation must be maintained throughout the contract.

3.6.2 Utility Location Verification

The Contractor must physically verify underground utility locations by hand digging using wood or fiberglass handled tools when any adjacent construction work is expected to come within three feet of the underground system. Digging within 0.061 m (2 feet) of a known utility must not be performed by means of mechanical equipment; hand digging shall be used. If construction is parallel to an existing utility the utility shall be exposed by hand digging every 30.5 m (100 feet) if parallel within 1.5 m (5

feet) of the excavation.

3.6.3 Shoring Systems

Trench and shoring systems must be identified in the accepted safety plan and AHA. Manufacture tabulated data and specifications or registered engineer tabulated data for shoring or benching systems shall be readily available on-site for review. Job-made shoring or shielding shall have the registered professional engineer stamp, specifications, and tabulated data. Extreme care must be used when excavating near direct burial electric underground cables.

3.6.4 Trenching Machinery

Trenching machines with digging chain drives shall be operated only when the spotters/laborers are in plain view of the operator. Operator and spotters/laborers shall be provided training on the hazards of the digging chain drives with emphasis on the distance that needs to be maintained when the digging chain is operating. Documentation of the training shall be kept on file at the project site.

3.7 UTILITIES WITHIN CONCRETE SLABS

Utilities located within concrete slabs or pier structures, bridges, and the like, are extremely difficult to identify due to the reinforcing steel used in the construction of these structures. Whenever contract work involves concrete chipping, saw cutting, or core drilling, the existing utility location must be coordinated with station utility departments in addition to a private locating service. Outages to isolate utility systems shall be used in circumstances where utilities are unable to be positively identified. The use of historical drawings does not alleviate the contractor from meeting this requirement.

3.8 ELECTRICAL

3.8.1 Conduct of Electrical Work

Underground electrical spaces must be certified safe for entry before entering to conduct work. Cables that will be cut must be positively identified and de-energized prior to performing each cut. Positive cable identification must be made prior to submitting any outage request for electrical systems. Arrangements are to be coordinated with the Contracting Officer and Station Utilities for identification. The Contracting Officer will not accept an outage request until the Contractor satisfactorily documents that the circuits have been clearly identified. Perform all high voltage cable cutting remotely using hydraulic cutting tool. When racking in or live switching of circuit breakers, no additional person other than the switch operator will be allowed in the space during the actual operation. Plan so that work near energized parts is minimized to the fullest extent possible. Use of electrical outages clear of any energized electrical sources is the preferred method. When working in energized substations, only qualified electrical workers shall be permitted to enter. When work requires Contractor to work near energized circuits as defined by the NFPA 70, high voltage personnel must use personal protective equipment that includes, as a minimum, electrical hard hat, safety shoes, insulating gloves with leather protective sleeves, fire retarding shirts, coveralls, face shields, and safety glasses. In addition, provide electrical arc flash protection for personnel as required by NFPA 70E. Insulating blankets, hearing protection, and switching suits may also be

required, depending on the specific job and as delineated in the Contractor's AHA.

3.8.2 Portable Extension Cords

Portable extension cords shall be sized in accordance with manufacturer ratings for the tool to be powered and protected from damage. All damaged extension cords shall be immediately removed from service. Portable extension cords shall meet the requirements of NFPA 70.

3.9 WORK IN CONFINED SPACES

The Contractor shall comply with the requirements in Section 06.I of USACE EM 385-1-1, OSHA 29 CFR 1910.146 and OSHA 29 CFR 1926.21(b)(6). Any potential for a hazard in the confined space requires a permit system to be used.

a. Entry Procedures. Prohibit entry into a confined space by personnel for any purpose, including hot work, until the qualified person has conducted appropriate tests to ensure the confined or enclosed space is safe for the work intended and that all potential hazards are controlled or eliminated and documented. (See Section 06.I.06 of USACE EM 385-1-1 for entry procedures.) All hazards pertaining to the space shall be reviewed with each employee during review of the AHA.

b. Forced air ventilation is required for all confined space entry operations and the minimum air exchange requirements must be maintained to ensure exposure to any hazardous atmosphere is kept below its action level.

c. Sewer wet wells require continuous atmosphere monitoring with audible alarm for toxic gas detection.

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SECTION 01550

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SECTION 01550

MAINTENANCE OF TRAFFIC

PART 1 GENERAL

1.1 SCOPE

The work covered by this section consists of furnishing all plant, labor and materials; and performing all operations in connection with maintenance of traffic while undergoing construction.

1.2 REFERENCES

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

ILLINOIS DEPARTMENT OF TRANSPORTATION (IDOT)

IDOT	(2007) Standard Specifications for Road and Bridge Construction; and current Supplemental Specifications and Recurring Special Provisions

U.S. FEDERAL HIGHWAY ADMINISTRATION (FHWA)

FHWA SA-89-006	(1988) Manual on Uniform Traffic Control Devices for Streets and Highways

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only or as otherwise designated. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Traffic Control Plan; G, CN

The contractor shall submit a traffic control plan to Great Lakes Area Office. In addition to the Great Lakes Area Office, the Contractor may be required to submit the traffic control plan to the City of Prospect Heights and IDOT for approval before start of any construction that will require lane restrictions.

1.4 PAYMENT

Payment for maintenance of traffic and any other incidental work shall be made in accordance to Section 01270 MEASUREMENT AND PAYMENTS.

PART 2 PRODUCTS (Not applicable

PART 3 EXECUTION

3.1 PROTECTION AND MAINTENANCE OF TRAFFIC

During construction the Contractor shall provide access and temporary relocated roads as necessary to maintain traffic. The Contractor shall maintain and protect traffic on all affected roads during the construction period except as otherwise specifically directed by the Contracting Officer. Lane closures shall be restricted to 9AM to 3PM and from between 9PM and 5AM. Measures for the protection and diversion of traffic, including the provision of watchmen and flagmen, erection of barricades, placing of lights around and in front of equipment and the work, and the erection and maintenance of adequate warning, danger, and direction signs, shall be as required by the State and local authorities having jurisdiction. The traveling public shall be protected from damage to person and property. The Contractor's traffic on roads selected for hauling material to and from the site shall interfere as little as possible with public traffic. The Contractor shall investigate the adequacy of existing roads and the allowable load limit on these roads. The Contractor shall be responsible for the repair of any damage to roads caused by construction operations. Maintenance of traffic shall conform to Illinois Department of Transportation, IDOT. The contractor is responsible for the design, installation and maintenance of traffic control devices during construction. Traffic control devices includes signs, signals, lighting devices, markings, barricades, channelizing and hand signaling devices.

3.2 FURNISHING, ERECTING AND MAINTAINING TRAFFIC CONTROL DEVICES

The Contractor shall protect the workers and provide for safe and convenient public travel by furnishing, erecting and maintaining to the satisfaction of the Contracting Officer, all signs, signals, markings, barricades, warning lights, and other traffic control devices required for the type of work being performed. The number, type, color size, and placement of all traffic control devices shall conform to the requirements of the FHWA SA-89-006 and the Cities of Prospect Heights standards. Any traffic control device which has become ineffective due to damage or defacement shall be replaced by the Contractor. Temporary traffic control devices shall remain in place only as long as they are needed and shall be removed as soon thereafter as practical. The Contracting Officer shall be the sole judge as to the acceptability of placement and maintenance of all traffic control devices. The portion of the roadway being used by public traffic shall be kept in such condition that such traffic will be accommodated adequately. Traffic control plans for restriction of traffic and/or detour plans shall be submitted to relevant regulatory bodies at least thirty (30) days before the desired date to restrict traffic.

3.3 QUALITY CONTROL

3.2.1 The Contractor shall establish and maintain a quality control system for the contract requirements; and maintain records of his quality control for all traffic control operations.

3.2.2 A copy of these records and tests, as well as the records of corrective actions taken, shall be furnished to the Government as directed by the Contracting Officer. See Section 01451, CONTRACTOR QUALITY CONTROL.

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SECTION 01580

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SECTION 01580

PROJECT SIGN AND SAFETY SIGN

PART 1 GENERAL

1.1 SCOPE

The work covered by this Section consists of providing the fabrication, erection and maintenance of one (1) Project Identification Sign and one (1) Safety Performance Sign. The items furnished in accordance with this Section shall be furnished within 10 calendar days after Notice to Proceed and shall be maintained in good condition throughout the construction period. All items will remain the property of the Contractor and shall be removed at the end of the contract.

1.2 APPLICABLE PUBLICATIONS

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

U.S. ARMY CORPS OF ENGINEERS (USACE)

EP 310-1-6-94	Graphic Standards Manual
EP 310-6a-85	Sign Standards Manual
EP 310-6b-85	Sign Standards Manual

1.3 PAYMENT

No separate or direct payment will be made for the items listed in this Section, and such work will be considered as a subsidiary obligation of the Contractor.

PART 2 PRODUCTS

2.1 CONSTRUCTION PROJECT SIGNS

a. Construction project signs shall be coordinated with the Contracting Officer. The signs include one (1) Project Identification Sign and one (1) Safety Performance Sign.

b. The construction project sign panels will each be electronically printed as a single decal and mounted on single sided vinyl faced White Board as described in Paragraph "MATERIALS" below.

c. The layout of all signs shall be in accordance with the standards specified in the USACE graphics and sign standards manuals referenced above. Relevant portions of the manuals will be provided to the Contractor upon request. Examples of generic signs are shown on Plates 01580-1 and 01580-2 included at the end of this specification section.

2.1.1 Project Identification Sign

One (1) project identification sign constructed in accordance with Plate

01580-1 and applicable publications shall be provided by the Contractor.

2.1.2 Safety Performance Sign

a. One (1) safety performance sign constructed in accordance with Plate 01580-2 and applicable publications shall be provided by the Contractor.

b. The safety performance record shall be updated daily.

2.1.3 Project Identification Label

The two plates at the end of the section are generic because the project identification is not included. For this particular project, the project identification label shall be identified as the following on both signs:

FOR LINE 1, DES PLAINES RIVER
FOR LINE 2, FLOOD DAMAGE REDUCTION
FOR LINE 3, FLOODWALL 37

2.1.4 Materials

The following are requirements for all of the construction project signs.

a. The sign faces shall be electronically printed on white non-reflective vinyl decals four (4) mil thick.

b. The sign face decals shall be mounted on panels of 1/2" thick White Board with single-sided vinyl facing. The entire circumference of the sign panels will be sealed and protected with white vinyl trim cap.

c. A protective overlaminate film shall be applied over the sign face decals capable of minimizing the deteriorating effects of ultraviolet radiation and providing additional protection against weathering and application of graffiti.

d. 2"x4" struts will be installed between the 4"x4" support posts to reinforce the top and bottom edges of the sign panels.

e. Wood material for the posts shall be preservative treated, structural grade Douglas Fir or No. 1 Southern Pine, or better. All other wood members shall be of well seasoned, kiln dried, clear redwood, bald cypress, red cedar, Douglas fir, spruce, tulip poplar, or white pine. The lumber materials shall be free of splits, wane, and loose knots or pitch pockets. All members of the sign shall be fastened with screws or bolts of type, size, number, and spacing to provide rigid construction and neat appearance. If the vertical supports system does not rigidly support the sign due to local soil conditions and/or wind loading additional bracing of the sign supports shall be provided. This additional bracing shall be composed of 2"X4" bracing bolted to the inside face of each 4"x4" support post and firmly anchored to the ground behind the sign. This additional bracing is not required to be treated lumber.

f. All bolts shall be 0.375" diameter and 4" long Allen head bolts, threaded to match T-nuts.

PART 3 EXECUTION

3.1 INSTALLATION

The Contractor shall affix the panels to the posts with the Allen head bolts prior to erection of the signs, including drilling counter-sunk 0.375 inch diameter holes in the posts to match the T-nut locations. The Contractor shall take all precautions necessary to protect the faces of the signs from damage during assembly and construction. The signs shall be installed upon commencement of the work under this contract. The location in which each sign is to be installed shall be cleared and leveled to facilitate the installation of, and provide easy visual contact with, the signs. Installation and positioning of the sign plate and posts shall be as indicated on Plates 01580-1 and 01580-2, found at the end of this section. Excavation and backfilling of the holes for posts and installation of the posts, braces, and stakes shall be such that signs are installed plumb and level.

3.2 MAINTENANCE

The Contractor shall maintain the signs in good condition and the sign site in a neat condition throughout the construction period.

3.3 QUALITY CONTROL

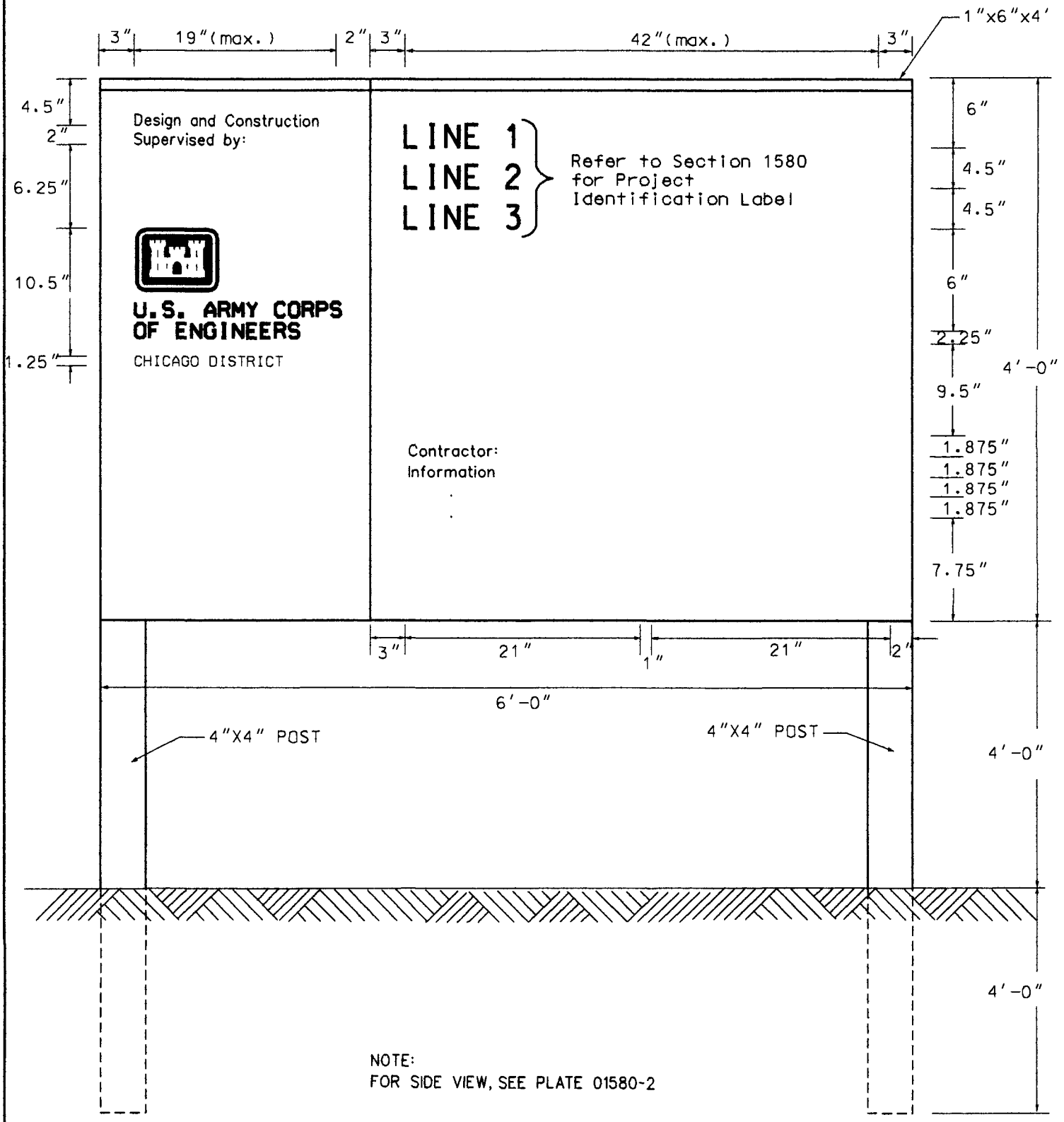
The Contractor shall establish and maintain a quality control system for all operations performed under this section to assure compliance with contract requirements. The Contractor shall maintain records of his quality control for all operations performed, including, but not limited to, the following:

a. Quality of materials and workmanship
b. Overall appearance of signs and site
c. Observance of safety regulations

3.3.1 Records

A copy of the record of inspections, as well as records of any corrective action taken, shall be furnished to Contracting Officer in accordance with SECTION 01451 CONTRACTOR QUALITY CONTROL.

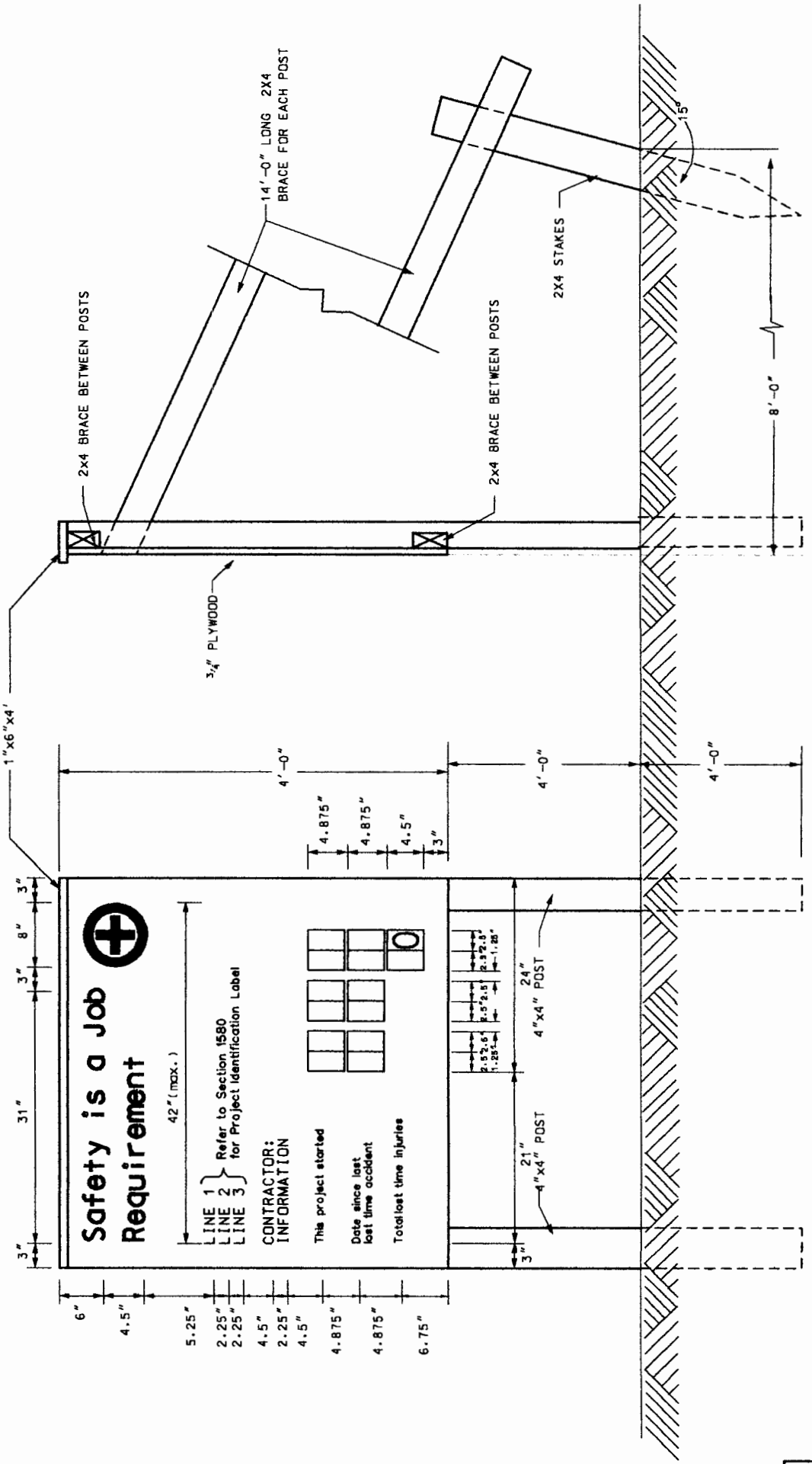
-- End of Section --



GENERIC PROJECT IDENTIFICATION SIGN

NOT TO SCALE

PLATE 01580-1



GENERIC SAFETY PERFORMANCE SIGN

NOT TO SCALE

PLATE 01580-2

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SECTION 02215

COFFERDAMS

PART 1 GENERAL

1.1 SCOPE

This Section covers construction of localized cofferdams and dewatering systems to provide the placement and removal of structures. Contractor shall provide all labor, plant, equipment and materials necessary for the construction.

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

COFFERDAMS; G, DT

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.1 COFFERDAMS

Submit complete plan for dewatering including proposed cofferdams. Plans shall include design analysis computations, drawings, and properties of proposed materials. Drawings shall indicate cofferdam locations, heights, materials, connections to existing structures, seals, and details. The plan shall be in accordance with Section 01355 ENVIRONMENTAL PROTECTION and shall include all applicable permits.

The Contractor shall coordinate any cofferdam setting and sealing operations with the Contracting Officer (COR). The Contractor is responsible for the final design of all cofferdams using the latest applicable governing codes and standards. The design of the cofferdam must be stamped by an Illinois licensed structural engineer. The Contractor is responsible for the design of any cofferdams, maintenance of cofferdams, and removal of cofferdams at the completion of construction. The top of cofferdam elevation shall be of sufficient height to prevent overtopping and disruption of work. The Contractor shall submit his proposed plan and design of the cofferdams, including design computations and design analysis, for approval by the Contracting Officer a minimum of 30 days prior to start of construction of the cofferdams. Drawings shall be submitted for approval. The cofferdams shall be designed for water at the top and an ice load of 5 kips per foot applied horizontally at the top. Concrete forms shall not be used as cofferdams, although form material may be used in the construction of cofferdams. The Contractor shall take reasonable precautions to prevent damage to the cofferdams.

3.2 DEWATERING AND PRESSURE RELIEF

The Contractor shall furnish, install, operate, and maintain all pumps and other equipment required to dewater and maintain in a water-free condition the areas in which work is to be performed in the dry. The Contractor shall control, by acceptable means, all water regardless of source and arrange for the disposal of this water.

3.2.1 Design

The dewatering system shall be designed using accepted and professional methods of design and engineering consistent with the best modern practice. The dewatering system shall include sumps, well points, relief wells, and other equipment, appurtenances, and related earthwork necessary to perform the function. The system shall be designed to maintain a dry condition within the area enclosed by the cofferdam(s). A representative of the Contractor shall visit the site to determine the conditions. The Contractor shall be responsible for the accuracy of the drawings and design data.

3.2.2 Drawing and Design Data

The Contractor shall submit for approval on the Contracting Officer, within 30 calendar days after receipt of a Notice to Proceed, drawings and complete design data. The submittal shall show methods and equipment proposed to dewater and maintain the excavation in a dewatered condition. The material to be submitted shall include, but not necessarily be limited to the following:

a. Drawing indicating the location and size of cofferdams, all relief wells, observation wells, sumps, and discharge lines.
b. Capacities of pumps, prime movers, and standby equipment.
c. Design calculations proving adequacy of system and selected equipment.
d. Detailed description of dewatering procedure and maintenance method.

3.2.3 Responsibility

Approval by Contracting Officer of the plans and data submitted by the Contractor shall not in any way be considered to relieve the Contractor from full responsibility for errors therein, or from the entire responsibility of complete and adequate design and performance of the system in keeping the excavated area completely dry. The Contractor shall be solely responsible for proper design, installation, proper design, installation, proper operation, maintenance, and any failure of any component of the system.

3.2.4 Available Soil Test Data

Soil data compiled by the Government is located in Section 00800A. Pumping tests have not been made at the site.

3.2.5 Power Supply

The Contractor shall be responsible for providing the necessary power required to the pump(s) for the dewatering and pressure relief systems. Dewatering shall be a continuous operation and interruptions shall not be permitted.

3.2.6 Damages

The Contractor shall be responsible for, and shall repair any damage to work in place, any other Contractor's equipment, and the excavation. Responsibility shall include, but not be limited to, damage to the bottom due to heave and including removal of material and pumping out of the excavated area that may result from negligence, inadequate or improper design and operation of the dewatering system, and any mechanical or electrical failure of the dewatering system.

3.3 REMOVAL OF DEWATERING EQUIPMENT

Upon completion of all work within the areas to be protected, the Contractor shall remove all protective structure material, equipment, and appurtenances installed for protection and dewatering the site, except as noted on the drawings.

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SECTION 02220

DEMOLITION

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

The work includes demolition, salvage of identified items and materials, including catch basins, manhole, concrete structures, reinforce concrete pipes, flared end sections, guardrails, existing riprap, and other items indicated for removal on the contract drawings, and removal of resulting rubbish and debris. Rubbish and debris shall be removed from the project site daily, unless otherwise directed by either the Contracting Officer, to avoid accumulation at the demolition site. Materials that cannot be removed daily shall be stored in areas specified by the Contracting Officer. In the interest of occupational safety and health, the work shall be performed in accordance with EM 385-1-1, Section 23, Demolition, and other applicable Sections. Salvaged items and materials that are not to be reused shall be disposed of as specified.

1.2 REFERENCES

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

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A10.6	(1990; R 1998) Safety Requirements for Demolition Operations

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2003) Safety and Health Requirements

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-07 Certificates

Demolition plan; G, CN

Proposed salvage, demolition and removal procedures for approval before work is started.

1.4 REGULATORY AND SAFETY REQUIREMENTS

Comply with federal, state, and local hauling and disposal regulations. In addition to the requirements of the "Contract Clauses," conform to the

safety requirements contained in ANSI A10.6.

1.5 DUST CONTROL

Prevent the spread of dust and avoid the creation of a nuisance or hazard in the surrounding area. Use of water will not be permitted when it will result in, or create, hazardous or objectionable conditions such as ice, flooding and pollution.

1.6 PROTECTION

1.6.1 Traffic Control Signs

Where pedestrian and driver safety is endangered in the area of removal work, use traffic barricades with flashing lights. Notify the Contracting Officer prior to beginning such work.

1.6.2 Existing Work

Before beginning any demolition work, survey the site and examine the drawings and specifications to determine the extent of the work. Record existing work in the presence of the Contracting Officer showing the condition of structures and other facilities adjacent to areas of alteration or removal. Photographs sized 4 inch will be acceptable as a record of existing conditions. Include in the record the description of existing conditions that exist prior to before starting work.

1.6.3 Items to Remain in Place

Take necessary precautions to avoid damage to existing items to remain in place, to be reused, or to remain the property of the Government. Repair or replace damaged items as approved by the Contracting Officer. Coordinate the work of this section with all other work indicated. Construct and maintain shoring, bracing, and supports as required. Ensure that structural elements are not overloaded. Increase structural supports or add new supports as may be required as a result of any cutting, removal, or demolition work performed under this contract. Provide new supports and reinforcement for existing construction weakened by demolition or removal work. Repairs, reinforcement, or structural replacement require approval by the Contracting Officer prior to performing such work.

1.6.4 Existing Construction

Do not disturb existing construction beyond the extent indicated or necessary for installation of new construction. Provide temporary shoring and bracing for support of building components to prevent settlement or other movement. Provide protective measures to control accumulation and migration of dust and dirt in all work areas. Remove dust, dirt, and debris from work areas daily.

1.6.5 Weather Protection

For portions of the building to remain, protect building interior and materials and equipment from the weather at all times. Where removal of existing roofing is necessary to accomplish work, have materials and workmen ready to provide adequate and temporary covering of exposed areas.

1.6.6 Trees

Protect trees within the project site which might be damaged during demolition, and which are indicated to be left in place, in accordance to Section 02931 TREE PROTECTION. Replace any tree designated to remain that is damaged during the work under this contract with like-kind or as approved by the Contracting Officer.

1.6.7 Utility Service

Maintain existing utilities indicated to stay in service and protect against damage during demolition operations.

1.6.8 Facilities

Protect electrical and mechanical services and utilities. Where removal of existing utilities and pavement is specified or indicated, provide approved barricades, temporary covering of exposed areas, and temporary services or connections for electrical and mechanical utilities. Floors, roofs, walls, columns, pilasters, and other structural components that are designed and constructed to stand without lateral support or shoring, and are determined to be in stable condition, must remain standing without additional bracing, shoring, or lateral support until demolished, unless directed otherwise by the Contracting Officer. Ensure that no elements determined to be unstable are left unsupported and place and secure bracing, shoring, or lateral supports as may be required as a result of any cutting, removal, or demolition work performed under this contract.

1.6.9 Protection of Personnel

Before, during and after the demolition work the Contractor shall continuously evaluate the condition of the structure being demolished and take immediate action to protect all personnel working in and around the demolition site.

1.7 BURNING

The use of burning at the project site for the disposal of refuse and debris will not be permitted.

1.8 RELOCATIONS

Perform the removal and reinstallation of relocated items as indicated with workmen skilled in the trades involved. Items to be relocated which are damaged by the Contractor shall be repaired or replaced with new undamaged items as approved by the Contracting Officer.

1.9 REQUIRED DATA

The Demolition plan shall include procedures for safe conduct of the work, including procedures and methods to provide necessary supports, lateral bracing and shoring when required, careful removal and disposition of materials specified to be salvaged, protection of property which is to remain undisturbed, coordination with other work in progress, a disconnection schedule of utility services, and a detailed description of methods and equipment to be used for each operation and of the sequence of operations. Provide procedures for safe conduct of the work in accordance with EM 385-1-1.

1.10 ENVIRONMENTAL PROTECTION

The work shall comply with the requirements of Section 01355 ENVIRONMENTAL PROTECTION.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 EXISTING FACILITIES TO BE REMOVED

3.1.1 Structures

a. Remove all existing structures indicated on the plans to be removed, including the existing structure located at approximately STA. 266+00, adjacent to proposed closure No. 8. The series 35 valve attached to the structure shall be salvaged and returned to the city of Prospect Heights as described in paragraph "Salvaged Materials and Equipment".

b. Locate demolition equipment throughout the structure and remove materials so as to not impose excessive loads to surrounding structures.

3.1.2 Utilities and Related Equipment

3.1.2.1 General Requirements

Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by the Contracting Officer. Do not interrupt existing utilities serving facilities occupied and used by the Government except when approved in writing and then only after temporary utility services have been approved and provided. Do not begin demolition work until all utility disconnections have been made. Shut off and cap utilities for future use, as indicated.

3.1.2.2 Disconnecting Existing Utilities

Remove existing utilities as indicated and terminate in a manner conforming to the nationally recognized code covering the specific utility and approved by the Contracting Officer. When utility lines are encountered that are not indicated on the drawings, the Contracting Officer shall be notified prior to further work in that area. Remove meters and related equipment and deliver to a location in accordance with instructions of the Contracting Officer.

3.1.2.3 Piping

Disconnect piping at unions, flanges and valves, and fittings as required to reduce the pipe into straight lengths for practical storage. Store salvaged piping according to size and type. If the piping that remains can become pressurized due to upstream valve failure, end caps, blind flanges, or other types of plugs or fittings with a pressure gage and bleed valve shall be attached to the open end of the pipe to ensure positive leak control. Carefully dismantle piping that previously contained gas, gasoline, oil, or other dangerous fluids, with precautions taken to prevent injury to persons and property. Store piping outdoors until all fumes and residues are removed. Box prefabricated supports, hangers, plates, valves, and specialty items according to size and type. Wrap sprinkler heads individually in plastic bags before boxing. Classify piping not designated for salvage, or not reusable, as scrap metal.

3.2 CONCURRENT EARTH-MOVING OPERATIONS

Do not begin excavation, filling, and other earth-moving operations that are sequential to demolition work in areas occupied by structures to be demolished until all demolition in the area has been completed and debris removed. Holes, open basements and other hazardous openings shall be filled.

3.3 DISPOSITION OF MATERIAL

3.3.1 Title to Materials

All materials and equipment removed and not reused or salvaged, shall become the property of the Contractor and shall be removed from Government property. Title to materials resulting from demolition, and materials and equipment to be removed, is vested in the Contractor upon approval by the Contracting Officer of the Contractor's demolition and removal procedures, and authorization by the Contracting Officer to begin demolition. The Government will not be responsible for the condition or loss of, or damage to, such property after contract award. Materials and equipment shall not be viewed by prospective purchasers or sold on the site.

3.3.2 Reuse of Materials and Equipment

Remove and store materials and equipment to be reused or relocated to prevent damage, and reinstall as the work progresses.

3.3.3 Salvaged Materials and Equipment

Remove materials and equipment that are indicated to be removed by the Contractor and that are to remain the property of the Government, and deliver to a storage site as directed by the COR.

a. Salvage items and material to the maximum extent possible.

b. Material salvaged for the Contractor shall be stored as approved by the Contracting Officer and shall be removed from Government property before completion of the contract. Material salvaged for the Contractor shall not be sold on the site.

c. Salvaged items to remain the property of the Government shall be removed in a manner to prevent damage, and packed or crated to protect the items from damage while in storage or during shipment. Items damaged during removal or storage shall be repaired or replaced to match existing items. Containers shall be properly identified as to contents. The following items reserved as property of the Government shall be delivered to the areas designated: series 35 valve.

3.4 CLEANUP

Debris shall be removed and transported in a manner that prevents spillage on streets or adjacent areas. Apply local regulations regarding hauling and disposal.

3.5 DISPOSAL OF REMOVED MATERIALS

3.5.1 Disposal

Dispose of debris, rubbish, scrap, and other nonsalvageable materials resulting from removal operations with all applicable federal, state and local regulations. Disposal shall be in accordance to Section 01355 ENVIRONMENTAL PROTECTION. Removed materials shall not be stored on the project site.

3.5.2 Burning on Government Property

Burning of materials removed from demolished structures will not be permitted on Government property.

3.6 REUSE OF SALVAGED ITEMS

Recondition salvaged materials and equipment designated for reuse before installation. Replace items damaged during removal and salvage operations or restore them as necessary to usable condition.

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SECTION 02231

CLEARING AND GRUBBING

PART 1 GENERAL

1.1 SCOPE

The work covered by this section consists of preparing the work site for construction including clearing and grubbing, tree removal, hauling and disposing of debris, protection of existing structures and site restoration. The Contractor is responsible for furnishing all labor, equipment, and materials, and performing all operations in connection with the miscellaneous site work as shown on the drawings and in accordance with these specifications subject to the terms and conditions of the contract.

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Work Plan

The Contractor will provide a Work Plan detailing the procedures proposed for the accomplishment of the work. The procedures shall provide for safe conduct of the work, equipment per type of material for excavation, filling, and compaction, removal and disposition of materials specified to be salvaged, protection of existing structures, coordination with other work in progress, and disconnection of utilities. The Work Plan shall also include the following items:

a. Location of contractor's storage and staging areas.
b. Name and location of debris disposal site.
c. Manifests for debris removed from the work site.
d. Haul routes within the work limits.

Access Route and Traffic Control Plan;G,CN

Prior to starting work, the Contractor shall submit a plan to ensure the safety of pedestrian, bicycle and vehicle traffic along the access route, particularly where the access route crosses public roadways, walkways, and bicycle paths. The Contractor shall coordinate the plan with the Illinois Department of Transportation and Cook County Forest Preserve as necessary and shall outline the placement of all signs and traffic control devices. The contractor's plan shall also include measures that will maintain continuous flow of surface runoff through the access route.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 PROTECTION OF EXISTING STRUCTURES AND TREES

3.1.1 General

Protection of existing structures and trees shall be in conformance with the requirements of the "GENERAL PROVISIONS" Section including any applicable local requirements.

3.1.2 Trees, Shrubs, and Existing Facilities

Prior to any site preparation including clearing or grubbing the Contractor shall coordinate with the COR for removal, salvaging, storing, relocating, and protecting all existing structures within the work limits. Areas disturbed by construction operations shall be restored to it's original condition in cooperation with the Illinois Department of Transportation and Cook County Forest Preserve.

During construction, the Contractor will protect all existing landscaping, structures, utilities, and improvements. If damage occurs to any of the above stated items through negligence of the Contractor, the said items will be replaced at the Contractor's expense. It is the responsibility of the Contractor to review all available data, including possible utility locations with the utility and/or property owners, prior to beginning excavation. Reference SPECIAL CONTRACT REQUIREMENTS Section 01100, "ONE CALL SYSTEM FOR EXCAVATORS".

3.1.3 Protection of Existing Trees

Existing trees are indicated on the drawings. All trees not marked by an "X" on the plans are to remain and shall be protected in accordance with SECTION 02931, TREE PROTECTION.

3.1.4 Utility Lines

Protect existing utility lines that are indicated to remain from damage. Notify the Contracting Officer immediately of damage to or an encounter with an unknown existing utility line. The Contractor shall be responsible for the repairs of damage to existing utility lines that are indicated or made known to the Contractor prior to start of clearing and grubbing operations. When utility lines which are to be removed are encountered within the area of operations, the Contractor shall notify the Contracting Officer in ample time to minimize interruption of the service.

3.2 CLEARING

Clearing operations shall consist of the complete removal and disposal of all obstructions above the ground surface that obtrude, encroach upon, or otherwise obstruct the work. The contractor shall not disturb any trees except for trees specifically identified to be removed on the contract drawings. These trees, marked by an "X" on the drawings, shall be removed in accordance with SECTION 02931, TREE PROTECTION. The Contractor is required to work closely with the COR and Cook County Forest Preserve District to identify, mark, and protect such vegetation inside the work limits as specified in paragraph 3.1. Clearing shall consist of the removal of brush, vegetation, shrubs, trees, stones, concrete and debris.

Clearing and grubbing and demolition around trees to remain shall be in accordance with SECTION 02931, TREE PROTECTION.

3.3 GRUBBING

Grubbing shall consist of the removal and disposal of stumps, roots larger than 3 inches in diameter, matted roots, and other objectionable material from the designated grubbing areas. Grubbing also entails the filling of grubbing holes. Material to be grubbed, together with logs and other organic or metallic debris not suitable for foundation purposes, shall be removed to a depth of not less than 18 inches below the original surface level of the ground in areas indicated to be grubbed and in areas indicated as construction areas under this contract, such as areas for buildings, and areas to be paved. Depressions made by grubbing shall be filled with suitable material and compacted to make the surface conform with the original adjacent surface of the ground. Grubbing operation is required for before placing clay embankments.

3.4 DEMOLITION AND REMOVAL OF EXISTING STRUCTURES

Blasting shall not be allowed. All existing structure, stones, timbers, fill, rubble, and miscellaneous features shall be excavated and/or demolished as necessary in order to provide a firm, sound foundation for new construction. The Contractor shall excavate for and clear the driving line of stone and debris as necessary to properly align and drive the new steel sheet pile. Demolition and removal of existing structures shall be in accordance with Section 02220 DEMOLITION.

3.5 SITE RESTORATION

The Contractor shall restore all grades and turf, and provide topsoil and turf for areas damaged and used during construction in accordance with SECTION 02300 EARTHWORK and SECTION 02920 TURF.

3.6 DISPOSAL OF MATERIALS

Any timbers, unsatisfactory material and debris within the reach of construction shall be removed except as otherwise directed by the Contracting Officers Representative (COR), and upon removal shall become the property of the Contractor. All materials shall be disposed of in conformance with the requirements of the "ENVIRONMENTAL PROTECTION" Section including any applicable local requirements.

All material, including clearing and grubbing debris, shall be disposed of in a disposal site outside the limits of construction. Rubbish and debris will be disposed of from the site daily, unless otherwise directed, to avoid accumulation of debris at the site.

3.7 QUALITY CONTROL

The Contractor shall establish and maintain quality control for all work performed under this section to assure compliance with contract requirements and maintain records of his quality control in accordance with "CONTRACTOR QUALITY CONTROL" Section for all construction operations including but not limited to the following:

a. Clearing and Grubbing.
b. Protection of Existing Trees, Vegetation, Structures Utilities, and Improvements.

c. Site Restoration.
d. Disposal of materials.
e. Records: A copy of records of inspection, and records of any corrective action taken shall be furnished to the Government as directed by the Contracting Officer in accordance with the "CONTRACTOR QUALITY CONTROL" Section of these technical provisions and as otherwise directed.

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SECTION 02300

EARTHWORK

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO T 180	(2001; R 2004) Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and an 457-mm (18-in) Drop
AASHTO T 224	(2001; R 2004) Correction for Coarse Particles in the Soil Compaction Test

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C600	(2005) Installation of Ductile-Iron Water Mains and Their Appurtenances

ASTM INTERNATIONAL (ASTM)

ASTM C 136	(2001) Sieve Analysis of Fine and Coarse Aggregates
ASTM D 1140	(2000; R 2006) Amount of Material in Soils Finer than the No. 200 (75-micrometer) Sieve
ASTM D 1556	(2007) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 1557	(2007) Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3) (2700 kN-m/m3)
ASTM D 2487	(2006) Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 2922	(2005) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 422	(1963; R 2007) Particle-Size Analysis of Soils
ASTM D 4318	(2005) Liquid Limit, Plastic Limit, and Plasticity Index of Soils

ASTM D 6938	(2007a) Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
ASTM D 698	(2007e1) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu. ft. (600 kN-m/cu. m.))

1.2 DEFINITIONS

1.2.1 Satisfactory Materials

"Satisfactory cohesionless materials" shall comprise any materials classified by ASTM D 2487 as GW, GP, GM, GP-GM, GW-GM, GC, GP-GC, GM-GC, SW, SP, SW-SM, SW-SC, SP-SM, SP-SC. "Satisfactory cohesive materials" shall comprise any materials classified by ASTM D 2487 as SM, SC, CL, ML, CL-ML. Satisfactory materials for grading shall be comprised of stones less than 8 inches, except for fill material for pavements which shall be comprised of stones less than 3 inches in any dimension. Satisfactory materials obtained from any given borrow source shall meet the environmental requirements in paragraph "Environmental Testing of Borrow Materials."

1.2.2 Unsatisfactory Materials

Materials which do not comply with the requirements for satisfactory materials are unsatisfactory. Unsatisfactory materials also include man-made fills; trash; refuse; backfills from previous construction; and material classified as satisfactory which contains root and other organic matter or frozen material. Material from any given borrow site that does not satisfy all the requirements set forth in paragraph "Environmental Testing of Borrow Materials" shall be deemed unsatisfactory and shall not be used for this contract.

1.2.3 In-situ Borrow Materials

In-situ borrow materials are those native, undisturbed materials that are in-situ at a borrow source (new or existing) prior to being selected for use on this project.

1.2.4 Stockpiled Borrow Materials

Stockpiled borrow materials are those materials that are stockpiled for use at the time of identification for use on the project. This includes but is not limited to spoil piles, soils identified for re-use or purchased for re-use off of the original site, recycled materials including those from a commercial recycling operation, piles of material that are ex-situ at the time of identification for use on the project, and any other materials that are not in-situ in the native condition.

1.2.5 Cohesionless and Cohesive Materials

Cohesionless materials include materials classified in ASTM D 2487 as GW, GP, SW, and SP. Cohesive materials include materials classified as GC, SC, ML, CL. Testing required for classifying materials shall be in accordance with ASTM D 4318, ASTM C 136, ASTM D 422, and ASTM D 1140.

1.2.6 Degree of Compaction

Degree of compaction required, except as noted in the second sentence, is expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D 698 abbreviated as a percent of laboratory maximum density. Since ASTM D 698 applies only to soils that have 30 percent or less by weight of their particles retained on the 3/4 inch sieve, the degree of compaction for material having more than 30 percent by weight of their particles retained on the 3/4 inch sieve shall be expressed as a percentage of the maximum density in accordance with AASHTO T 180 Method D and corrected with AASHTO T 224. To maintain the same percentage of coarse material, the "remove and replace" procedure as described in the NOTE 8 in Paragraph 7.2 of AASHTO T 180 shall be used.

1.2.7 Topsoil

Material suitable for topsoils obtained from offsite areas are defined as: Natural, friable soil representative of productive, well-drained soils in the area, free of subsoil, stumps, rocks larger than one inch diameter, brush, weeds, toxic substances, and other material detrimental to plant growth. Topsoil shall be processed screened prior to delivery. Amend topsoil pH range to obtain a pH of 5.5 to 7.

1.2.8 Unstable Material

Unstable material shall consist of materials too wet to properly support the utility pipe, conduit, or appurtenant structure.

1.2.9 Select Granular Material

1.2.9.1 General Requirements

Select granular material shall consist of materials classified as GW, GP, SW, SP by ASTM D 2487 where indicated.

1.2.10 Initial Backfill Material

Initial backfill shall consist of select granular material or satisfactory materials free from rocks 3inches or larger in any dimension or free from rocks of such size as recommended by the pipe manufacturer, whichever is smaller.

1.2.11 Nonfrost Susceptible (NFS) Material

Nonfrost susceptible material shall be a uniformly graded washed sand with a maximum particle size of 3 inch and less than 5 percent passing the No. 200 size sieve, and with not more than 3 percent by weight finer than 0.02 mm grain size.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Commercial Borrow Source;G,*PL*

Submit name and location of commercial source of borrow material and a letter from owner/operator of quarry or borrow site certifying that all environmental and operating permits have been acquired. This submittal does not relieve the Contractor of the requirements in paragraph "Environmental Testing of Borrow Materials". In addition to PL (planning), other parties who may be reviewing the information include C (construction branch), and any other entity deemed appropriate by the Government.

Soil Sampling Plan for Borrow Source;G,*DH*

Prior to sampling borrow material from any given source, the Contractor must have a Government approved soil sampling plan. The Contractor shall submit a soil sampling plan for environmental testing of the borrow material before proceeding with sampling of any given source. Samples collected prior to Government approval of a soil sampling plan will not be considered and any costs associated with sampling prior to approval of a soil sampling plan will be the Contractors expense. In addition to DH, other parties who may be reviewing the report include C and LS (local sponsor), PL (planning), and any other entity deemed appropriate by the Government. The comments from all reviewers will be considered in the review and approval process of the soil sampling plan.

Environmental Soil Sampling Report for Borrow Source;G,*DH*

Prior to excavating material from any given borrow source and bringing it to the job site, the Contractor shall submit, for Government review and approval, the final report of environmental soil sampling and testing for any given source. No material from a borrow source shall be brought to the project site before the Contractor receives written Government approval of the environmental soil sampling report. In addition to DH, other parties who may be reviewing the report include C and LS, Local Sponsor, and any other entity deemed appropriate by the Government. The comments from all reviewers will be considered in the review and approval process of the environmental soil sampling report.

Shoring and Excavation; G,DT

Dewatering Work Plan; G,DG

SD-07 Certificates

Testing

Qualifications of the commercial testing laboratory or Contractor's testing facilities.

1.4 SUBSURFACE DATA

Subsurface soil boring logs are shown. Additional geotechnical information is provided in Section 00800A. These data represent the best subsurface information available; however, variations may exist in the subsurface between boring locations.

1.5 CLASSIFICATION OF EXCAVATION

No consideration will be given to the nature of the materials, and all excavation will be designated as unclassified excavation.

1.6 CRITERIA FOR BIDDING

Base bids on the following criteria:

a. Surface elevations are as indicated.

b. Pipes or other artificial obstructions, except those indicated, will not be encountered.

c. Ground water elevations indicated by the boring log were those existing at the time subsurface investigations were made and do not necessarily represent ground water elevation at the time of construction.

e. Material character is indicated by the boring logs.

f. Bedrock will not be encountered for this work.

1.7 DEWATERING WORK PLAN

Submit procedures for accomplishing dewatering work. This plan shall include the method of dewatering, the location of dewatering sumps or wells, and the level to which the groundwater should be lowered. All permenant work shall be accomplished in the dry and on a stable subgrade. The Contractor is responsible for designing, providing, installing, operation, monitoring, and removing the dewatering system by a plan approved by the Contracting Officer. Note that the groundwater elevation information is limited to the 24 hour measurements taken after advancement of site borings shown and described in detail in Section 00800-A.

The dewatering plan shall include a list of equipment to be used. Perimeter and diversion ditches and dikes shall be included and maintained to prevent surface water from entering any excavation. Surface water that falls or flowing into the excatvation shall be controlled by adequate pumps and sumps. Seepage of any water from excavated slopes should be controlled to prevent sloughing, and ponding of water in the excavation and should be prevented during construction operations. If the flow of water into the excavation becomes excessive and cannot be controlled by the dewatering system that the Contractor has installed, excavation should be halted until satisfactory remedial measures have been taken. The Dewatering Work shall be conducted in compliance with ILR10 (attached to Section 01355) and all applicable permits shall be obtained prior to conducting any dewatering work.

PART 2 PRODUCTS

2.1 SELECTION OF BORROW MATERIAL

Borrow material shall be satisfactory material, as defined in paragraph "Satisfactory Materials", selected to meet the requirements and conditions for the particular fill for which it is to be used. Contractor shall not bring borrow material to the job site until all required submittals and reports pertaining to borrow material have been approved in writing by the

Government. If the Contractor brings material to the job site without first obtaining written approval from the Government, the materials shall be removed within forty-eight (48) hours of receipt of a direction from the Government to remove the material from the job site. The Contractor shall not be entitled to any additional increase in the contract price or any additional time for completion of the contract associated with the removal of the materials notwithstanding any other provision in the contract. If the Contractor has not completed removal of the material from the job site within forty-eight (48) hours of receipt of a direction from the Government to remove the material for the job site, this failure shall constitute a material breach of the contract and entitle the Government to all appropriate remedial actions including, but not limited to, termination for default.

Contractor shall comply with the borrow/disposal sites and quarries requirements in SECTION 01100 GENERAL PROVISIONS. The requirements of SECTION 01100 not withstanding, all borrow sources, including commercial sources, must comply with the paragraph "Environmental Testing of Borrow Materials."

2.1.1 Commercial borrow source

The Contractor shall submit for approval, prior to importing borrow material from a commercial borrow source, the name of the borrow site or quarry and the supporting documentation required in paragraph "Commercial Borrow Source." The commercial borrow site or quarry shall be in the business of providing borrow and whose materials meet all applicable federal, state, and local environmental statutory and regulatory requirements.

2.1.2 Environmental Testing of Borrow Materials

Prior to bringing borrow material from any given borrow source to the job site, the Contractor shall submit for approval a request to utilize any given borrow source. Submission for approval includes a soil sampling plan and an environmental soil sampling report. Contractor shall not bring material to the job site until the soil sampling plan and environmental soil sampling report, for any given source, are submitted and have been approved in writing by the Government. The Contractor shall remove material brought to the job site that does not have written Government approval in accordance with the provisions set forth in paragraph "Selection of Borrow Material". Any costs associated with deviating from the requirements in this section will be the Contractors expense.

Material obtained from any borrow source will be considered acceptable under this part if the values obtained by the analysis of all parameters specified in paragraph "Soil Sampling Plan for Borrow Source" are below values included in Tables 1 and 2 attached. If the values obtained by the analysis of one or more of the parameters set forth in Table 1 and Table 2 are exceeded, the material from that source will be deemed unsatisfactory and may not be used for this contract. Analytical results shall not be averaged for purposes of determining compliance with the requirements set forth in Table 1 and Table 2.

Materials classified as commercially manufactured stone or sand, or topsoil, do not require the environmental testing stated in this paragraph. Materials obtained from the project site do not require the environmental testing stated in this paragraph.

2.1.2.1 Soil Sampling Plan for Borrow Source

The Contractor shall address the following, at a minimum, in the soil sampling plan for any given source of material: location of the material source, proposed sample locations (including a map), volume of borrow material, sample collection and handling procedures, laboratory selected, laboratory certifications, parameters to be analyzed, analytical methods, laboratory reporting limits, QA/QC requirements, chain of custody procedures, the quality assurance project plan (QAPP), data quality objectives, data validation, and reporting requirements. The data quality objectives for the soil sampling are to detect contamination and produce results that are at or below the values for all parameters included in Table 1 and 2 attached. If a phase I or phase II environmental site assessment of the borrow site exists, this information shall be submitted as part of the sampling plan. The Contractor shall use and submit the name and qualifications of a qualified environmental professional who will conduct all sampling, analysis, and reporting. The laboratory selected to perform the laboratory analysis must comply with the requirements of the DOD QSM and shall be certified through the National Environmental Laboratory Accreditation Conference/National Environmental Laboratory Accreditation Program (NELAC/NELAP) certification program.

The Contractor shall sample and test the borrow material for all of the parameters listed in Tables 1 and 2 using SW-846 methodology. Total and Synthetic Precipitation Leaching Procedure (SPLP) metals analysis shall include the following metals: Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Mercury, Nickel, Silver, Lead, Zinc, and Selenium. Contractor shall collect at least one composite sample for every ½ acre of property where borrow will be obtained, from any given borrow location. A minimum of three composite samples shall be collected for any given borrow location. Contractor shall composite each individual sample to represent the vertical extent of the borrow area. Contractor shall distribute samples to adequately cover the horizontal extent of the borrow area. The proposed sample locations shall be included in the soil sampling plan.

The sampling frequency for the materials depends on whether the borrow material is in-situ (in-situ borrow materials) or is ex-situ (stockpiled borrow materials.) For in-situ borrow materials, the Contractor shall collect at least one composite sample for every ½ acre of property where borrow will be obtained, from any given borrow location. A minimum of three composite samples shall be collected for any given borrow location. Contractor shall composite each individual sample to represent the vertical extent of the borrow area. Contractor shall distribute samples to adequately cover the horizontal extent of the borrow area. The proposed sample locations shall be included in the soil sampling plan. Contractor shall sample soils in-situ and shall not remove in-situ materials, or bring materials to the job site, until the soil sampling plan and environmental soil sampling report, for any given in-situ source, are submitted and have been approved in writing by the Government

For stockpiled (ex-situ) borrow materials, the Contractor shall collect at least one sample for every 250 cubic yards of stockpiled material. A minimum of three samples shall be collected from any given stockpile. The Contractor shall include the stockpile size and the proposed sample locations in the soil sampling plan. In addition, the Contractor shall describe how the stockpiled material is being secured to ensure that the material being tested will remain in the stockpile and will be the same material used on the project site in the soil sampling plan. Contractor

shall locate samples throughout the stockpile to ensure that the horizontal and vertical extent of the stockpile is adequately covered. Contractor shall not move or remove stockpiled materials, or bring materials to the job site until the soil sampling plan and environmental soil sampling report, for any given ex-situ source, are submitted and have been approved in writing by the Government

The Contractor shall notify the Government at least 48 hours prior to sampling activities. The Government may choose to have a representative on-site during sampling activities.

2.1.2.2 Environmental Soil Sampling Report for Borrow Source

After completing soil sampling and testing from any given borrow source, the Contractor shall prepare and submit an environmental soil sampling report for Governmental approval. The report shall consist of, at a minimum: a narrative of information obtained during sampling, copy of field notes, identification of sample locations from borrow material, copies of chain of custody forms, copies of laboratory data, a table comparing the analytical results to the contract requirements specified in paragraph "Environmental Testing of Borrow Materials", and a discussion of results and conclusions. The report shall be called "final" after approval is made by the Government. The Contractor is responsible for maintaining accurate records to support information for development of the borrow source. Only after receiving written Government approval of the environmental soil sampling report for any given borrow source will the Contractor be allowed to import soil material from that source to the contract job.

PART 3 EXECUTION

3.1 STRIPPING OF TOPSOIL

Where shown, topsoil shall be stripped. Topsoil shall be spread on areas already graded and prepared for topsoil, or transported and deposited in stockpiles convenient to areas that are to receive application of the topsoil later, or at locations indicated or specified. Topsoil shall be kept separate from other excavated materials, brush, litter, objectionable weeds, roots, stones larger than 1 inch in diameter, and other materials that would interfere with planting and maintenance operations. Any surplus of topsoil from excavations and grading shall be removed from the site.

3.2 GENERAL EXCAVATION

The Contractor shall perform excavation of every type of material encountered within the limits of the project to the lines, grades, and elevations indicated and as specified. Grading shall be in conformity with the typical sections shown and the tolerances specified in paragraph FINISHING. Satisfactory excavated materials shall be transported to and placed in fill or embankment within the limits of the work. Unsatisfactory materials encountered within the limits of the work shall be excavated below grade and replaced with satisfactory materials as directed. Such excavated material and the satisfactory material ordered as replacement shall be included in excavation. Surplus satisfactory excavated material not required for fill or embankment shall be disposed of in areas approved for surplus material storage or designated waste areas. Unsatisfactory excavated material shall be disposed of in designated waste or spoil areas. During construction, excavation and fill shall be performed in a manner and sequence that will provide proper drainage at all times. Material required for fill or embankment in excess of that produced by

excavation within the grading limits shall be excavated from other approved areas selected by the Contractor as specified.

3.2.1 Ditches

Excavation of ditches shall be accomplished by cutting accurately to the cross sections, grades, and elevations shown. Ditches and gutters shall not be excavated below grades shown. Excessive open ditch excavation shall be backfilled with satisfactory, thoroughly compacted, material or with suitable stone or cobble to grades shown. Material excavated shall be disposed of as directed, except that in no case shall material be deposited less than 4 feet from the edge of a ditch. The Contractor shall maintain excavations free from detrimental quantities of leaves, brush, sticks, trash, and other debris until final acceptance of the work.

3.2.2 Drainage Structures

Excavations shall be made to the lines, grades, and elevations shown, or as directed. Trenches and foundation pits shall be of sufficient size to permit the placement and removal of forms for the full length and width of structure footings and foundations as shown. When concrete is to be placed in an excavated area, the bottom of the excavation shall not be disturbed. Excavation to the final grade level shall not be made until just before the concrete is to be placed.

3.2.3 Drainage

Provide for the collection and disposal of surface and subsurface water encountered during construction. Completely drain construction site during periods of construction to keep soil materials sufficiently dry. The Contractor shall establish/construct storm drainage features (ponds/basins) at the earliest stages of site development, and throughout construction grade the construction area to provide positive surface water runoff away from the construction activity and/or provide temporary ditches, swales, and other drainage features and equipment as required to maintain dry soils. When unsuitable working platforms for equipment operation and unsuitable soil support for subsequent construction features develop, remove unsuitable material and provide new soil material as specified herein. It is the responsibility of the Contractor to assess the soil and ground water conditions presented by the plans and specifications and to employ necessary measures to permit construction to proceed. All drainage features shall comply with Section 01355 ENVIRONMENTAL PROTECTION.

3.2.4 Dewatering

Groundwater flowing toward or into excavations shall be controlled to prevent sloughing of excavation slopes and walls, boils, uplift and heave in the excavation and to eliminate interference with orderly progress of construction. French drains, sumps, ditches or trenches will not be permitted within 3 feet of the foundation of any structure, except with specific written approval, and after specific contractual provisions for restoration of the foundation area have been made. Control measures shall be taken by the time the excavation reaches the water level in order to maintain the integrity of the in situ material. While the excavation is open, the water level shall be maintained continuously, at least 2feet below the working level. Operate dewatering system continuously until construction work below existing water levels is complete. Submit performance records weekly. Measure and record performance of dewatering system at same time each day by use of observation wells or piezometers

installed in conjunction with the dewatering system. Relieve hydrostatic head in previous zones below subgrade elevation in layered soils to prevent uplift.

3.2.5 Trench Excavation Requirements

The trench shall be excavated as recommended by the manufacturer of the pipe to be installed. Trench walls below the top of the pipe shall be sloped, or made vertical, and of such width as recommended in the manufacturer's installation manual. Where no manufacturer's installation manual is available, trench walls shall be made vertical. Trench walls more than 4 feet high shall be shored, cut back to a stable slope, or provided with equivalent means of protection for employees who may be exposed to moving ground or cave in. Vertical trench walls more than 4 feet high shall be shored. Trench walls which are cut back shall be excavated to at least the angle of repose of the soil. Special attention shall be given to slopes which may be adversely affected by weather or moisture content. The trench width below the top of pipe shall not exceed 24 inches plus pipe outside diameter (O.D.) for pipes of less than 24 inches inside diameter and shall not exceed 36 inches plus pipe outside diameter for sizes larger than 24 inches inside diameter. Where recommended trench widths are exceeded, redesign, stronger pipe, or special installation procedures shall be utilized by the Contractor. The cost of redesign, stronger pipe, or special installation procedures shall be borne by the Contractor without any additional cost to the Government.

3.2.5.1 Bottom Preparation

The bottoms of trenches shall be accurately graded to provide uniform bearing and support for the bottom quadrant of each section of the pipe. Bell holes shall be excavated to the necessary size at each joint or coupling to eliminate point bearing. Stones recommended by the pipe manufacturer shall be removed to avoid point bearing.

3.2.5.2 Removal of Unstable Material

Where unstable material is encountered in the bottom of the trench, such material shall be removed to the depth directed and replaced to the proper grade with select granular material as provided in paragraph BACKFILLING AND COMPACTION. When removal of unstable material is required due to the Contractor's fault or neglect in performing the work, the resulting material shall be excavated and replaced by the Contractor without additional cost to the Government.

3.2.5.3 Excavation for Appurtenances

Excavation for manholes, catch-basins, inlets, or similar structures shall be of sufficient size to permit the placement and removal of forms for the full length and width of structure footings and foundations as shown. Removal of unstable material shall be as specified above. When concrete is to be placed in an excavated area, special care shall be taken not to disturb the bottom of the excavation. Excavation to the final grade level shall not be made until just before the concrete is to be placed.

3.2.5.4 Jacking, Boring, and Tunneling

Excavation shall be by open cut.

3.2.6 Structural Excavation

Ensure that footing subgrades have been inspected and approved by the Contracting Officer prior to concrete placement. Backfill and compact over excavations to 95 percent of ASTM D 698 maximum density.

3.3 SHORING AND EXCAVATION

3.3.1 General Requirements

The Contractor shall submit a Shoring, Sheeting, and excavation plan for approval 30 days prior to starting work. Submit drawings and calculations, certified by a registered professional engineer, describing the methods for shoring, sheeting and sloping of excavations. Shoring, including sheet piling, shall be furnished and installed as necessary to protect workmen, banks, adjacent paving, structures, and utilities. Shoring, bracing, and sheeting shall be removed as excavations are backfilled, in a manner to prevent caving. Excavation slopes shall be evaluated by a professional engineer licensed to practice geotechnical engineering.

3.3.2 Geotechnical Engineer

The Contractor is required to hire a Professional Geotechnical Engineer to provide inspection of excavations and soil/groundwater conditions throughout construction. The Geotechnical Engineer shall be responsible for performing pre-construction and periodic site visits throughout construction to assess site conditions. The Geotechnical Engineer shall update the excavation, sheeting and dewatering plans as construction progresses to reflect changing conditions and shall submit an updated plan if necessary. A written report shall be submitted, at least monthly, informing the Contractor and Contracting Officer of the status of the plan and an accounting of the Contractor's adherence to the plan addressing any present or potential problems. The Geotechnical Engineer shall be available to meet with the Contracting Officer at any time throughout the contract duration.

3.4 FINAL GRADE OF SURFACES TO SUPPORT CONCRETE

Excavation to final grade shall not be made until just before concrete is to be placed. Approximately level surfaces shall be roughened, and sloped surfaces shall be cut as indicated into rough steps or benches to provide a satisfactory bond. All surfaces shall be protected from erosion resulting from ponding or flow of water.

3.5 GROUND SURFACE PREPARATION

3.5.1 General Requirements

Unsatisfactory material in surfaces to receive fill or in excavated areas shall be removed and replaced with satisfactory materials as directed by the Contracting Officer. The surface shall be scarified to a depth of 6 inches before the fill is started. Sloped surfaces steeper than 1 vertical to 4 horizontal shall be plowed, stepped, benched, or broken up so that the fill material will bond with the existing material. When subgrades are less than the specified density, the ground surface shall be broken up to a minimum depth of 6 inches, pulverized, and compacted to the specified density. When the subgrade is part fill and part excavation or natural ground, the excavated or natural ground portion shall be scarified to a depth of 12 inches and compacted as specified for the adjacent fill.

3.5.2 Unsuitable Subgrade

Material shall not be placed on surfaces that are muddy, frozen, or contain frost. Placement of fill shall cease due to cold weather when the sheepsfoot pods are no longer able to penetrate the ground. Earthen material shall not contain frozen clumps of soil, snow or ice.

3.6 UTILIZATION OF EXCAVATED MATERIALS

Unsatisfactory materials removed from excavations shall be removed from the site. Satisfactory material removed from excavations shall be used, insofar as practicable, in the construction of fills, embankments, subgrades, shoulders, bedding (as backfill), and for similar purposes. No satisfactory excavated material shall be wasted without specific written authorization. Satisfactory material authorized to be wasted shall be disposed of in accordance to paragraph DISPOSITION OF SURPLUS MATERIAL. No excavated material shall be disposed of to obstruct the flow of any stream, endanger a partly finished structure, impair the efficiency or appearance of any structure, or be detrimental to the completed work in any way.

3.7 BACKFILLING AND COMPACTION

Backfill adjacent to any and all types of structures shall be placed and compacted to at 95 percent laboratory maximum density for cohesionless materials and 90 percent laboratory maximum density for cohesive materials to prevent wedging action or eccentric loading upon or against the structure. Ground surface on which backfill is to be placed shall be prepared as specified in paragraph PREPARATION OF GROUND SURFACE FOR EMBANKMENTS. Compaction requirements for backfill materials shall also conform to the applicable portions of paragraphs PREPARATION OF GROUND SURFACE FOR EMBANKMENTS, EMBANKMENTS, and SUBGRADE PREPARATION. Compaction shall be accomplished by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, vibratory compactors, or other approved equipment.

3.7.1 Trench Backfill

Trenches shall be backfilled to the grade shown. The trench shall be backfilled to 2 feet above the top of pipe prior to performing the required pressure tests. The joints and couplings shall be left uncovered during the pressure test. The trench shall not be backfilled until all specified tests are performed.

3.7.1.1 Replacement of Unstable Material

Unstable material removed from the bottom of the trench or excavation shall be replaced with select granular material placed in layers not exceeding 6 inches loose thickness.

3.7.1.2 Bedding and Initial Backfill

Bedding shall be of the type and thickness shown. Initial backfill material shall be placed and compacted with approved tampers to a height of at least one foot above the utility pipe or conduit. The backfill shall be brought up evenly on both sides of the pipe for the full length of the pipe. Care shall be taken to ensure thorough compaction of the fill under the haunches of the pipe. Except as specified otherwise in the individual piping section, provide bedding for buried piping in accordance with AWWA C600, Type 4, except as specified herein. Backfill to top of pipe

shall be compacted to 95 percent of ASTM D 698 maximum density. Plastic piping shall have bedding to spring line of pipe. Provide materials as follows:

a. Class I: Angular, 0.25 to 1.5 inches, graded stone, including a number of fill materials that have regional significance such as coral, slag, cinders, crushed stone, and crushed shells.

b. Class II: Coarse sands and gravels with maximum particle size of 1.5 inches, including various graded sands and gravels containing small percentages of fines, generally granular and noncohesive, either wet or dry. Soil Types GW, GP, SW, and SP are included in this class as specified in ASTM D 2487.

c. Clean, coarse-grained sand classified as SW or SP by ASTM D 2487 for bedding and backfill as indicated.

d. Clean, coarsely graded natural gravel, crushed stone or a combination thereof classified as GW, GP in accordance with ASTM D 2487 for bedding and backfill as indicated. Maximum particle size shall not exceed 3 inches.

3.7.1.3 Final Backfill

The remainder of the trench, except for special materials for roadways, shall be filled with satisfactory material. Backfill material shall be placed and compacted as follows:

a. Roadways: Backfill shall be placed up to the required elevation as specified. Water flooding or jetting methods of compaction will not be permitted.

b. Turfed or Seeded Areas and Miscellaneous Areas: Backfill shall be deposited in layers of a maximum of 12 inch loose thickness, and compacted to 85 percent maximum density for cohesive soils and 90 percent maximum density for cohesionless soils ASTM D 698. Compaction by water flooding or jetting will not be permitted. This requirement shall also apply to all other areas not specifically designated above.

3.7.2 Backfill for Appurtenances

After the manhole, catchbasin, inlet, or similar structure has been constructed and the concrete has been allowed to cure for 3 days, backfill shall be placed in such a manner that the structure will not be damaged by the shock of falling earth. The backfill material shall be deposited and compacted as specified for final backfill, and shall be brought up evenly on all sides of the structure to prevent eccentric loading and excessive stress.

3.8 SPECIAL REQUIREMENTS

Special requirements for both excavation and backfill relating to the specific utilities are as follows:

3.8.1 Electrical Distribution System

Direct burial cable and conduit or duct line shall have a minimum cover of 24 inches from the finished grade, unless otherwise indicated.

3.9 SUBGRADE PREPARATION

3.9.1 Construction

Subgrade shall be shaped to line, grade, and cross section, and compacted as specified. This operation shall include plowing, disking, and any moistening or aerating required to obtain specified compaction. Soft or otherwise unsatisfactory material shall be removed and replaced with satisfactory excavated material or other approved material as directed. Low areas resulting from removal of unsatisfactory material or excavation of rock shall be brought up to required grade with satisfactory materials, and the entire subgrade shall be shaped to line, grade, and cross section and compacted as specified.

3.9.2 Compaction

Compaction shall be accomplished by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, vibratory compactors, or other approved equipment. Except for paved areas, each layer of the embankment shall be compacted to at least 90 percent of laboratory maximum density ASTM D 698.

3.9.2.1 Subgrade for Pavements

Subgrade for pavements shall be compacted to at least 95 percent laboratory maximum density ASTM D 1557 to the depth below the surface of the pavement shown. When more than one soil classification is present in the subgrade, the top 12 inches of subgrade shall be scarified, windrowed, thoroughly blended, reshaped, and compacted.

3.10 FINISHING

The surface of excavations, embankments, and subgrades shall be finished to a smooth and compact surface in accordance with the lines, grades, and cross sections or elevations shown. The degree of finish for graded areas shall be within 0.1 foot of the grades and elevations indicated except that the degree of finish for subgrades shall be specified in paragraph SUBGRADE PREPARATION. Gutters and ditches shall be finished in a manner that will result in effective drainage. The surface of areas to be turfed shall be finished to a smoothness suitable for the application of turfing materials. Settlement or washing that occurs in graded, topsoiled, or backfilled areas prior to acceptance of the work, shall be repaired and grades re-established to the required elevations and slopes.

3.10.1 Subgrade and Embankments

During construction, embankments and excavations shall be kept shaped and drained. Ditches and drains along subgrade shall be maintained to drain effectively at all times. The finished subgrade shall not be disturbed by traffic or other operation and shall be protected and maintained by the Contractor in a satisfactory condition until ballast, subbase, base, or pavement is placed. The storage or stockpiling of materials on the finished subgrade will not be permitted. No subbase, base course, ballast, or pavement shall be laid until the subgrade has been checked and approved, and in no case shall subbase, base, surfacing, pavement, or ballast be placed on a muddy, spongy, or frozen subgrade.

3.10.2 Grading Around Structures

Areas within 5 feet outside of each building and structure line shall be constructed true-to-grade, shaped to drain, and shall be maintained free of trash and debris until final inspection has been completed and the work has been accepted.

3.11 PLACING TOPSOIL

On areas to receive topsoil, the compacted subgrade soil shall be scarified to a 2 inch depth for bonding of topsoil with subsoil. Topsoil then shall be spread evenly to a thickness of 6 inches and graded to the elevations and slopes shown. Topsoil shall not be spread when frozen or excessively wet or dry. Material required for topsoil in excess of that produced by excavation within the grading limits shall be obtained from offsite areas or within project work limits .

3.12 TESTING

Testing shall be performed by an approved commercial testing laboratory or by the Contractor subject to approval. If the Contractor elects to establish testing facilities, no work requiring testing will be permitted until the Contractor's facilities have been inspected and approved by the Contracting Officer. Field in-place density shall be determined in accordance with ASTM D 6938. When test results indicate, as determined by the Contracting Officer, that compaction is not as specified, the material shall be removed, replaced and recompacted to meet specification requirements. Tests on recompacted areas shall be performed to determine conformance with specification requirements. Inspections and test results shall be certified by a registered professional civil engineer. These certifications shall state that the tests and observations were performed by or under the direct supervision of the engineer and that the results are representative of the materials or conditions being certified by the tests. The following number of tests, if performed at the appropriate time, will be the minimum acceptable for each type operation.

3.12.1 Fill and Backfill Material Gradation

One test per 500 cubic yards stockpiled or in-place source material. Gradation of fill and backfill material shall be determined in accordance with ASTM D 422.

3.12.2 In-Place Densities

a. One test per 500 linear feet, or fraction thereof, of each lift of fill or backfill areas compacted by hand or other than hand-operated machines.

b. One test per 100 linear feet, or fraction thereof, of each lift of embankment or backfill for roads.

3.12.3 Check Tests on In-Place Densities

If ASTM D 2922 is used, in-place densities shall be checked by ASTM D 1556 as follows:

a. One check test per lift for each 200 square feet, or fraction thereof, of each lift of fill or backfill compacted by other than hand-operated machines.

b. One check test per lift for each 100 square feet, of fill or backfill areas compacted by hand-operated machines.

c. One check test per lift for each 100 linear feet, or fraction thereof, of embankment or backfill for roads.

d. One check test per lift for each 100 linear feet, or fraction thereof of embankment.

3.12.4 Moisture Contents

In the stockpile, excavation, or borrow areas, a minimum of two tests per day per type of material or source of material being placed during stable weather conditions shall be performed. During unstable weather, tests shall be made as dictated by local conditions and approved by the Contracting Officer.

3.12.5 Optimum Moisture and Laboratory Maximum Density

Tests shall be made for each type material or source of material including borrow material to determine the optimum moisture and laboratory maximum density values. One representative test per 500 cubic yards of fill and backfill, or when any change in material occurs which may affect the optimum moisture content or laboratory maximum density.

3.12.6 Tolerance Tests for Subgrades

Continuous checks on the degree of finish specified in paragraph SUBGRADE PREPARATION shall be made during construction of the subgrades.

3.12.7 Displacement of Sewers

After other required tests have been performed and the trench backfill compacted to 2 feet above the top of the pipe, the pipe shall be inspected to determine whether significant displacement has occurred. This inspection shall be conducted in the presence of the Contracting Officer. Pipe sizes larger than 36 inches shall be entered and examined, while smaller diameter pipe shall be inspected by shining a light or laser between manholes or manhole locations, or by the use of television cameras passed through the pipe. If, in the judgement of the Contracting Officer, the interior of the pipe shows poor alignment or any other defects that would cause improper functioning of the system, the defects shall be remedied as directed at no additional cost to the Government.

3.13 DISPOSITION OF SURPLUS MATERIAL

Surplus material or other soil material not required or suitable for filling or backfilling, and brush, refuse, stumps, roots, and timber shall be removed from Government property in accordance with Section 01355 and as directed by the Contracting Officer.

-- End of Section --

Table 1: Illinois - Compound	CAS Number	Total Concentration (mg/kg)
1,1 - Dichloroethane	75-34-3	23
1,1 - Dichloroethylene	75-35-4	0.06
1,1,1 - Trichloroethane	71-55-6	2
1,1,2 - Trichloroethane	79-00-5	0.02
1,2 - Dichloroethane	107-06-2	0.02
1,2 - Dichloropropane	78-87-5	0.03
1,2,4-Trichlorobenzene	120-82-1	5
1,2-Dibromo-3-chloropropane	96-12-8	0.002
1,2-Dibromoethane	106-93-4	0.0004
1,2-Dichlorobenzene, (ortho)	95-50-1	17
1,3-Dichloropropene, *cis + trans*	542-75-6	0.004
1,4 Dichlorobenzene, (para)	106-46-7	2
2,4 - Dinitrophenol	51-28-5	0.2
2,4,5-Trichlorophenol	95-95-4	270
2,4,6-Trichlorophenol	88-06-2	0.2
2,4-D	94-75-7	1.5
2,4-Dichlorophenol	120-83-2	1
2,4-Dimethylphenol	105-67-9	9
2,4-Dinitrotoluene	121-14-2	0.0008
2,6-Dinitrotoluene	606-20-2	0.0007
2-Chlorophenol	95-57-8	4
2-Methylphenol	95-48-7	15
3,3'-Dichlorobenzidine	91-94-1	0.007
4-Chloroaniline	106-47-8	0.7
Acenaphthene	83-32-9	570
Acetone	67-64-1	16
Alachlor	15972-60-8	0.04
Aldicarb	116-06-3	0.013
Aldrin	309-00-2	0.04
alpha-HCH (BHC)	319-84-6	0.0005
Anthracene	120-12-7	12,000
Atrazine	1912-24-9	0.066
Benzene	71-43-2	0.03
Benzo(a)anthracene	56-55-3	1.1
Benzo(a)pyrene	50-32-8	1.3
Benzo(b)fluoranthene	205-99-2	1.5
Benzo(k)fluoranthene	207-08-9	9
Benzoic Acid	65-85-0	400
Bis(2-chloroethyl) ether	111-44-4	0.0004
Bis(2-ethylhexyI)phthalate	117-81-7	46
Bromodichloromethane	75-27-4	0.6
Bromoform	75-25-2	0.8

Table 1: Illinois - Compound, continued	CAS Number	Total Concentration (mg/kg)
Butanol	71-36-3	17
Butyl benzyl phthalate	85-68-7	930
Carbazole	86-74-8	0.6
Carbofuran	1563-66-2	0.22
Carbon disulfide	75-15-0	32
Carbon tetrachloride	56-23-5	0.07
Chlordane	57-74-9	1.8
Chlorobenzene	108-90-7	1
Chlorodibromomethane	124-48-1	0.4
Chloroform	67-66-3	0.3
Chrysene	218-01-9	88
cis-1,2-Dichloroethylene	156-59-2	0.4
Dalapon	75-99-0	0.85
DDD	72-54-8	3
DDE	72-55-9	2
DDT	50-29-3	2
Dibenzo(a,h)anthracene	53-70-3	0.2
Dieldrin	60-57-1	0.004
Diethyl phthalate	84-66-2	470
Di-n-butyl phthalate	84-74-2	2300
Di-n-octyl phthalate	117-84-0	1,600
Dinoseb	88-85-7	0.34
Endosulfan	115-29-7	18
Endothall	145-73-3	0.4
Endrin	72-20-8	1
Ethylbenzene	100-41-4	13
Fluoranthene	206-44-0	3,100
Fluorene	86-73-7	560
gamma-HCH (Lindane)	58-89-9	0.009
Heptachlor	76-44-8	0.1
Heptachlor epoxide	1024-57-3	0.07
Hexachlorocyclopentadiene	77-47-4	10
Hexachlorobenzene	118-74-1	0.4
Hexachloroethane	67-72-1	0.5
Indeno(1,2,3-c,d)pyrene	193-39-5	0.9
lsophorone	78-59-1	8
m - Xylene	108-38-3	210
Methoxychlor	72-43-5	160
Methyl bromide	74-83-9	0.2
Methyl tertiary-butyl ether	1634-04-4	0.32
Methylene chloride	75-09-2	0.02
Naphthalene	91-20-3	12

Table 1: Illinois - Compound, continued	CAS Number	Total Concentration (mg/kg)
Nitrobenzene	98-95-3	0.1
N-Nitrosodi-n-propylamine	621-64-7	0.00005
N-Nitrosodiphenylamine	86-30-6	1
o - Xylene	95-47-6	190
p - Xylene	106-42-3	200
Pentachlorophenol	87-86-5	0.03
Phenol	108-95-2	100
Picloram	1918-02-1	2
Polychlorinated biphenyls (PCBs)	1336-36-3	1
Pyrene	129-00-0	2,300
Silvex (2,4,5-TP)	93-72-1	11
Simazine	122-34-9	0.04
Styrene	100-42-5	4
Tetrachloroethylene	127-18-4	0.06
Toluene	108-88-3	12
Toxaphene	8001-35-2	0.6
trans-1,2-Dichloroethylene	156-60-5	0.7
Trichloroethylene	79-01-6	0.06
Vinyl acetate	108-05-4	170
Vinyl chloride	75-01-4	0.01
Xylenes (Total)	1330-20-7	150

Table 2: Illinois - Compound	CAS No.	SPLP Concentration (mg/L)	Total Concentration (mg/kg)
Antimony	7440-36-0	0.006	31
Arsenic	7440-38-2	0.05	13
Barium	7440-39-3	2	5,500
Beryllium	7440-41-7	0.004	160
Cadmium	7440-43-9	0.005	78
Chromium (total)	7440-47-3	0.1	230
Copper	7440-50-8	0.65	2,900
Lead	7439-92-1	0.0075	400
Mercury	7439-97-6	0.002	10
Nickel	7440-02-0	0.1	1,600
Silver	7440-22-4	0.05	390
Selenium	7782-49-2	0.05	390
Zinc	7440-66-6	5	23,000

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SECTION 02373

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SECTION 02373

GEOTEXTILES USED AS FILTERS AND UNDERLAYS

PART 1 GENERAL

1.1 SCOPE

The work of this section consists of furnishing, hauling, and placing the geotextile, and maintaining the geotextile until placement of the riprap, aggregate base, or soil cover is completed and accepted.

1.2 REFERENCES

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

ASTM INTERNATIONAL (ASTM)

ASTM D 123	(2007) Terminology Relating to Textiles
ASTM D 4355	(2007) Deterioration of Geotextiles from Exposure to Light, Moisture and Heat in a Xenon-Arc Type Apparatus
ASTM D 4491	(1999a; R 2004e1) Water Permeability of Geotextiles by Permittivity
ASTM D 4533	(2004) Trapezoid Tearing Strength of Geotextiles
ASTM D 4632	(1991; R 2003) Grab Breaking Load and Elongation of Geotextiles
ASTM D 4751	(2004) Determining Apparent Opening Size of a Geotextile
ASTM D 4833	(2000e1) Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products
ASTM D 4873	(2002) Identification, Storage, and Handling of Geosynthetic Rolls and Samples

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-03 Product Data

Thread

A minimum of 14 days prior to scheduled use, proposed thread type for sewn seams along with data sheets showing the physical properties of the thread.

Manufacturing Quality Control Sampling and Testing

A minimum of 14 days prior to scheduled use, manufacturer's quality control manual.

SD-04 Samples

Quality Assurance Samples and Tests

Samples for quality assurance testing; 14 days shall be allotted in the schedule to allow for testing.

SD-07 Certificates

Geotextile

A minimum of 14 days prior to scheduled use, manufacturer's certificate of compliance stating that the geotextile meets the requirements of this section. For needle punched geotextiles, the manufacturer shall also certify that the geotextile has been continuously inspected using permanent on-line full-width metal detectors and does not contain any needles which could damage other geosynthetic layers. The certificate of compliance shall be attested to by a person having legal authority to bind the geotextile manufacturer.

1.4 DELIVERY, STORAGE AND HANDLING

1.4.1 General

Geotextiles shall be labeled, handled, and stored in accordance with ASTM D 4873 and as specified herein. Each roll shall be wrapped in an opaque and waterproof layer of plastic during shipment and storage. The plastic wrapping shall not be removed until deployment. Each roll shall be labeled with the manufacturers name, geotextile type, lot number, roll number, and roll dimensions (length, width, gross weight). Geotextile or plastic wrapping damaged as a result of storage or handling shall be repaired or replaced, as directed. Geotextile shall not be exposed to temperatures in excess of 140 degrees F or less if recommended by the manufacturer.

1.4.2 Delivery

The Contracting Officer shall be notified a minimum of 24 hours prior to delivery and unloading of geotextile rolls. Rolls shall be packaged in an opaque, waterproof, protective plastic wrapping. The plastic wrapping shall not be removed until deployment. If quality assurance samples are collected, rolls shall be immediately rewrapped with the plastic wrapping. Geotextile or plastic wrapping damaged during storage or handling shall be repaired or replaced, as directed. Each roll shall be labeled with the manufacturer's name, geotextile type, roll number, roll dimensions (length,

width, gross weight), and date manufactured.

1.4.3 Storage

Rolls of geotextile shall be protected from construction equipment, chemicals, sparks and flames, temperatures in excess of 160 degrees F, or any other environmental condition that may damage the physical properties of the geotextile. To protect geotextile from becoming saturated, rolls shall either be elevated off the ground or placed on a sacrificial sheet of plastic in an area where water will not accumulate.

1.4.4 Handling

Geotextile rolls shall be handled and unloaded with load carrying straps, a fork lift with a stinger bar, or an axial bar assembly. No hooks, tongs or other sharp instruments shall be used for handling geotextile. Rolls shall not be dragged along the ground, lifted by one end, or dropped to the ground.

PART 2 PRODUCTS

2.1 GEOTEXTILE

The geotextile shall be a non-woven pervious sheet of plastic yarn as defined by ASTM D 123. The geotextile shall meet the physical requirements listed in Table No. 1 of these specifications. The geotextile fiber shall consist of a long-chain synthetic polymer composed of at least 85 percent by weight of propylene, ethylene, ester, amide, or vinylidene-chloride, and shall contain stabilizers and/or inhibitors added to the base plastic if necessary to make the filaments resistant to deterioration due to ultra-violet and heat exposure. The edges of the geotextile shall be finished to prevent the outer fiber from pulling away from the geotextile.

TABLE 1A
MINIMUM PHYSICAL REQUIREMENTS FOR DRAINAGE GEOTEXTILE
FOR USE WITH WIRE MESH GABIONS AND RIPRAP

PROPERTY	UNITS	ACCEPTABLE VALUES	TEST METHOD
GRAB STRENGTH	lb	180	ASTM D 4632
PUNCTURE	lb	75	ASTM D 4833
TRAPEZOID TEAR	lb	75	ASTM D 4533
APPARENT OPENING SIZE	U.S. SIEVE	30	ASTM D 4751
PERMITTIVITY	sec -1	0.1	ASTM D 4491
ULTRAVIOLET DEGRADATION	Percent	70 AT 500 Hrs	ASTM D 4355

2.2 SEAMS

The seams of the geotextile shall be sewn with thread of a material meeting the chemical requirements given above for geotextile yarn or shall be

bonded by cementing or by heat. All seaming shall be done with a thread of contrasting color to the fabric. The seams of the geotextiles shall be overlapped a minimum of 12 inches. Successive geotextile sheets shall be overlapped in such a manner that the upstream sheet is placed over the downstream sheet and/or upslope over downslope.

2.3 SECURING PINS

Securing pins shall be steel, 3/16 inch in diameter, pointed at one end, and fabricated with a head to retain a steel washer having an outside diameter of no less than 1.5 inches. The lengths of the pins shall be no less than 18 inches.

2.4 ACCEPTANCE REQUIREMENTS

2.4.1 Certificates and Testing

All brands of geotextile and all seams to be used shall be accepted on the following basis. The Contractor shall furnish the Contracting Officer, in duplicate, a mill certificate or affidavit signed by a legally authorized official from the company manufacturing the geotextile. The mill certificate or affidavit shall attest that the geotextile meets the chemical, physical and manufacturing requirements stated in this specification. If requested by the Contracting Officer, the Contractor shall provide to the Government geotextile samples for testing to determine compliance with any or all of the requirements in this specification. When samples are to be provided, they shall be submitted a minimum of 60 days prior to the beginning of installation of the same geotextile.

2.4.2 Samples

All samples provided shall be from the same production lot as will be supplied for the contract, and shall be the full manufactured width of the geotextile by at least 10 feet long, except that samples for seam strength may be a full width sample folded over and the edges stitched for a length of at least 5 feet. Samples submitted for testing shall be identified by manufacturers lot designation.

PART 3 EXECUTION

3.1 SHIPMENT AND STORAGE

During all periods of shipment and storage, the geotextile shall be protected from direct sunlight, ultra-violet rays, temperatures greater than 140 degrees Fahrenheit, mud, dirt, dust, and debris. To the extent possible, the fabric shall be maintained wrapped in a heavy-duty protective covering.

3.2 INSTALLATION OF THE GEOTEXTILE

3.2.1 General

The weight of the filter fabric used will depend on the gradation of riprap specified. For riprap gradations 4 and 5, a fabric weight of 200 g/sq m (6 oz/sq yd) shall be used. A fabric weight of 8 oz/sq yd shall be used with riprap gradations 6 and 7. The exposure of the filter fabric to the elements between laydown and cover shall be a maximum of 7 days.

3.2.2 Subgrade Preparation

The depth and area of excavation for the filter placement shall not exceed the dimensions necessary to properly place the filter fabric. If overexcavation is performed, the fabric shall be laid on the exposed surface and required grade attained through the use of additional bedding or drainage material. Prior to the installation of the fabric, the foundation surface shall be cleared of debris, sharp objects and trees. All wheel tracks, ruts, or surface irregularities in excess of 2 in. in depth shall be graded smooth or otherwise filled with soil to provide a reasonably smooth surface. The filter fabric shall not be placed until the prepared bed has been approved by the COR.

3.2.3 Placement

The geotextile shall be placed at the locations shown on the drawings. At the time of installation, the geotextile shall be rejected if it has defects, rips, holes, flaws, deterioration, or damage incurred during manufacture, transportation or storage. The geotextile shall be laid smooth and free from tension, stress, creases, or wrinkles. The geotextile shall be placed with the long dimension (machine direction) as described.

Application	Long Dimension Placement
Drainage Filter	Parallel to direction of water flow
Slope Treatment	Perpendicular to slope

3.2.4 Temporary Pinning

Temporary pinning of the textile to help hold it in place shall be allowed. The temporary pins shall be removed as the cover is placed to relieve high tensile stress which may occur during placement of material on the geotextile. Securing pins with washers shall be inserted through both strips of overlapped fabric at not greater than 2 foot intervals along a line through the midpoint of the overlap. Additional pins regardless of location shall be installed as necessary to prevent any slippage of the filter fabric.

3.2.5 Fabric

The fabric shall be placed so that the upper strip of fabric will overlap the next lower strip. Each securing pin shall be pushed through the fabric until the washer bears against the fabric and secures it firmly to the foundation.

3.2.6 Protection

The geotextile shall be protected from clogging by surface runoff sediments and other debris at all times during construction. Any geotextile so clogged shall be removed and replaced by the Contractor at no cost to the Government. Any damage to the geotextile during its installation or during placement of cover materials shall be replaced by the Contractor at no cost to the Government. The work shall be scheduled so that the covering of the geotextile with a layer of the specified material is accomplished 7 calendar days after placement of the geotextile. Failure to comply shall require replacement of geotextile. The geotextile shall be protected from damage prior to and during the placement of cover materials. This may be accomplished by limiting the height of drop to less than 1 foot, by placing a cushioning layer of sand or gravel on top of the geotextile before

placing the material, or other methods approved by the Contracting Officer. Before placement of overlying materials, the Contractor shall demonstrate that the placement technique will prevent damage to the geotextile. In no case shall any type of equipment be allowed on the unprotected geotextile.

3.3 REPAIRS

Torn or damaged geotextile shall be repaired. Clogged areas of geotextile shall be removed. Repairs shall be performed by placing a patch of the same type of geotextile over the damaged area. The patch shall extend a minimum of 12 inches beyond the edge of the damaged area. Patches shall be continuously fastened using approved methods. The machine direction of the patch shall be aligned with the machine direction of the geotextile being repaired. Geotextile rolls which cannot be repaired shall be removed and replaced. Repairs shall be performed at no additional cost to the Government

3.4 COVERING

Geotextile shall not be covered prior to inspection and approval by the Contracting Officer. Cover soil shall be placed in a manner that prevents soil from entering the geotextile overlap zone, prevents tensile stress from being mobilized in the geotextile, and prevents wrinkles from folding over onto themselves. On side slopes, soil backfill shall be placed from the bottom of the slope upward. Cover soil shall not be dropped onto the geotextile from a height greater than 3 feet. No equipment shall be operated directly on top of the geotextile without approval of the Contracting Officer. Equipment with ground pressures less than 7 psi shall be used to place the first lift over the geotextile. A minimum of 12 inches of soil shall be maintained between full-scale construction equipment and the geotextile. Equipment placing cover soil shall not stop abruptly, make sharp turns, spin their wheels, or travel at speeds exceeding 5 mph.

3.5 QUALITY CONTROL

The Contractor shall establish and maintain a quality control system for the work under this section to ensure compliance with the contract requirements; and maintain records of his quality control for all construction operations. A copy of these records, as well as the records of corrective actions taken, shall be furnished to the Government as directed by the Contracting Officer. See Section 01451, CONTRACTOR QUALITY CONTROL.

-- End of Section --

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SECTION 02380

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SECTION 02380

STONE, CHANNEL, SHORELINE/COASTAL PROTECTION FOR STRUCTURES

PART 1 GENERAL

1.1 REFERENCES

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

ILLINOIS DEPARTMENT OF TRANSPORTATION (IDOT)

IDOT Standard Specifications	Standard Specifications for Road and Bridge Construction (2002)

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-03 Product Data

Stone For Erosion Protection; G,CN

Submit the source for materials used in riprap.

Bulk Specific Gravity of Stone and Redesign

If the Contractor proposes to utilize stone having a specific gravity outside of the specific design range, and as a result thereof, the Government provides the Contractor with a redesign, then, within fifteen (15) calendar days after receipt of the Government's redesign, submit a formal proposal to perform the work in accordance with the redesign. The submittal shall include a statement of the direct savings to the Government and a tabulation in the form of a revised BIDDING SCHEDULE showing unchanged unit prices for the revised quantities.

SD-04 Samples

Stone For Erosion Protection; G,CN

Submit suitable stone samples prior to delivery of any such material to the worksite.

SD-06 Test Reports

Gradation Test; G, CN

Submit a gradation tests meet the required gradation.

Bedding Material; G, CN

Submit test reports attesting that the bedding material meet specified requirements.

Bulk Specific Gravity

At least 120 calendar days in advance of shipment of stone to the work site, submit a copy of bulk specific gravity test results for each gradation range of stone proposed to be furnished. The information shall be furnished prior to preparation of pre-production demonstration stockpiles.

SD-07 Certificates

Stone

Submit certificates of compliance attesting that the materials meet specification requirements.

Bedding Material

Submit certificates of compliance attesting that the materials meet specification requirements.

Laboratory; G, CN

Submit a copy of the documents, provided by the Materials Testing Center (MTC) at CEWES or other governmental agency, that validates that the laboratory can perform the required tests. The individual tests shall be listed for which the validation covers along with the date of the inspection.

1.3 REGULATORY REQUIREMENTS

The regulatory requirements listed below form a part of this specification to the extent referenced. The regulatory requirements are referred to in the text by basic designation only.

ILLINIOS DEPARTMENT OF TRANSPORTATION

2002 Standard Specifications for Road and Bridge Construction

1.4 TERMINOLOGY

1.4.1 Stone for Erosion Protection

Stone Protection is defined as a system which includes a layer of bedding material or layers of filter material beneath a layer or layers of riprap. Stone for erosion protection is placed around structures in slack water or within a dewatered site. Stone for erosion protection may also be used to protect channel banks when it is placed in the dry or in slack water.

1.4.2 Riprap

Riprap is defined as a material having a gradation band similar to those specified in Table 2. Riprap gradations have a maximum top size of 3.5

tons.

1.4.3 Bedding Stone

Bedding stone is defined as a material having a gradation band similar to those specified in Table 1.

PART 2 PRODUCTS

2.1 STONE FOR EROSION PROTECTION

2.1.1 Description.

The material shall be stone quarried from undisturbed, consolidated deposits of rock reasonably free of shale and shaly stone. The ledges shall be sufficiently thick to produce the desired dimensions. The stone shall be reasonably free of laminations, seams, cracks and other structural defects or imperfections tending to destroy its resistance to weather. Field stone or boulders will not be accepted. Bedding material shall be crushed stone, crushed gravel, crushed sandstone, or crushed slag. The crushed slag shall meet the Department's "Test for Leachate".

2.1.2 Quality

Stone for erosion protection shall be quarried from ledges meeting one of the listed quality designations. All ledges shall be sufficiently thick to produce the desired dimensions. Ledges shall be checked with rock samples sized to CA-7/11 and run in the IDOT sodium sulfate soundness test. Bedding material shall be tested in its manufactured gradation in the Department's sodium sulfate soundness test.

Quality Designation	PERCENT BY WEIGHT, PASSING
A	The stone shall not exceed 15 percent sodium sulfate soundness loss. Elongated pieces (length is greater than five times Average thickness) shall not exceed 10 percent by weight. The stone shall have a specific gravity (dry) greater than 2.45 when checked in a full gradation product.
B	The stone shall not exceed 25 percent sodium sulfate soundness loss. Elongated pieces (length is greater than five times average thickness) shall not exceed 10 percent by weight.
C	The stone shall only have to conform to the above Description paragraph.

2.1.3 Gradation.

Stone for erosion protection or sediment control shall meet one of the gradation number designations listed in the following table. All gradations produced shall be well graded. A minimum of one gradation check for each

gradation produced shall be run during initial production each year. Additional checks may be done by visual inspection if no gradation problem exists.

(Table 1)
BEDDING MATERIAL

Sieve Size
Percent Passing

GRAD. NO.	4 in.	3 in.	2 in.	1 1/2 in.	No.4
1	--	100	--	53±23	8±8
2	100	--	53±23	--	8±8

(Table 2)
RIPRAP MATERIAL

Rock Size (lb)
Percent Passing

GRAD. No.	1000(1/)	600(1/)	400(1/)	300	170	150(1/)
3(2/)	--	--	--	--	--	--
4	--	--	--	--	--	100
5	--	--	100	--	--	--
6	--	100	--	--	50±20	--
7	100	--	--	50±20	--	--

RIPRAP MATERIAL (Cont.)

Rock Size (lb)
Percent Passing

GRAD. No.	90	50(1/)	40	12	10	6	3	1
3(2/)	--	100	--	--	50±20	--	--	8±8
4	--	--	50±20	--	--	--	--	8±8
5	50±20	--	--	--	--	--	8±8	--
6	--	--	--	--	--	8±8	--	--
7	--	--	--	8±8	--	--	--	--

1/ Five percent by weight may be oversize. Each oversize piece shall not exceed the maximum size of the gradation by more than 20 percent.

2/ When used for aggregate ditch check, Gradation 3 may be modified as follows: Percent Passing: 50 lb - 100; 3 lb - 50±20; 1 lb - 8±8.

PART 3 EXECUTION

This Part shall consist of furnishing and placing a protective course of stone laid as riprap for erosion protection on slopes or in channels.

3.1 DEMONSTRATION SECTION

Prior to placement of stone, the Contractor shall construct a section of channel protection consisting of riprap to demonstrate his proposed operations for production placement. The section shall demonstrate procedures and capability of grading, placing stone and bank protection within the tolerances specified. The demonstration section shall be 100 feet in length and shall conform to all applicable specifications.

3.1.1 Methods and Equipment

Methods and equipment employed for placement shall demonstrate the adequacy for use in placement of riprap and shall conform with the requirements specified. The quantities of all materials placed within the section shall be accurately tabulated and provided immediately to the Contracting Officer for comparison with computed quantities.

3.1.2 Demonstration Section Evaluation

The Contractor shall not proceed with placing channel protection prior to the approval of the demonstration section. Within a period of 7 days after completion of the section, the Contracting Officer shall determine the adequacy of the section to function as part of the permanent construction. The Contractor shall be notified as to the acceptability of the section and may be directed to modify methods of construction and remove the section if necessary.

3.1.3 Removal of Demonstration Section

If removal of the demonstration section is required, it shall be conducted in such a manner as to maintain the integrity of the underlying subgrade. The Contractor shall make his own arrangements for disposal in areas not located on the site.

3.2 BASE PREPARATION

Areas on which geotextile and riprap are to be placed shall be graded and/or dressed to conform to cross sections shown on the contract drawings within an allowable tolerance of plus 2 inches and minus 4 inches from the theoretical slope lines and grades. The prepared base shall be approved by the Contracting Officer. Where such areas are below the allowable minus tolerance limit they shall be brought to grade by fill with earth similar to the adjacent material and then compacted to a density equal to the adjacent in place material. Subaqueous areas on which bedding material and riprap are to be placed shall be graded and/or dressed to conform to cross sections shown on the contract drawings within an allowable tolerance of plus 1 foot and minus 2 feet from the specified slope line and grades.

3.3 BEDDING MATERIAL

Gradation 1 shall be used as the bedding material for Gradations 4 and 5. Gradation 2 shall be used as the bedding material for Gradations 6 and 7. When filter fabric is used, coarse aggregate Gradation CA 1 may be used in lieu of Gradation 2, and coarse aggregate Gradation CA 3 may be used in

lieu of Gradation 1.

3.4 PLACEMENT OF BEDDING LAYERS

Bedding layer shall be placed on the prepared base and in accordance with the details shown on the contract drawings. A tolerance of plus 2 inches and minus 1 inch from the slope lines and grades shown on the contract drawings will be allowed in the finished surface of the bedding, except that the extreme of this tolerance shall not be continuous over an area greater than 200 square feet. Bedding material shall be spread uniformly on the filter fabric in a satisfactory manner to the neat lines specified. Placing of material by methods which will tend to segregate particle sizes within the bedding will not be permitted. Any damage to the surface of the bedding base or the filter fabric during placing of the bedding shall be repaired before proceeding with the work. Compaction of the bedding layers will not be required but it shall be finished to present a reasonably even surface free from mounds, windrows, or depressions.

3.5 THICKNESS OF STONE RIPRAP LAYERS

The thickness of the stone riprap layer shall be as specified on the contract drawings, Sheet C-41.

3.6 PLACEMENT OF RIPRAP

3.6.1 General

Riprap shall be placed on the filter and bedding layers specified herein and contract drawings and within the limits shown on the contract drawings.

3.7.2 Placement

No riprap shall be placed until the foundation preparation has been approved by the COR. Installation of the filter fabric will be required under stone riprap gradations 4, 5, 6, and 7 for all uses, and under concrete block, broken concrete, and stone or broken concrete dumped riprap when used for erosion protection. The fabric shall be installed according to the plans and as specified in IDOT Standard Specifications Section 282. A bedding layer will be required for stone riprap gradations 4, 5, 6, and 7, and for stone riprap when used for erosion protection. Under water placement rates shall be used when the top of the layer to be placed is covered by more than 3 feet of water.

Stone shall be placed on the bedding layer in such manner as to produce a reasonably well-graded mass of rock with the minimum practicable percentage of voids providing maximum interlocking of stones and shall be constructed to the lines and grades shown. The riprap shall not be placed or dropped from a height of more than 1 ft. The stone riprap shall be placed to its full course thickness in one operation and in such a manner as to avoid displacing the bedding material. Placing of material shall begin at the lower elevations, progressing up the slope and, from the center outward, unless otherwise determined by the COR. The larger stones shall be well distributed and the entire mass of stones in their final position shall be roughly graded to conform to the gradation specified. There shall be no abrupt changes in the riprap surface. All tapers between minimum thickness and any high points shall be at a uniform rate. The finished riprap shall be free from objectionable pockets of small stones and clusters of larger stones. Placing riprap in layers will not be permitted. Placing riprap by dumping into chutes or by similar methods likely to cause segregation of

the various sizes will not be permitted. The desired distribution of the various sizes of stones throughout the mass shall be obtained by selective loading of the material at the quarry or other source, by controlled dumping of successive loads during final placing, or by other methods of placement which will produce the specified results. Rearranging of individual stones by mechanical equipment or by hand will be required to the extent necessary to obtain a reasonably well-graded distribution of stone sizes as specified above.

3.6.2 Under Water Placement

When riprap , with a maximum size of 400 pounds, is placed under water onto geotextile it may be dropped from the water surface if the water depth over the geotextile is greater than 5 feet. Riprap placed in the wet shall be placed evenly at a rate of 10 tons per square (100 square feet) per pass for thickness of 2.5 ft and 4 tons per square (100 square feet) per pass for thickness of 1 ft riprap.

3.7 QUALITY CONTROL

The Contractor shall establish and maintain a quality control system for the contract requirements and maintain records of his quality control for all construction operations. A copy of these records and tests, as well as the records of corrective action taken shall be furnished to the Government as directed by the Contracting Officer.

-- End of Section --

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SECTION 02464

METAL SHEET PILING

PART 1 GENERAL

1.1 SCOPE

The work covered by this section consists of furnishing all plant, equipment, labor and materials and performing all operations in connection with the installation of metal sheet piling wall system, including wales and/or bolted or structural connections; and miscellaneous steel, in accordance with these specifications and applicable drawings.

1.2 REFERENCES

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

ASTM INTERNATIONAL (ASTM)

ASTM A 572/A 572M	(2007) Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel
ASTM A 36/A 36M	(2005) Standard Specification for Carbon Structural Steel
ASTM A 325	(2007) Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
ASTM A 449	(2007a) Specification for Hex Cap Screws, Bolts, and Studs, Steel, Heat Treated, 120/105/90 ksi Minimum Tensile Strength, General Use
ASTM F 436	(2007) Hardened Steel Washers
ASTM A 123/A 123M	(2002) Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

AISC 348	(2000) Structural Joints Using ASTM A325 or A490 Bolts

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be

submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Shop Drawings; G, DT

Shop drawings for steel sheet piling, including fabricated sections, and miscellaneous steel, shall show complete piling dimensions and details, driving sequence and location of installed piling. Shop drawings shall include details of the method of handling piling interlocks Shop drawings shall show complete details for the fabrication, erection and installation for all miscellaneous steel including special fabricated piles and connections. In addition to DT, other parties who will be reviewing the report will be C-N, Northern Area Office representative.

Driving Equipment

Complete descriptions of driving equipment including hammers, extractors, protection caps and other installation appurtenances shall be submitted prior to commencement of work.

SD-03 Product Data

Data

Manufacturer's literature available from suppliers, that demonstrates compliance with applicable specifications for the materials listed below.

SD-06 Test Reports

Reports

Test reports or certificates of compliance that show that the materials to be provided are in compliance with the applicable specifications. Testing of sheet piling for mechanical properties shall be performed after the completion of all rolling and forming operations.

Records;

A complete and accurate record of each sheet pile driven shall be submitted within 3 days of completion of pile driving operation. The record shall indicate the pile location (as driven), date driven, size, driven length, embedded length, final elevations of tip and top, pile weight, blows required for each foot of penetration throughout the entire length of the pile and for the final 6 inches of penetration, and the total driving time. When vibratory hammers are used, the driving records shall include pile penetration rate data in feet of installation per minute. The record shall also include the type and size of the hammer used,the rate of operation, and the type and dimensions of driving helmetand cushion block used.

SD-07 Certificates

Materials test Certificates; G,DT

Materials test certificates and test reports shall be submitted for each shipment of steel sheet piling and identified with specific lots prior to installing piling. Identification data should include piling type, heat analysis number, chemical composition, mechanical properties and the steel manufacturer's name.

PART 2 PRODUCTS

2.1 METAL SHEET PILING

2.1.1 Steel Sheet Piling

Steel sheet piling shall be hot-rolled sections, of the type shown on the drawings or an approved alternative section, conforming to the requirements of ASTM A 572/A 572M Grade 50. The interlocks of the sheet piling shall be free-sliding, provide a swing angle suitable for the intended installation, but not less than 5 degrees when interlocked, and maintain continuous interlocking when installed throughout their entire length. The sheet piling shall be homogeneous for the full thickness of the section and shall be capable of developing the structural capacity using the full section modulus. The Government reserves the right to perform supplemental nondestructive examination of the sheet piling prior to installation of the piling. The cost of such inspection will be borne by the Government. Any sheets determined to be defective shall be rejected and replaced as directed by the contracting officer and at no cost of the Government. Sheet piling shall be provided with standard pulling holes. Pulling holes shall be in the web of the section and within the top twenty (20) inches of the sheet pile top. Holes are not allowed in the flanges of the sheet pile sections unless indicated on the drawings.

2.1.2 Alternative Steel Sheet Piling

Alternative hot-rolled steel sheet pile sections may be substituted for the section shown on the drawings. Piling substituted for the section shown on the drawings shall have as a minimum the properties listed in the following table:

Minimum Value for Substitution

Section Shown on Drawings	Section Modulus (in3/ft of wall)	Section Depth (in)	Thickness (Flanges or webs) (in)	Yield Strength (ksi)
AZ 13	24.2	11.93	0.375	50
AZ 18	33.5	14.96	0.375	50
AZ 46	85.5	18.94	0.375	50

Substituted sections for those shown on the drawings shall have a Z profile. Substituted sections shall conform to all other requirements of this specification in addition to the requirements of this paragraph. The total number of shear studs per linear foot of wall shall remain constant. When possible, the layout, location, size, and spacing of studs shall not change. The Contractor is responsible for detailing all revisions to the layout affected by the selected alternative piling. Any revised layouts shall be be submitted as shop drawings for approval. If directed by the Contracting Officer, the Contractor shall submit calculations sealed by a licensed structural engineer in the state of Illinois to demonstrate equivalency for any substituted sections and associated layouts.

2.1.3 Cold Formed Sheet Pile

Cold Formed Sheet Pile sections will not be considered for this project.

2.2 APPURTENANT METAL MATERIALS

2.2.1 Bolts

All bolts shall conform to ASTM A 325 or ASTM A 449 as indicated on the drawings with threads excluded from the shear plane. All bolts shall be installed at the proper location and set straight and square with connecting members. Hardened washers conforming to ASTM F 436, shall be provided under nuts and bolt heads. Until final acceptance of the completed work, the Contractor shall be required to check, straighten and tighten bolts in any part of the structure. Installation shall conform to the requirements of AISC 348 as applicable.

2.2.2 Bolt Holes

All holes for bolts shall be provided where required or specified and at the proper location or position. Holes in metal members shall be shop punched or drilled. Field cutting or drilling of holes will be allowed where field variations of bolt location may be expected. Field cut bolt holes shall be drilled or torched undersized and shall be reamed to the proper size. Burrs and ridges around the holes shall be removed flush to the surface. Unless otherwise indicated or specified all holes for items that are to be inserted through metal members shall be standard size and not more than 1/16 inch larger than the diameter of the item being installed.

2.2.3 Special Pile Sections

The Contractor shall design and provide special pile sections as necessary to accommodate alignment changes. Special pile sections shall be fabricated from plates, angles, and standard pile sections cut or bent as necessary.

2.2.4 Miscellaneous Plates and Shapes

Miscellaneous plates and shapes, as shown on the drawings, shall conform to ASTM A 36/A 36M. Galvanizing shall conform to ASTM A 123/A 123M.

2.4 PILING DRIVING EQUIPMENT - HAMMER

Pile Driving Hammers shall be either impact or vibratory type. The selected hammer shall be such that it does not damage the piles. The driving energy of the hammers shall be as recommended by the manufacturer for the piling weights and subsurface materials to be encountered. Selection of the hammer necessary to drive the piles to the required tip elevation is the responsibility of the Contractor, except rated energy of the hammer shall be not less than 17,000 foot-pounds. If a pile fails to reach the design tip elevation using a vibratory hammer, the Contractor shall attempt to drive the pile using an impact hammer.

PART 3 EXECUTION

3.1 GENERAL

3.1.1 Delivery and Storage

Materials delivered to the site shall be new and undamaged and shall be accompanied by certified test reports. The manufacturer's logo and mill identification mark shall be provided on the sheet piling as required by the referenced specifications. Sheet piling shall be stored and handled in the manner recommended by the manufacturer to prevent permanent deflection, distortion or damage. Storage of piling should also facilitate required inspection activities.

3.1.2 Field Measurements

The Contractor shall obtain all field measurements required for proper and adequate fabrication and installation of the work. Exact measurements are the Contractor's responsibility.

3.1.3 Preparation

The Contractor shall relocate/remove all stone, concrete, submerged timbers, and other materials interfering with the proper alignment and performance of the work.

3.2 PLACING AND DRIVING

3.2.1 Placing

Any excavation required within the area where sheet pilings are to be installed shall be completed prior to placing sheet pilings. Pilings shall be carefully located as shown. Pilings shall be placed plumb with out-of-plumbness not exceeding 1/8 inch per foot of length and true to line. Temporary wales, templates, or guide structures shall be provided to insure that the pilings are placed and driven to the correct alignment. Pilings properly placed and driven shall be interlocked throughout their length with adjacent pilings to form a continuous diaphragm throughout the length or run of piling wall.

3.2.2 Driving

Pilings shall be driven with the proper size hammer and by approved methods so as not to subject the pilings to damage and to ensure proper sheet pile interlocking throughout their lengths. Each pile shall be driven continuously and without interruption until the required depth of penetration has been reached. If a pile fails to reach the tip elevation shown on the drawings the Contractor shall notify the Contracting Officer and perform corrective measures as directed. If a pile fails to reach the design tip elevation using a vibratory hammer, the Contractor shall attempt to drive the pile using an appropriate impact hammer. If and when driving resistance of 10 blows per inch for impact hammers or a pile penetration rate of less than one (1) foot per minute for a period of 15 minutes for vibratory hammers is reached, the Contractor shall immediately stop driving the pile and inform the Contracting Officer. The Contracting Officer will decide if the pile can continue to be driven without damage and will then instruct the Contractor to either stop or continue driving the particular pile.

Driving hammers shall be maintained in proper alignment during driving operations by use of leads or guides attached to the hammer. A protecting cap shall be employed in driving when using impact hammers to prevent damage to the tops of pilings. Pilings damaged during driving or driven out of interlock shall be removed and replaced at the Contractor's expense. Adequate precautions shall be taken to ensure that pilings are driven plumb. If at any time the forward or leading edge of the sheet piling wall is found to be out-of-plumb in the plane of the wall, the piling being driven shall be driven to the required depth and tapered pilings shall be provided and driven to interlock with the out-of-plumb leading edge or other approved corrective measures shall be taken to ensure the plumbness of succeeding pilings. The maximum permissible taper for any tapered piling shall be 1/8 inch per foot of length. The horizontal alignment of the steel sheet pile wall shall be within one (1) inch of required location after completion of driving and after assembly and tightening of wales. Pilings in each run or continuous length of piling wall shall be driven alternately in increments of depth to the required depth or elevation. No piling shall be driven to a lower elevation than those behind it in the same run except when the pilings behind it cannot be driven deeper. If the sheet piling next to the one being driven tends to follow below final elevation it may be pinned to the next adjacent piling. If obstructions restrict driving a piling to the specified penetration the obstructions shall be removed or penetrated with chisel beam. If the Contractor demonstrate that removal or penetration is impractical the Contractor shall make changes in the design alignment of the piling structure as directed by the Contracting Officer to ensure the adequacy and stability of the structure. Pilings shall be driven to depths shown on the drawings and shall extend up to the elevation shown on the drawings for the top of pilings. A tolerance of one (1) inch above the required top elevations will be permitted providing the top of the piling is cut in a neat straight line. Pilings shall not be driven within 100 feet of concrete less than 7 days old.

3.3 CUTTING OFF AND SPLICING

Pilings driven to refusal or to the point where additional penetration cannot be attained and are extending above the required top elevation shall be cut off to the required elevation, as directed by the Contracting Officer. Pilings driven below the required top elevation and pilings damaged by driving and cut off to permit further driving shall be extended as required to reach the top elevation by splicing when directed by the Contracting Officer at no additional cost to the Government. If directed by the Contracting Officer pilings shall be spliced as required to drive them to depths greater than shown on the drawings and extend them up to the required top elevation. Splices shall be made by an approved butt weld, making full penetration of the pile section, or as otherwise directed or approved by the Contracting Officer. Pilings adjoining spliced pilings shall be full length unless otherwise approved. Ends of pilings to be spliced shall be squared before splicing to eliminate dips or camber. Pilings shall be spliced together with concentric alignment of the interlocks so that there are no discontinuities, dips or camber at the abutting interlocks. Spliced pilings shall be free sliding and able to obtain the maximum swing with contiguous pilings. The tops of pilings excessively battered during driving shall be trimmed when directed at no cost to the Government. Piling cutoffs shall become the property of the Contractor and shall be removed from the site. The Contractor shall cut holes in pilings for bolts, rods, drains, or utilities as shown on the drawings or as directed. All cutting shall be done in a neat and workmanlike manner. A straight edge shall be used in cuts made by burning

to avoid abrupt nicks. Bolt holes in steel piling shall be drilled or may be burned and reamed by approved methods that will not damage the surrounding metal. Handling holes shall be plugged or cut off.

3.3.1 Inspection of Driven Piling

The Contractor shall inspect the interlocked joints of driven sheet pilings extending above ground. Pilings found to be out of interlock shall be removed and replaced at the Contractor's expense.

3.3.2 Pulling and Redriving

The Contractor shall pull selected pilings after driving to determine the condition of the underground portions of pilings when directed by the Contracting Officer. The Contracting Officer shall approve the Contractor's method for pulling pilings. Any piling so pulled and found to be damaged to the extent that its usefulness in the structure is impaired shall be removed and replaced at the Contractor's expense. Pilings pulled and found to be in satisfactory condition shall be redriven when directed by the Contracting Officer.

3.4 REMOVAL

The removal of pilings shall consist of pulling, sorting, cleaning, inventorying and storing previously installed pilings as shown on the drawings and directed by the Contracting Officer.

3.4.1 Pulling

The method of pulling piling must be approved by the Contracting Officer. Pulling holes shall be provided in pilings as required. Extractors shall be of suitable type and size. Care shall be exercised during the pulling of pilings to avoid damaging piling interlocks and adjacent construction. If the Contracting Officer determines that adjacent permanent construction has been damaged during pulling the Contractor will be required to repair this construction at no cost to the Government. Pilings shall be pulled one sheet at a time. Pilings fused together shall be separated prior to pulling unless the Contractor demonstrates to the satisfaction of the Contracting Officer that the pilings cannot be separated. The Contractor will not be paid for the removal of pilings damaged beyond structural use due to proper care not being exercised during pulling.

3.4.2 Sorting, Cleaning, Inventorying and Storing

Pulled pilings shall be sorted, cleaned, inventoried and stored by type into groups as (1) piling usable without reconditioning, (2) piling requiring reconditioning and (3) piling damaged beyond structural use.

3.5 TEMPORARY CONSTRUCTION

The Contractor is responsible for temporary bracing and support of the structure during construction and shall protect all exposed partially complete work against damage. Any structural component damaged during construction shall be replaced by the Contractor at no cost to the government. The Contractor's means and methods of providing temporary protection shall be included in the work plan as approved by the contracting officer.

3.6 QUALITY CONTROL

The Contractor shall establish and maintain quality control for work under this section to assure compliance with contract requirements and maintain records of his quality control for all construction operations including, but not limited to, the following:

a. Materials;
b. Sheet piling driving operations, including type and rating of hammer; and
c. Driving depth or depth of refusal.

A copy of the records of inspections, as well as the records of corrective actions taken, shall be furnished to the Government as directed by the Contracting Officer's Authorized Representative in accordance with the CONTRACTOR QUALITY CONTROL section of this document.

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SECTION 02630

STORM DRAINAGE

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO HB-17	(2002; Errata 2003; Errata 2005) Standard Specifications for Highway Bridges
AASHTO M 294	(2006) Corrugated Polyethylene Pipe, 300- to 1200-mm Diameter
AASHTO M 252M	(1996) Corrugated Polyethylene Drainage Tubing

ASTM INTERNATIONAL (ASTM)

ASTM A 123/A 123M	(2002) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 48/A 48M	(2003) Standard Specification for Gray Iron Castings
ASTM A 536	(1984; R 2004) Standard Specification for Ductile Iron Castings
ASTM A 929/A 929M	(2001; R 2007) Standard Specification for Steel Sheet, Metallic-Coated by the Hot-Dip Process for Corrugated Steel Pipe
ASTM B 26/B 26M	(2005) Standard Specification for Aluminum-Alloy Sand Castings
ASTM C 270	(2007a) Standard Specification for Mortar for Unit Masonry
ASTM C 443	(2005a) Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets
ASTM C 478	(2007) Standard Specification for Precast Reinforced Concrete Manhole Sections
ASTM C 923	(2002) Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals

ASTM D 1557	(2002) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cu. ft. (2,700 kN-m/cu.m.))
ASTM D 2167	(1994; R 2001) Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D 2321	(2005) Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications
ASTM D 2922	(2001) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017	(2001) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
ASTM D 3350	(2006) Polyethylene Plastics Pipe and Fittings Materials
ASTM F 405	(1997) Corrugated Polyethylene (PE) Tubing and Fittings
ASTM F 477	(2002e1) Elastomeric Seals (Gaskets) for Joining Plastic Pipe
ASTM F 667	(1997) Large Diameter Corrugated Polyethylene Pipe and Fittings

ILLINOIS DEPARTMENT OF TRANSPORTATION (IDOT)

IDOT	(2007) Standard Specifications for Road and Bridge Construction; and current Supplemental Specifications and Recurring Special Provisions

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Temporary Outlet Plan

The Contractor shall submit to the Contracting Officer a plan for providing temporary gravity flow outlet capacity and pump station outlet capacity, for review and approval within thirty (30) calendar days after Notice to Proceed.

SD-03 Product Data

Placing Pipe

Printed copies of the manufacturer's recommendations for installation procedures of the material being placed, prior to installation.

SD-07 Certificates

Resin Certification
Pipeline Testing
Hydrostatic Test on Watertight Joints
Determination of Density
Frame and Cover for Gratings

Certified copies of test reports demonstrating conformance to applicable pipe specifications shall be delivered to the Contracting Officer 30 days before pipe is installed. Certification on the ability of frame and cover or gratings to carry the imposed live load.

SD-08 Manufacturer's Instructions

Manufacturer's Recommendation

Where installation procedures or any part thereof are required to be in accordance with the recommendations of the manufacturer of the material being installed, printed copies of these recommendations shall be furnished to the Contracting Officer 30 days prior to installation.

1.3 DELIVERY, STORAGE, AND HANDLING

1.3.1 Delivery and Storage

Materials delivered to site shall be inspected for damage, unloaded, and stored with a minimum of handling. Materials shall not be stored directly on the ground. The inside of pipes and fittings shall be kept free of dirt and debris. Before, during, and after installation, plastic pipe and fittings shall be protected from any environment that would result in damage or deterioration to the material. The Contractor shall have a copy of the manufacturer's instructions available at the construction site at all times and shall follow these instructions unless directed otherwise by the Contracting Officer. Solvents, solvent compounds, lubricants, elastomeric gaskets, and any similar materials required to install plastic pipe shall be stored in accordance with the manufacturer's recommendations and shall be discarded if the storage period exceeds the recommended shelf life. Solvents in use shall be discarded when the recommended pot life is exceeded.

1.3.2 Handling

Materials shall be handled in a manner that ensures delivery to the trench in sound, undamaged condition. Pipe shall be carried to the trench, not dragged.

PART 2 PRODUCTS

2.1 PIPE FOR CULVERTS AND STORM DRAINS

Pipe for culverts and storm drains shall be of the sizes indicated and shall conform to the requirements specified.

2.1.1 Concrete Pipe

The Reinforced concrete pipe shall conform to IDOT Standard Specifications Section 550 Storm Sewers. The Contractor shall verify the type and class with the COR before deliverying the pipes to the site. The type and class varies depending on the size and cover.

2.1.2 Polyethylene (PE) Pipe

The pipe manufacturer's resin certification indicating the cell classification of PE used to manufacture the pipe shall be submitted prior to installation of the pipe. The minimum cell classification for polyethylene plastic shall apply to each of the seven primary properties of the cell classification limits in accordance with ASTM D 3350.

2.1.2.1 Corrugated PE Pipe

AASHTO M 252M for pipe 3 to 10 inches in diameter or AASHTO M 294 for pipe 12 to 24 inches in diameter produced from PE certified by the resin producer as meeting the requirements of ASTM D 3350, minimum cell class in accordance with AASHTO M 252M or AASHTO M 294. Fitting shall be pipe manufacturer's standard type. Pipe shall conform to IDOT Standard Specifications Section 601 and 1040.

2.2 DRAINAGE STRUCTURES

2.2.1 Flared End Sections

Sections shall be of a standard design fabricated from zinc coated steel sheets meeting requirements of ASTM A 929/A 929M.

2.3 MISCELLANEOUS MATERIALS

2.3.1 Mortar

Mortar for pipe joints, connections to other drainage structures, and brick or block construction shall conform to ASTM C 270, Type M, except that the maximum placement time shall be 1 hour. The quantity of water in the mixture shall be sufficient to produce a stiff workable mortar but in no case shall exceed the manufacturer's recommendated gallons of water per sack of cement. Water shall be clean and free of harmful acids, alkalies, and organic impurities. The mortar shall be used within 30 minutes after the ingredients are mixed with water. The inside of the joint shall be wiped clean and finished smooth. The mortar head on the outside shall be protected from air and sun with a proper covering until satisfactorily cured.

2.3.2 Precast Reinforced Concrete Manholes

Precast reinforced concrete manholes shall conform to ASTM C 478. Joints between precast concrete risers and tops shall be full-bedded in cement mortar and shall be smoothed to a uniform surface on both interior and exterior of the structure.

2.3.3 Frame and Cover for Gratings

Frame and cover gratings shall be cast gray iron, ASTM A 48/A 48M, Class 35B; cast ductile iron, ASTM A 536, Grade 65-45-12; or cast aluminum,

ASTM B 26/B 26M, Alloy 356.OT6. Weight, shape, size, and waterway openings for grates and curb inlets shall be as indicated on the plans. Frame and cover shall conform to IDOT Highway Standards.

2.3.4 Joints

2.3.4.1 Transverse Field Joints

For reinforced concrete pipe, transverse field joints shall be of such design that the successive connection of pipe sections will form a continuous line free of appreciable irregularities in the flow line. In addition, the joints shall be rubber ring, gasket type, flexible joints and meet all requirements described in ASTM C 443.

2.3.4.2 Flexible Watertight Joints

Flexible watertight joints shall be made with rubber-type gaskets for concrete pipe. The design of joints and the physical requirements for rubber-type gaskets shall conform to ASTM C 443. Gaskets shall have not more than one factory fabricated splice, except that two factory-fabricated splices of the rubber-type gasket are permitted if the nominal diameter of the pipe being gasketed exceeds 54 inches.

2.3.4.3 Corrugated PE Plastic Pipe

Water tight joints shall be made using a PVC or PE coupling and rubber gaskets as recommended by the pipe manufacturer. Rubber gaskets shall conform to ASTM F 477. Soil tight joints shall conform to the requirements in AASHTO HB-17, Division II, Section 26.4.2.4. (e) for soil tightness and shall be as recommended by the pipe manufacturer.

2.4 STEEL LADDER

Steel ladder shall be provided where the depth of the manhole exceeds 12 feet. These ladders shall be not less than 16 inches in width, with 3/4 inch diameter rungs spaced 12 inches apart. The two stringers shall be a minimum 3/8 inch thick and 2-1/2 inches wide. Ladders and inserts shall be galvanized after fabrication in conformance with ASTM A 123/A 123M.

2.5 RESILIENT CONNECTORS

Flexible, watertight connectors used for connecting pipe to manholes and inlets shall conform to ASTM C 923.

2.6 EROSION CONTROL RIPRAP

Provide nonerodible rock not exceeding 15 inches in its greatest dimension and choked with sufficient small rocks to provide a dense mass with a minimum thickness of 8 inches.

PART 3 EXECUTION

3.1 EXCAVATION FOR PIPE CULVERTS, STORM DRAINS, AND DRAINAGE STRUCTURES

Excavation of trenches, and for appurtenances and backfilling for culverts and storm drains, shall be in accordance with the applicable portions of Section 02300 EARTHWORK and the requirements specified below.

3.1.1 Trenching

The trench shall be excavated to an elevation 4 inches below the bottom of the pipe and so that the flow line of the finished sewer will be at the depth or grade specified or established by the COR. For trench depths of less than 5 feet and when sheeting or shoring is not required, the trench shall be excavated 18 inches wider than the external diameter of the pipe to permit thorough tamping of the foundation material under the haunches and around the pipe. For trench depths of 5 feet or more and when sheeting or shoring is required, the trench width shall be 3 feett wider than the external diameter of the pipe. The trench shall be excavated so that vertical faces are maintained at least to the elevation of the top of pipe. For trench depths of 5 feett or more, the Contractor shall provide trench protection according to the applicable standards for work place safety. The Contractor shall provide to the COR, in writing, his/her procedures for fulfilling the safety requiremets for trench protection. If a water main is encountered during storm sewer construction, the requirements of the IEPA shall govern the horizontal and vertical separation of the water main from the storm sewer. Cost of this redesign and increased cost of pipe or installation shall be borne by the Contractor without additional cost to the Government.

3.1.2 Removal of Unstable Material

Where wet or otherwise unstable soil incapable of properly supporting the pipe, as determined by the Contracting Officer, is unexpectedly encountered in the bottom of a trench, such material shall be removed to the depth required and replaced to the proper grade with select granular material, compacted as provided in paragraph BACKFILLING. When removal of unstable material is due to the fault or neglect of the Contractor while performing shoring and sheeting, water removal, or other specified requirements, such removal and replacement shall be performed at no additional cost to the Government.

3.2 BEDDING

Well compacted, moist fine aggregate meeting the gradations specified in IDOT Article 1003.04 of to at least 4 inches in depth below the pipe, shall be placed the entire width of the trench and for the length of the pipe. The fine aggregate shall meet the approval of the Engineer and shall be compacted to the Engineer's satisfaction by ramming or tamping with tools approved by the Engineer. When the storm sewer outlets from an embankment or natural ground, the last 3 feet of the bedding and backfill at the outfall end shall be impervious material.

3.2.1 Concrete Pipe Requirements

When no bedding class is specified or detailed on the drawings, concrete pipe shall be bedded in a soil foundation accurately shaped and rounded to conform to the lowest one-fourth of the outside portion of circular pipe or to the lower curved portion of pipe arch for the entire length of the pipe or pipe arch. When necessary, the bedding shall be tamped. Bell holes and depressions for joints shall be not more than the length, depth, and width required for properly making the particular type of joint.

3.2.2 Plastic Pipe

Bedding for PVC and PE pipe shall meet the requirements of ASTM D 2321. Bedding, haunching, and initial backfill shall be either Class IB or II

material.

3.3 PLACING PIPE

Each pipe shall be thoroughly examined before being laid; defective or damaged pipe shall not be used. Plastic pipe shall be protected from exposure to direct sunlight prior to laying, if necessary to maintain adequate pipe stiffness and meet installation deflection requirements. Pipelines shall be laid to the grades and alignment indicated. Proper facilities shall be provided for lowering sections of pipe into trenches. Pipe shall not be laid in water, and pipe shall not be laid when trench conditions or weather are unsuitable for such work. Diversion of drainage or dewatering of trenches during construction shall be provided as necessary in accordance to Section 02300 EARTHWORK. Deflection of installed plastic pipe shall not exceed the maximum allowable deflection of 7.5%.

3.3.1 Concrete, Clay, PVC, Ribbed PVC, Ductile Iron and Cast-Iron Pipe

Laying shall proceed upgrade with spigot ends of bell-and-spigot pipe and tongue ends of tongue-and-groove pipe pointing in the direction of the flow.

3.3.2 Elliptical and Elliptical Reinforced Concrete Pipe

The manufacturer's reference lines, designating the top of the pipe, shall be within 5 degrees of a vertical plane through the longitudinal axis of the pipe, during placement. Damage to or misalignment of the pipe shall be prevented in all backfilling operations.

3.3.3 Corrugated PE Pipe

Laying shall be with the separate sections joined firmly on a bed shaped to line and grade and shall follow manufacturer's recommendations.

3.4 JOINTING

3.4.1 Concrete Pipe

3.4.1.1 Cement-Mortar Bell-and-Spigot Joint

The first pipe shall be bedded to the established gradeline, with the bell end placed upstream. The interior surface of the bell shall be thoroughly cleaned with a wet brush and the lower portion of the bell filled with mortar as required to bring inner surfaces of abutting pipes flush and even. The spigot end of each subsequent pipe shall be cleaned with a wet brush and uniformly matched into a bell so that sections are closely fitted. After each section is laid, the remainder of the joint shall be filled with mortar, and a bead shall be formed around the outside of the joint with sufficient additional mortar. If mortar is not sufficiently stiff to prevent appreciable slump before setting, the outside of the joint shall be wrapped or bandaged with cheesecloth to hold mortar in place.

3.4.1.2 Cement-Mortar Oakum Joint for Bell-and-Spigot Pipe

A closely twisted gasket shall be made of jute or oakum of the diameter required to support the spigot end of the pipe at the proper grade and to make the joint concentric. Joint packing shall be in one piece of sufficient length to pass around the pipe and lap at top. This gasket shall be thoroughly saturated with neat cement grout. The bell of the pipe shall be thoroughly cleaned with a wet brush, and the gasket shall be laid

in the bell for the lower third of the circumference and covered with mortar. The spigot of the pipe shall be thoroughly cleaned with a wet brush, inserted in the bell, and carefully driven home. A small amount of mortar shall be inserted in the annular space for the upper two-thirds of the circumference. The gasket shall be lapped at the top of the pipe and driven home in the annular space with a caulking tool. The remainder of the annular space shall be filled completely with mortar and beveled at an angle of approximately 45 degrees with the outside of the bell. If mortar is not sufficiently stiff to prevent appreciable slump before setting, the outside of the joint thus made shall be wrapped with cheesecloth. Placing of this type of joint shall be kept at least five joints behind laying operations.

3.4.1.3 Flexible Watertight Joints

Gaskets and jointing materials shall be as recommended by the particular manufacturer in regard to use of lubricants, cements, adhesives, and other special installation requirements. Surfaces to receive lubricants, cements, or adhesives shall be clean and dry. Gaskets and jointing materials shall be affixed to the pipe not more than 24 hours prior to the installation of the pipe, and shall be protected from the sun, blowing dust, and other deleterious agents at all times. Gaskets and jointing materials shall be inspected before installing the pipe; any loose or improperly affixed gaskets and jointing materials shall be removed and replaced. The pipe shall be aligned with the previously installed pipe, and the joint pushed home. If, while the joint is being made the gasket becomes visibly dislocated the pipe shall be removed and the joint remade.

3.4.2 Corrugated PE pipe

Corrugated polyethylene (PE) pipe joints shall be in accordance with ASTM F 405 or ASTM F 667.

3.5 DRAINAGE STRUCTURES

3.5.1 Manholes, Catch Basin and Inlets

Construction shall be of reinforced concrete, plain concrete, brick, precast reinforced concrete or precast concrete segmental blocks complete with frames and covers or gratings; and with fixed galvanized steel ladders where indicated. Construction requirements shall follow IDOT section 602.

3.6 STEEL LADDER INSTALLATION

Ladder shall be adequately anchored to the wall by means of steel inserts spaced not more than 6 feet vertically, and shall be installed to provide at least 6 inches of space between the wall and the rungs. The wall along the line of the ladder shall be vertical for its entire length.

3.7 BACKFILLING TRENCHES

Trench and excavated areas shall be backfilled to the natural line or finished surface as rapidly as the condition of the sewer will permit. All backfill material shall be deposited in the trench or excavation in such a manner as not to damage the sewer. The filling of the trench shall be carried on simultaneously on both sides of the pipe in such a manner that injurious side pressures do not occur. Trenches and excavated areas outside of the subgrade where the inner edge of the trench is within 2 feet of the edge of the proposed pavement, curb, gutter, curb and gutter,

stabilized shoulder or sidewalk, shall be made with trench backfill material, unless the excavated material meets the requirements of Articles 1003.01 and 1003.04 of IDOT.

3.7.1 Concrete Pipe

As soon as the condition of the pipe will permit, the entire width of the trench shall be backfilled with moist fine aggregate meeting the gradations specified in Article 1003.04 of IDOT Standard Specifications to a height of at least the elevation of the center of the pipe. The fine aggregate shall be placed longitudinally along the pipe. The elevation of the backfill material on each side of the pipe shall be the same. Special care shall be taken to completely fill the space under the pipe. The fine aggregate backfill material shall be placed in 8 inches layers, loose measurement and compacted to the satisfaction of the Engineer by ramming or tamping with tools approved by the Engineer. The fine aggregate used for backfilling shall meet the approval of the Engineer. Tests for density shall be made as necessary to ensure conformance to the compaction requirements specified below. Where it is necessary, in the opinion of the Contracting Officer, that sheeting or portions of bracing used be left in place, the contract will be adjusted accordingly. Untreated sheeting shall not be left in place beneath structures or pavements.

3.7.2 Perforated Corrugated PE Pipe

After placing the geotextile fabric, the entire width of the trench shall be backfilled with moist coarse aggregate meeting the gradations specified in Article 1004. COARSE AGGREGATE of IDOT Standard Specifications to a height of at least the elevation of the center of the pipe. The elevation of the backfill material on each side of the pipe shall be the same. Special care shall be taken to completely fill the space under the pipe.

3.7.3 Compaction

3.7.3.1 General Requirements

Cohesionless materials include gravels, gravel-sand mixtures, sands, and gravelly sands. Cohesive materials include clayey and silty gravels, gravel-silt mixtures, clayey and silty sands, sand-clay mixtures, clays, silts, and very fine sands. When results of compaction tests for moisture-density relations are recorded on graphs, cohesionless soils will show straight lines or reverse-shaped moisture-density curves, and cohesive soils will show normal moisture-density curves.

3.7.3.2 Minimum Density

Backfill over and around the pipe and backfill around and adjacent to drainage structures shall be compacted at the approved moisture content to the following applicable minimum density, which will be determined as specified below.

a. Within 2 feet of the edge of the proposed pavement, curb, gutter, curb and gutter, stabilized shoulder, sidewalk and parking areas, the density shall be not less than 90 percent of maximum density for cohesive material and 95 percent of maximum density for cohesionless material, up to the elevation where requirements for pavement subgrade materials and compaction shall control.

b. Under unpaved or turfed traffic areas, density shall not be less

than 90 percent of maximum density for cohesive material and 95 percent of maximum density for cohesionless material.

c. Under nontraffic areas, density shall be not less than that of the surrounding material.

3.7.4 Determination of Density

Testing shall be the responsibility of the Contractor and performed at no additional cost to the Government. Testing shall be performed by an approved commercial testing laboratory or by the Contractor subject to approval. Tests shall be performed in sufficient number to ensure that specified density is being obtained. Laboratory tests for moisture-density relations shall be made in accordance with ASTM D 1557 except that mechanical tampers may be used provided the results are correlated with those obtained with the specified hand tamper. Field density tests shall be determined in accordance with ASTM D 2167 or ASTM D 2922. When ASTM D 2922 is used, the calibration curves shall be checked and adjusted, if necessary, using the sand cone method as described in paragraph Calibration of the referenced publications. ASTM D 2922 results in a wet unit weight of soil and when using this method ASTM D 3017 shall be used to determine the moisture content of the soil. The calibration curves furnished with the moisture gauges shall be checked along with density calibration checks as described in ASTM D 3017 or ASTM D 2922. Test results shall be furnished the Contracting Officer. The calibration checks of both the density and moisture gauges shall be made at the beginning of a job on each different type of material encountered and at intervals as directed.

3.8 JOINT TESTING

3.8.1 Shop Testing Concrete Pipe

The concrete pipe and joints shall be tested for leakage as followings: A hydrostatic test shall be made on the watertight joint types proposed. Only one sample joint of each type needs testing; however, if the sample joint fails because of faulty workmanship, any additional sample joint may be tested. During the test period the joint shall be protected from high temperature that might soften or adversely affect the jointing materials. The possibility that some water may be absorbed by concrete pipes during this test will be considered before rejecting any rubber seals proposed. Performance requirements for joints in reinforced concrete pipe shall conform to ASTM C 443.

3.8.2 Defects

Defects or visible leakage from joints or pipe shall be corrected. Defective pipe or joints disclosed in the hydrostatic test shall be replaced and the test repeated until the results are satisfactory to the Contracting Officer.

3.9 Quality Control System

The contractor shall establish and maintain a quality control system for work under this section to assure compliance with the contract requirements; and maintain records of his quality control for all construction operations, including but not limited to the following:

1. Material,

2. Grade and Alignment,
3. Excavation and Trenching, Bedding, Placement and Backfill, and
4. Verification of in-place inverts.

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SECTION 02741

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SECTION 02741

BITUMINOUS CONCRETE PAVEMENT

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO T 230	(1968; R 2000) Determining Degree of Pavement Compaction of Bituminous Aggregate Mixtures
AASHTO T 30	(2006) Mechanical Analysis of Extracted Aggregate

ASTM INTERNATIONAL (ASTM)

ASTM D 1559	(1989) Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus
ASTM D 2172	(2005) Quantitative Extraction of Bitumen from Bituminous Paving Mixtures
ASTM D 2950	(2005) Density of Bituminous Concrete in Place by Nuclear Methods

ILLINOIS DEPARTMENT OF TRANSPORTATION (IDOT)

IDOT	(2007) Standard Specifications for Road and Bridge Construction; and current Supplemental Specifications and Recurring Special Provisions

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-04 Samples

Uncompacted mix

Pavement cores

SD-06 Test Reports

Trial batch reports

Mix design

Asphalt concrete

Density

Thickness

Straightedge test

Submit reports for testing specified under paragraph entitled "Field Quality Control."

SD-07 Certificates

Asphalt mix delivery record

Asphalt concrete and material sources

Obtain approval of the Contracting Officer for materials and material sources 2 days prior to the use of such material in the work.

Asphalt concrete

Curbs

Guardrails

Traffic signs

Submit certificates, signed by the producer, that paving materials and incidental construction items conform to specification requirements.

1.3 QUALITY ASSURANCE

1.3.1 Regulatory Requirements

Provide work and materials in accordance with applicable requirements of IDOT Section 407 and mentioned herein refer to those specifications. Paragraphs in IDOT Standard Specifications entitled "Method of Measurement" and "Basis of Payment" shall not apply.

1.3.2 Modification of References

Where term "Engineer" is used in IDOT Standard Specifications it shall be construed to mean Contracting Officer. Where term "state" is used, it shall mean "Federal Government".

1.3.3 Mix Delivery Record Data

Record and submit the following information to each load of mix delivered to the job site. Submit within one day after delivery on Government-furnished forms:

a. Truck No:

b. Time In:

c. Time Out:

d. Tonnage and Discharge Temperature:

e. Mix Type:

f. Location:

g. Stations Placed:

1.3.4 Trial Batch

Submit current bituminous design reports for all mix types proposed for use on the project.

1.3.5 Mix Design

Submit results of laboratory tests performed on each mix design. Testing shall have been accomplished not more than one year prior to date of material placement.

PART 2 PRODUCTS

2.1 ASPHALT CONCRETE

Provide asphalt concrete in accordance with the applicable requirements of IDOT Standard Specifications, except where specified otherwise.

2.2 SUBBASE

Materials for construction of the subbase shall be in accordance with IDOT Standard Specifications, Section 407.02.

2.3 BASE COURSE

Materials for construction of the base course shall be in accordance with IDOT Standard Specifications, Section 407.02.

2.4 BITUMINOUS BINDER AND SURFACE

Materials for construction of the bituminous binder and surface shall be in accordance with IDOT Standard Specifications, Section 407.02.

2.5 CURBS AND GUTTERS

Materials for construction of curbs and gutters shall be in accordance with IDOT Standard Specifications, Section 606.

2.6 GUARDRAILS

Materials for construction of the guardrails shall be in accordance with IDOT Standard Specifications Section 630 and 631 and IDOT BDE Chapter 38.

2.7 TRAFFIC SIGNS

Provide traffic signs in accordance with IDOT Standard Specifications Sections 1090, 1091, and 1092.

2.8 COMPOSITION OF MIXTURE REQUIREMENTS

2.8.1 Mixture Properties

Gradation of mineral aggregate shall be as specified. Percentage of bituminous material provided in the bituminous mixtures shall be within the limits specified. Mixtures shall have the following physical properties:

Test Property	Values
Stability (50 Blows)	Not less than 1000 pounds
Flow (0.01 inch)	Not more than 20 nor less than 8
Percent Air Voids	Not less than 3 nor more than 8 for binder course; not less than 3 nor more than 5 for wearing course
Percent Voids in Mineral Aggregates	See Table I

TABLE I

MINIMUM PERCENT VOIDS IN MINERAL AGGREGATE (VMA)

U.S.A. Standard Sieve Designation	Nominal Maximum Particle Size, Inch	Minimum VMA Percent
No. 4	0.187	18
3/8 inch	0.375	16
1/2 inch	0.500	15
3/4 inch	0.750	14
1 inch	1.000	13

2.8.2 Quantity of Bituminous Material

Mix asphalt cement with aggregates of corresponding mixes in the following proportions:

ASPHALT CEMENT PERCENT BY WEIGHT OF TOTAL MIX

Binder Course	Wearing Course
4 to 8	5 to 9

PART 3 EXECUTION

3.1 PREPARATION

3.1.1 Excavation and Filling

Excavation and filling to establish elevation of subgrade is specified in Section 02300 EXCAVATION.

3.2 CONSTRUCTION

Provide construction in accordance with the applicable requirements of the

IDOT Standard Specifications, except where indicated or specified otherwise.

3.2.1 Subgrade

Preparation of subgrade shall be in accordance with Section 02300 EXCAVATION.

3.2.2 Bituminous Binder and Surface Course

Methods of construction of the bituminous binder and surface course shall be in accordance with IDOT Standard Specifications Section 407.06.

3.2.3 Curbs and Gutters

Methods of construction of curbs and gutters shall be in accordance with IDOT Standard Specifications Section 606.

3.2.4 Guardrails

Methods of construction of the guardrails shall be in accordance with IDOT Standard Specifications Section 630, 631, and 633 and IDOT BDE Chapter 38.

3.2.5 Traffic Signs

Install traffic signs in accordance with IDOT 730.04.

3.3 FIELD QUALITY CONTROL

Sample shall be taken by Contractor as specified herein. Contractor shall replace pavement where sample cores have been removed. Submit 2 pavement cores when using the in-place nuclear density method.

3.3.1 Sample and Core Identification

Place each sample and core in a container and securely seal to prevent loss of material. Tag each sample for identification. Tag shall contain the following information:

a. Contract No.

b. Sample No.

c. Quantity

d. Date of Sample

e. Sample Description

f. Source/Location/Stations Placed/depth below the finish grade

g. Intended Use

h. Thicknesses of various lifts placed

3.3.2 Testing

3.3.2.1 Bituminous Mix Testing

Take two samples per day per mix type at plant or from truck. Test uncompacted mix for extraction in accordance with ASTM D 2172 and sieve analysis in accordance with AASHTO T 30. Test samples for stability and flow in accordance with ASTM D 1559. When two consecutive tests fail to meet requirements of specifications, cease placement operations and test a new trial batch prior to resumption of placement operations. Submit 2 per day of each mix type. When two tests on uncompacted mix fail submit new trial batch for approval.

3.3.2.2 Testing of Pavement Course

a. Density: Determine density of pavement by testing cores obtained from the binder and wearing course in accordance with AASHTO T 230. Take three cores at location designated by Contracting Officer for each 200 tons or fraction thereof, of asphalt placed. Deliver cores undisturbed and undamaged to laboratory and provide test results within 48 hours of each day placement of paving materials.

b. Thickness: Determine thickness of the binder and wearing course from cores taken for density test.

c. Straightedge Test: Test compacted surface of binder course and wearing course with a straightedge as work progresses. Apply straightedge parallel with and at right angles to center line after final rolling. Variations in the binder course surface shall not be more than 1/2 inches from the lower edge of the 10 foot straightedge; variations in wearing course surface shall not be more than 1/2 from the lower edge of the 10 foot straightedge. Pavement showing irregularities greater than that specified shall be corrected as directed by Contracting Officer.

3.3.2.3 Alternate Testing Method for Pavement Courses

At Contractor's option the following in-place testing method may be used to determine density and thickness in lieu of testing specified above. Frequency of testing shall be the same. When in-place nuclear method to determine density is used, take two pavement cores at locations designated by Contracting Officer and turn over to Government to verify pavement thickness.

a. Density: Determine density of pavement by in-place testing using Nuclear Method in accordance with ASTM D 2950.

b. Thickness: Determine thickness of finished pavement by use of following equation:

$$t = \frac{W}{0.75d}$$

Where t= pavement thickness, in inches.
W= average weight per square yard of mixture actually used in work.
d= compacted density as measured by nuclear density device.

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SECTION 02920

SEEDING

PART 1 GENERAL

1.1 SCOPE

The work covered by this section includes the planting of salt tolerant roadside seeds at all graded areas within the worklimits as shown on the contract drawings. The Contractor is responsible for furnishing all labor, equipments, and materials and performing all operations in accordance with IDOT and as specified herein.

1.2 REFERENCES

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

ASTM INTERNATIONAL (ASTM)

ASTM C 602	(2006) Agricultural Liming Materials
ASTM D 4427	(1992; R 2002e1) Peat Samples by Laboratory Testing
ASTM D 4972	(2001) pH of Soils

U.S. DEPARTMENT OF AGRICULTURE (USDA)

DOA SSIR 42	(1996) Soil Survey Investigation Report No. 42, Soil Survey Laboratory Methods Manual, Version 3.0

U.S. DEPARTMENT OF AGRICULTURE (USDA)

AMS Seed Act	(1940; R 1988; R 1998) Federal Seed Act

ILLINOIS DEPARTMENT OF TRANSPORTATION (IDOT)

IDOT	(2007) Standard Specifications for Road and Bridge Construction; and current Supplemental Specifications and Recurring Special Provisions

1.3 DEFINITIONS

1.2.1 Stand of Turf

95 percent ground cover of the established species.

1.4 SUBMITTALS

The following shall be submitted in accordance with Section 01330, SUBMITTAL PROCEDURES:

Prior to the delivery of materials, certificates of compliance and certified laboratory test reports shall be submitted certifying that materials meet the requirements specified. Certified copies of the reports for the following materials shall be submitted.

SD-03 Product Data

Fertilizer

Include physical characteristics, and recommendations.

Seed Mixes; G,LS

Seed mixes indicating the name and address of seed supplier and estimated seed per pound (or seed per ounce) of each species.

Vendor's invoice for each shipment of seed material showing botanical and common names, quantities by species, geographic origin, and harvest date of seed.

Include physical characteristics, and recommendations.

Delivery Schedule

Submittal of the schedule shall be at least 10 days before delivery.

SD-06 Test Reports

Seeds

For mixture percentage, pure live seed, weed seed content, and germination.

Topsoil composition tests (reports and recommendations).

Fertilizer

For chemical analysis composition percent.

SD-08 Manufacturer's Instructions

Manufacturer's Literature

Discussing physical characteristics, applications, guarantees, and installation.

Erosion Control Materials

SD-10 Operation and Maintenance Data

Maintenance Instructions

Three copies written instructions for long-term and year-round care of turfed areas.

1.5 DELIVERY, STORAGE, AND HANDLING

1.5.1 Delivery

Seed material shall be inspected upon arrival at the jobsite. The Contractor will insure that all seed materials are delivered in manufacturer's original, unopened containers with labels and tags intact and legible. The Contracting Officer shall certify that all seed materials received proper handling during delivery (including moisture content and temperature control), especially any grasses that need special attention between gathering and planting. Materials violating any of the above mentioned conditions shall be removed from the jobsite at no additional cost to the Government. Delivery of fertilizer to the site shall be in the original, unopened containers bearing manufacturer's chemical analysis. Instead of containers, fertilizer may be furnished in bulk. A chemical analysis shall be provided for bulk deliveries. Seed that has become wet, moldy, or otherwise damaged will not be acceptable.

1.5.2 Storage

If it is necessary to store the seeds after their arrival on the work site, they shall be stored in an approved weatherproof building in such a manner as to protect the seeds from deterioration and to permit easy access for inspection. Seed and fertilizer shall be stored in cool, dry locations away from contaminants. Chemical treatment materials shall not be stored with other landscape materials.

1.5.3 Handling

Except for bulk deliveries, materials shall not be dropped or dumped from vehicles.

1.6 TIME RESTRICTIONS AND PLANTING CONDITIONS

1.6.1 Restrictions

Do not plant when the ground is frozen, snow covered, muddy, or when air temperature exceeds 90 degrees Fahrenheit.

1.6.2 Time Limitations

Apply seed within twenty four hours after seed bed preparation. Apply seed during the planting season described in paragraph "Seeding Times".

PART 2 PRODUCTS

2.1 SEED

2.1.1 IDOT Seed Classification

State-certified seed of the latest season's crop, shall be provided in original sealed packages bearing the producer's guaranteed analysis for mixture percentage, purity, germination, weed seed content, and inert material. Labels shall be in conformance with AMS Seed Act, Federal Seed Act Regulations and applicable state seed laws.

2.1.2 Seed Mixes

The contractor shall use a 2A class and Salt Tolerant Roadside seeding mixture type as defined in Articles 250.07 Seeding Mixture of the IDOT Standard Specifications.

2.1.3 Weed Seed

No seed shall be sown until the purity test has been completed for the seeds to be used, and shows that the seed meets the noxious weed seed requirements. Create field mixes on site in the presence of the Contracting Officer's Representative.

2.2 TOPSOIL

2.2.1 On-Site Topsoil

Surface soil stripped and stockpiled on site and modified as necessary to meet the requirements specified for topsoil in paragraph entitled "Composition." Topsoil shall be existing surface soil stripped and stockpiled on-site in accordance with Section 02300 EARTHWORK.

2.2.2 Off-Site Topsoil

Conform to requirements specified in paragraph entitled "Composition." Additional topsoil shall be furnished by the Contractor.

2.2.3 Composition

Containing from 5 to 10 percent organic matter as determined by the topsoil composition tests of the Organic Carbon, 6A, Chemical Analysis Method described in DOA SSIR 42. Maximum particle size, 3/4 inch, with maximum 3 percent retained on 1/4 inch screen. The pH shall be tested in accordance with ASTM D 4972. Topsoil shall be free of sticks, stones, roots, and other debris and objectionable materials. Other components shall conform to the following limits:

Fine gravel, coarse sand, medium sand..... 20 - 40 percent
Silt..... 25 - 60 percent
Clay..... 5 - 25 percent

2.3 SOIL CONDITIONERS

Add conditioners to topsoil as required to bring into compliance with paragraph "composition" standard for topsoil. Soil conditioners shall be delivered to the site in the original, unopened containers bearing the manufacturer's guaranteed chemical analysis and name. In lieu of containers, soil conditioners may be furnished in bulk and a certificate from the manufacturer indicating the above information shall accompany each delivery.

2.3.1 Lime

Commercial grade hydrate or burnt limestone containing a calcium carbonate equivalent (C.C.E.) as specified in ASTM C 602.

2.3.2 Aluminum Sulfate

Commercial grade.

2.3.3 Sulfur

100 percent elemental

2.3.4 Iron

100 percent elemental

2.3.5 Peat

Natural product of peat moss derived from a freshwater site and conforming to ASTM D 4427. Shred and granulate peat to pass a 1/2 inch mesh screen and condition in storage pile for minimum 6 months after excavation.

2.3.6 Sand

Clean and free of materials harmful to plants.

2.3.7 Perlite

Horticultural grade.

2.3.8 Composted Derivatives

Ground bark, nitrolized sawdust, humus or other green wood waste material free of stones, sticks, and soil stabilized with nitrogen and having the following properties:

2.3.8.1 Particle Size

Minimum percent by weight passing:

No. 4 mesh screen	95
No. 8 mesh screen	80

2.3.8.2 Nitrogen Content

Minimum percent based on dry weight:

Fir Sawdust	0.7
Fir or Pine Bark	1.0

2.3.9 Gypsum

Coarsely ground gypsum comprised of calcium sulfate dihydrate 91 percent, calcium 22 percent, sulfur 17 percent; minimum 96 percent passing through 20 mesh screen, 100 percent passing thru 16 mesh screen.

2.3.10 Calcined Clay

Calcined clay shall be granular particles produced from montmorillonite clay calcined to a minimum temperature of 1200 degrees F. Gradation: A minimum 90 percent shall pass a No. 8 sieve; a minimum 99 percent shall be retained on a No. 60 sieve; and a maximum 2 percent shall pass a No. 100 sieve. Bulk density: A maximum 40 pounds per cubic foot.

2.4 OTHER MATERIALS

2.4.1 Fertilizer and Agricultural Ground Limestone

When specified for bare earth areas, fertilizer nutrients and agricultural ground limestone shall be uniformly spread over the designated areas immediately prior to seed bed preparation. The Contractor shall follow Articles 250.07 Fertilizer and Agricultural Ground Limestone Application of the IDOT Standard Specifications.

2.4.2 Mulches

Mulches shall be free from weeds, mold, and other deleterious materials.

2.4.3 Water

Water shall be of a quality suitable for irrigation.

2.4.4 Herbicide

Herbicide shall be broad spectrum that leaves no lasting harmful residues and allows planting within 10 to 14 days after application. Herbicide shall be applied per manufacturer's recommendations.

2.5 SOIL EROSION MATERIALS

Soil erosion control materials shall conform to the following:

2.5.1 Soil Erosion Control Blanket

Machine produced mat of wood excelsior formed from a web of interlocking wood fibers, covered on one side with either plastic netting or twisted kraft paper cord netting.

2.5.2 Soil Erosion Control Fabric

Knitted construction of polypropylene yarn with uniform mesh openings 3/4-to 1-inch square with strips of biodegradable paper. Filler paper strips should last 6 to 8 months.

2.5.3 Soil Erosion Control Net

Heavy, twisted jute mesh weighing approximately 5 pounds per 100 square feet and 4 feet wide with mesh openings of approximately 1/2-inch square.

2.5.4 Erosion Control Anchor Material

Erosion control anchor material shall be as recommended by the manufacturer.

2.6 SPECIAL SEEDING AND MULCHING EQUIPMENT

Only pneumatic tired tractors shall be permitted on levee sections having topsoil. Special equipment such as mulch spreaders may be used if approved by the Contracting Officer. The request for approval shall be made well in advance of the planned planting date and shall include full information on equipment and materials.

PART 3 EXECUTION

3.1 SEEDING TIMES

Seed shall be sown ideally from April 15 to June 30 for spring planting and from September 1 to October 15 for fall planting. In the event that seeding must occur from July 1 to August 31, the soil shall receive an equivalent of one (1) inch of water per week, either through rainfall, watering, or both.

3.2 SITE PREPARATION

3.2.1 Preparation of Seeding Areas

3.2.1.1 Grading

Seed bed preparation shall not be started until all stones, boulders, debris and similar material larger than 3 inches in diameter have been removed and all other requirements of Section 212 of the IDOT Standard Specifications have been completed. The Contractor shall verify that the finished grades were executed as indicated on drawings, and that the placing of topsoil and the smooth grading have been completed. Deviations in the ground surface in relation to the grades indicated on the drawings shall be corrected prior to seeding.

3.2.1.2 Unsatisfactory Environmental Conditions

Site preparation work shall be performed only during periods when beneficial results can be obtained. When drought, excessive moisture or other unsatisfactory condition prevails, the work shall be stopped when directed by the Contracting Officer.

3.2.2 Tilling

Soil shall be tilled to a minimum depth of 4 inches by plowing, disking, harrowing, rototilling or other approved method. On slopes 2 horizontal to 1 vertical and steeper, the soil shall be tilled to a maximum depth of 2 inches by scarifying with heavy rakes, or other approved method. Rototillers shall be used where soil conditions and length of slope permit. On slopes 1 horizontal to 1 vertical and steeper, no tillage is required.

3.2.3 Finished Grading

3.2.3.1 Preparation

Seeding areas shall be filled as needed or have surplus soil removed to attain the finished grade. Drainage patterns shall be maintained as indicated on drawings. Seeding areas compacted by construction operations shall be completely pulverized by tillage. Finished grade shall be 1 inch below the adjoining grade of any surfaced area. New surfaces shall be blended to existing areas.

3.2.3.2 Debris, 3 Inch

Graded areas within the work limits shall have debris and stones larger than 3 inches in any dimension removed from the surface.

3.2.3.3 Protection

Finished graded areas shall be protected from damage by vehicular or pedestrian traffic and erosion.

3.3 SEEDING

Prior to seeding, any previously prepared seedbed areas compacted or damaged by interim rains, traffic, or other cause, shall be reworked to restore the ground condition previously specified. Seed will not be broadcast when the wind velocity is great enough as to prevent uniform seed distribution. The Contractor shall follow Articles 250.06 Seeding Methods of IDOT Standard Specifications for applying seeds.

3.3.1 Applying and Anchoring Mulch

Immediately after the seeding has been completed, mulch shall be spread uniformly in a continuous blanket at a rate of 1 1/2 tons per acre. Mulch shall be spread by hand, manure spreader, modified grain combine with straw-spreader attachment, or a blower-type mulch spreader. Mulching shall be started at the windward side of relatively flat areas, or at the upper part of a steep slope, and continued uniformly until the area is covered. Mulch shall not be bunched. Immediately following the spreading, the mulch shall be anchored to the soil by a V-type wheel land packer, a scalloped-disk land packer designed to force mulch into the soil surface, or other suitable equipment. The number of passes needed, not to exceed three, will be determined by the Contracting Officer. All areas seeded on any given day must be mulched on that same day.

3.3.2 Watering

Immediately upon completion of seeding and mulching, all seeded areas shall be given one watering. Sufficient water to penetrate the seed bed to a minimum of 3 inches shall be applied. Water shall be delivered through a system which will insure even distribution. Watering shall be done in manner which will provide uniform coverage, prevent erosion, and prevent damage to the finished surface by the watering equipment. Maintenance watering shall commence within 7 days after completing the seeded area. Water shall be applied at a rate to insure moist soil conditions to a depth of 2 inches. Runoff and puddling shall be prevented. The Contractor shall water seeded areas so that adequate growth and development are maintained.

3.3.3 Topsoil and Seeding

No finished construction area shall be left untopsoiled and unseeded during the winter months. All construction areas finished before June 15th shall be topsoiled and spring-seeded; all construction finished before October 1st shall be topsoiled and seeded in fall seeding.

3.3.4 Temporary Winter Cover

When the completion schedule of the work under the contract requires a delay in the seeding operations due to the limitation dates above, the areas not yet seeded or which do not have grass shall be planted with temporary winter cover. Temporary seed species shall be Secale cereale (rye) at 91 percent pure live seed, applied at a seeding rate of 2 bushels per acre. Temporary winter cover planting shall include the application of 1/2 the amounts of fertilizer specified with the remaining 1/2 to be included with the permanent seeding operations. The areas to be seeded to

a temporary winter cover shall be thoroughly mowed prior to permanent seeding in the same manner as specified for the existing ground cover. Areas which have been provided with temporary winter cover shall be thoroughly mowed and turfed with permanent species in accordance with PARAGRAPH 3.1; SEEDING TIMES. All areas seeded with temporary winter cover shall be staked in the field and marked on the plans. A copy of the plans shall then be submitted to the Contracting Officer. Temporary Winter Cover shall be in accordance to Section 01355 ENVIRONMENTAL PROTECTION, paragraph 1.7.

3.4 EROSION CONTROL

Where erosion control is required, install erosion control material in accordance with manufacturer's instructions. Placement of the erosion control material shall be accomplished without damage to installed material or without deviation to finished grade.

3.5 RESTORATION AND CLEANUP

Excess and waste material shall be removed and properly disposed of off the site. Adjacent paved areas shall be cleaned. Existing turf areas which have been damaged during the contract operations, and which are outside of the limits designated to be seeded, shall be restored using the seed mix as shown in Table 1 following the requirements in this section.

3.6 PROTECTION OF TURFED AREAS

Immediately after turfing, the area shall be protected against traffic or other use by erecting barricades and providing signage as required or as directed by the Contracting Officer.

3.7 TURF ESTABLISHMENT PERIOD

3.7.1 Length of Period

On completion of the last day of the turfing operation, the Turf Establishment Period will begin. Establishment period shall extend for 12 months after completion of the seeding on the entire project, unless desired growth is established, and shortening the period of the Contractor's responsibility for acceptably established areas is authorized by the Contracting Officer.

3.7.2 Stand of Turf

A stand of turf from the turf grass seeding operation is defined as a uniform stand of grass that is at least 2 inches tall with a minimum of 100 grass plants per square foot and reasonably free of weeds and visual imperfections as assessed by the Contracting Officer.

3.7.3 Maintenance During Establishment Period

3.7.3.1 Mulched Areas

Mulched areas shall be maintained until all work or designated portions thereof have been completed and accepted. Any damage shall be repaired, and mulch material that has been removed by wind or other causes shall be replaced and secured. Maintenance shall include protecting embankments and ditches from erosion and maintaining erosion control material.

3.7.3.2 Seeded Areas

The Contractor shall be responsible for the proper care of seeded areas during the period of establishment or until the project is accepted, whichever requires the longer period of maintenance.

3.7.3.3 Turf Grass Mowing Maintenance

All seeded areas shall be mowed prior to inspection for acceptance in order to improve visibility and to facilitate the evaluation of the seeding work. Clippings shall be removed when the amount of cut turf is heavy enough to damage turfed areas. Other mowing shall be done as needed to maintain lawn areas at a height of 2 inches until Final Acceptance. The first mowing shall not be performed until there is enough growth to cut. Not more than 1/3 of the grass blade shall be removed during initial or subsequent cuttings. Mowing equipment shall be power drawn rotary type in good operating condition, well adjusted and with sharp blades.

3.7.3.4 Watering

Watering of seeded areas shall be at intervals to obtain a moist soil condition to a minimum depth of 2 inches. Frequency of watering and quantity of water shall be adjusted in accordance with the growth of the turf. Runoff, puddling and wilting shall be prevented.

3.7.3.5 Post-Seeding Fertilization

Fertilizer shall be applied to seeded areas if deemed necessary by the Contracting Officer prior to final acceptance. The Contracting Officer shall base the need for post-seeding fertilizer on poor turf stand establishment during turf establishment period and subsequent soil tests. The application shall be timed prior to the advent of winter dormancy and shall avoid excessively high nitrogen levels.

3.7.3.6 Erosion Control

The Contractor shall control erosion during the maintenance period by using ditch checks, sod swales, silt fences or other methods until a proper stand of turf is established.

3.7.3.7 Repair

If any portion of the surface becomes rilled, gullied, damaged, or destroyed, that portion shall be repaired to re-establish the area without additional cost to the government.

3.8 QUALITY CONTROL

The Contractor shall establish and maintain a quality control system for the work under this section, in accordance with SECTION 01451, CONTRACTOR QUALITY CONTROL, including but not limited to the following:

A. Materials:

(a) Fertilizer
(b) Seed
(c) Mulch

B. Seeding, and Mulching

C. Maintenance and Turf Establishment
D. Repair of Damaged Areas
E. Soil Erosion Control

A copy of the records of inspections and tests, as well as the records of corrective action taken, shall be furnished the Government as directed by the Contracting Officer.

-- End of Section --

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DIVISION 02 - SITE CONSTRUCTION

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SECTION 02931

TREE PROTECTION

PART 1 GENERAL

1.1 SCOPE

The work covered in this section shall consist of furnishing all labor, equipment and materials to protect trees from damage throughout the duration of the Contract. Protecting existing trees as indicated on drawings within and adjacent to the work site is a requirement of this Contract. The Contractor shall be responsible for installation, maintainance of the tree protection throughout the entire duration of the Contract and removal at the end of the Contract. Any trees damaged as a result of the Contractor's activities shall be replaced in kind at no additional cost to the Government, and a fine shall be levied on the Contractor in accordance with these plans and specifications.

1.2 REFERENCES

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

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A300	Tree Care Operations - Tree, Shrub and Other Woody Plant Maintenance - Standard Practices
ANSI Z133	Tree Care Operations - Pruning, Trimming, Repairing, Maintaining, and Removing Trees, and Cutting Brush - Safety Requirements

1.3 DEFINITIONS

1.3.1 Tree Protection Zone

The tree protection zone is the area around designated trees that shall be protected from construction activity. The tree protection zone is the area identified within the drip line of the tree except larger tree protection zones around one or more trees as defined in the field by the COR shall be used.

1.3.2 Drip Line

"Drip Line" is a term given to the area under a tree, shrub or plant where it sheds rain or irrigation water.

1.3.3 Certified Arborist

Certified Arborist shall be an individual certified as an Arborist by the International Society of Arborculture. The certified Arborist shall be available on site when needed to perform all the duties specified herein

throughout the duration of the contract.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only or as otherwise designated. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with SECTION 01330 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Tree Protection Plan; G,CN

The Contractor shall submit for approval a Tree Protection Plan that details the proposed materials, means and methods for installing and maintaining tree protection throughout the duration of the Contract. The tree protection plan shall also include a site plan showing all proposed access and haul routes, storage areas, and tree protection zones.

SD-07 Certificates

Arborist's Qualifications;

The Contractor shall submit the qualifications of the proposed certified arborist, who shall perform all tree removal and tree and root pruning within the tree protection zones

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Fence Posts

Steel T-post shall be used for all tree protection and other plant and landscape protection. Steel T-post shall be placed at a distance no greater than 8 feet on center.

2.1.2 Fence Fabric

Fence fabric shall be 4-foot high wooden snow fencing.

PART 3 EXECUTION

3.1 SITE INSPECTION

The following work must be completed before any on-site material storage, equipment mobilization, erection of temporary field offices, utility relocation, demolition and site clearing, or other construction activities occur. If the work is shown on the plans to proceed in phases requiring different work limits, the inspection described below shall be repeated as required for each of the subsequent work areas.

Upon approval of the submitted Tree Protection Plan, the Contractor (and the approved certified arborist), the COR and the Cook County Forest Preserve Forester shall conduct a site inspection prior to any work beginning on the site. During the site inspection the following activities

shall be carried out:

a) Locate and identify in the field those trees marked on the plans or recommended by the certified arborist to be removed, transplanted, pruned or root pruned.

b) Review all work procedures, access routes, storage areas and tree protection measures.

c) Locate in the field and stake out the proposed limit of all tree protection zones.

3.2 PROHIBITED ACTIVITIES

Certain activities that may cause damage to trees are strictly prohibited throughout the entire duration of the Contract. The Contractor shall be responsible for ensuring that:

a) Construction trailers and field offices are not located within the tree protection zones;

b) Materials are not stored within the tree protection zones;

c) Vehicles, including construction equipment and personnel vehicles do not travel through the tree protection zones and are not parked within the tree protection zones;

d) Spoil, waste, ashes, garbage, debris and/or waste or washout water are not deposited, dumped or buried, either temporarily or permanently, within the tree protection zones;

e) No burn piles or debris pits are placed within the tree protection zones; and

f) No grading changes occur within the tree protection zones.

3.3 TREE PROTECTION

3.3.1 Tree Protection Fencing

Fences shall be erected to define a specific tree protection zone for each tree or group of trees according to the lines staked during the site inspection. Fence posts shall be installed to the minimum depth necessary for stability of the fence. Special care shall be taken where installing fence posts in areas where tree roots may exist. The fences shall remain in place until all site work has been completed and approved by the COR.

Fences must not be relocated or removed without the written authorization of the COR, and the Cook County Forest Preserve Forester shall be present on site to assist in selecting the new location.

3.3.2 Tree Protection Maintenance

The Contractor shall monitor the condition of the tree protection fencing on a regular basis, and repair all damaged or missing portions of the fences immediately. The Contractor shall allow the Cook County Forest Preserve Forester access to the work site to inspect the tree protection measures upon request. The Contractor shall mow within tree protection area

as a part of the tree protection maintenance to keep vegetation to 8" or less throughout this contract.

3.3.3 Work within Tree Protection Zone

The Contractor shall not perform any work in any of the tree protection zones except as authorized in writing and directed by the COR. Work includes, but is not limited to, removal of existing material, limited grading and excavation, placing satisfactory materials, topsoil and turf, and pruning of trees. The COR and the Cook County Forest Preserve Forester shall be notified at least twenty-four hours prior to initiating any work within the tree protection zone in order to schedule their presence. Prior to opening of the site to the public, the contractor shall mow within the tree protection zones as part of the turf grass mowing as describe in section 02920 SEEDING.

3.3.3.1 Removal

Structures and underground features to be removed within the tree protection zone shall use the smallest equipment possible and operate from outside the tree protection zone. The Contracting Officer's Representative and the Cook County Forest Preserve Forester shall be on site during all operations within the tree protection zones to monitor demolition activity.

3.3.3.2 Earthwork and Excavation

Grading, excavation, placement of satisfactory material, topsoil and turf, or construction or other work that is expected to encounter tree roots must be monitored by the COR, and the Cook County Forest Preserve Forester must be informed of all such work so that he can be present.

Before grading, pad preparation, or excavation for foundations, footings, walls or trenching, trees shall be root pruned one foot outside the tree protection zones by cutting all roots cleanly to a depth of twenty-four inches. Roots shall be cut by manually digging a trench and cutting exposed roots with a saw, vibrating knife, rock saw, narrow trencher with sharp blades, or other root-pruning equipment approved by the District Forester.

Any roots damaged during grading or construction shall be exposed to sound tissue and cut cleanly with a saw.

3.3.3.3 Pruning

All pruning shall be carried out by a qualified landscape contractor under the supervision of a certified arborist, in accordance with ISA tree pruning guidelines and/or the American National Standard for Tree Care Operations (ANSI) A300 Pruning Standard and adhere to the most recent edition of ANSI Z133.1.

Trees shall be trimmed where needed, or as directed by the COR, to maintain a vertical clearance as determined by the Cook County Forest Preserve District. All tree trimming shall be carried out and/or supervised by a certified arborist, in accordance with ANSI A300 and ANSI Z133. The Contractor shall not trim any other trees without the express written authorization of the COR and Cook County Forest Preserve. Any tree limbs damaged during construction activity shall be repaired as described above and in accordance with paragraph Tree Protection Deficiencies.

Where indicated by Certified Arborist and agreed upon by the COR and Cook County Forest Preserve Forester, prune and root prune trees to offset damage caused to trees by construction.

All pruning cuts are to be made with clean, sharp instruments. Do not break or chop.

Where temporary clearance is needed for access, branches shall be tied back to hold them back out of the clearance zone. Interior branches shall not be stripped out. Pruning cuts larger than 4 inches in diameter, except for dead wood, shall be avoided. Pruning cuts that expose heartwood shall be avoided whenever possible. No more than 20 percent of the foliage shall be removed within the trees. Brush shall be chipped and the chips shall be spread underneath trees within the tree protection zones to a maximum depth of six inches, leaving the trunk clear of mulch. All additional tree pruning, authorized by the COR in writing, required for clearance during construction shall be performed by a qualified landscape contractor under the supervision of a certified arborist, and not by construction personnel.

Where necessary for grading, or excavation for foundations or sub-base preparation, trees shall be root pruned prior to grading and excavation activities. All root pruning shall be performed or supervised by a certified arborist and in accordance with ANSI A300 and ANSI Z133. The Contractor shall not prune any roots within the tree dripline without approval from the COR and Cook County Forest Preserve Forester. Any roots exposed or damaged during grading or other construction activity shall be exposed to sound tissue and pruned as described above.

3.3.3.4 Mowing

The Contractor will be responsible for no more than 6 mowings and weedings within the tree protection fencing per calendar year. The contractor shall be notified by the representative of the Cook County Forest Preserve as to when the area will need to be mowed, and should execute the request within five (5) working days. The Contractor may also request permission from the Cook County Forest Preserve representative to mow and weed if deemed necessary due to work conditions

3.3.3.5 Utilities

All underground utilities and drain or irrigation lines shall be routed outside the tree protection zone. If lines must traverse the tree protection area, they shall be tunneled or bored under the tree(s).

3.3.3.6 Foliage Protection

Clean tree foliage by spraying with water to remove dust accumulated due to construction or demolition activities, as directed by the COR

3.3.3.7 Access for Cook County Forest Preserve District Staff

Contractor shall allow Cook County Forest Preserve District staff to have access to all tree protection zones to perform park maintenance activities.

3.3.4 Tree Protection Deficiencies

Any damage to trees arising due to the Contractor's activities shall be reported to the COR within six hours so that remedial action can be taken. Timeliness is critical to tree health. All trees scheduled to remain and

subsequently damaged by the contractor shall be repaired in a manner acceptable to the COR and the Cook County Forest Preserve Forester at no additional cost to the Government.

The Contractor shall be liable for the cost of tree repair and/or replacement when the tree protection is breached. The value of the damaged tree shall be determined based on International Society of Arboriculture (ISA) Appraisal Guidelines

3.3.4.1 Identification of Deficiencies

The Contracting Officer will be the sole judge of whether or not an infraction of these specifications constitutes a Tree Protection Deficiency. When the Contracting Officer is notified or determines a deficiency exists, the Contractor will be notified. Tree Protection Deficiencies may include, but are not limited to:

a) Tree protection not in place at the start of construction;

b) Any portion of the tree protection fencing damaged or down;

c) Unauthorized removal of tree protection fencing;

d) Contractor's vehicles or equipment or personal vehicles parking under trees;

e) Any encroachment of the tree protection fencing within the drip lines of the protected trees;

f) Damage to any tree; and

g) Unauthorized removal or pruning of trees.

3.3.4.2 Correction of Deficiencies

The Contractor must dispatch sufficient resources within 2 hours of notification to make needed corrections of deficiencies. This time period will begin with the time of notification to the Contractor and end with the COR's acceptance of the corrections. The damaged trunks, limbs, and roots of the trees shall be treated according to the written instructions of a certified arborist. A report of repairs shall be submitted to the COR. In the event that a tree is damaged by the Contractor's operation or personnel, the Contractor is responsible for repair or remediation of the damage as determined by the COR. In the event that a tree is beyond repair and requires removal or the tree is mistakenly removed by the Contractor, the tree must be replaced on an inch by inch basis. The minimum size for replacement tree(s) shall be 3 inches DBH (Diameter Breast Height) and shall be of same kind.

If the contractor fails to restore the required tree protection within the time limits specified above, the Cook County Forest Preserve may impose a monetary fine of $500 for each incident, payable to the Cook County Forest Preserve. In addition, if the contractor fails to respond, the Government may correct the deficiencies and the cost thereof will be deducted from monies due or which may become due to the contractor. This corrective action will in no way relieve the contractor of his/her contractual requirements or responsibilities.

3.4 TREE REMOVAL

Only those trees indicated on the plans, or subsequently authorized in writing by the Contracting Officer, shall be removed.

3.4.1 Tree Removal

The contractor shall perform a joint field investigation with the Contracting Officer's Representative and the Cook County Forest Preserve Forester to field verify the trees scheduled for removal.

Trees to be removed from tree protection zones or trees to be removed that have branches extending into the canopy of tree(s) to remain, must be removed by a qualified landscape contractor under the supervision of a certified arborist and not by a demolition or construction contractor. The landscape contractor shall remove the tree(s) in a manner that causes no damage to the tree(s) and understory to remain. The trees shall be cut near ground level and the stump ground out to a clear depth of eighteen inches below grade.

Any brush clearing within the tree protection zones shall be accomplished with hand-operated equipment. Trees to be removed shall be felled so as to fall away from tree protection zones and to avoid pulling and breaking of roots or trees to remain. If roots are entwined, the Contracting Officer may require that the Contractor first sever the major woody root mass before extracting the trees. Such work shall be accomplished by cutting through the roots by hand, with a vibrating knife, rock saw, narrow trencher with sharp blades, or other root-pruning equipment approved by the Contracting Officer.

All downed brush and trees shall be removed from the tree protection zone either by hand or with equipment sitting outside the tree protection zone. Extraction shall occur by lifting the material out, not by skidding it across the ground. Excavation from tree removal shall be backfilled with satisfactory material and compacted to adjacent material density. Surface shall match existing material in kind and thickness, as approved.

3.5 USE OF HERBICIDES AND PESTICIDES

The use of any herbicide and/or pesticide shall be permitted only after approval of the COR and the Cook County Forest Preserve Forester. Any herbicides placed under paving materials must be safe for use around trees and labeled for that use. Any pesticides used on-site must be tree safe and not easily transported by water.

3.6 HAUL OR ACCESS ROADS

If temporary haul or access roads must pass over the root area of trees to be retained, a road bed of gravel with a minimum depth of six inches shall be created. The road bed material shall be replenished as necessary to maintain the six inch depth.

3.7 DISPOSAL OF WASTE MATERIALS

Excess excavated material, removed trees or limbs and chips shall not be burned, but shall be removed from City of Prospect Heights and Cook County Forest Preserve property and disposed of in accordance with City of Prospect Heights and Cook County Forest Preserve requirements. Also refer to Section 01355 ENVIRONMENTAL PROTECTION for disposal requirements.

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SECTION 02938

STONE PATHWAYS

PART 1 GENERAL

1.1 SCOPE

The work covered by this section includes the preparation of areas to receive new stone pathways, as shown on the drawings, constructing pathway and removal and disposal of all debris.

1.2 REFERENCES

The following publications of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by reference thereto:

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 127	(1988, R1993) Standard Test Method for Specific Gravity and Absorption of Coarse Aggregate

ILLINOIS DEPARTMENT OF TRANSPORTATION (IDOT)

IDOT	(2007) Standard Specifications for Road and Bridge Construction; and current Supplemental Specifications and Recurring Special Provisions

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only or as otherwise designated. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with SECTION 01330 SUBMITTAL PROCEDURES:

SD-03 Product Data

Test Report; G,CN

At least 30 calendar days in advance of shipment of stone to the work site, submit a copy of bulk specific gravity (ASTM C 127) test results for each gradation range of stone proposed to be furnished. The information shall be furnished prior to preparation of pre-production demonstration stockpiles.

SD-04 Samples

Sampling; G,CN

Submit a 100 pound bagged sample to the Contracting Officer's Representative for approval prior to delivery of material to the

work site.

SD-07 Certificates

Geotextile; G,CN

PART 2 PRODUCT

2.1 MATERIAL

2.1.1 Gradation

Stone material shall be from a sand/gravel source. Gradation shall be IDOT CA-6 meeting the gradation limits below and as stated in IDOT Article 1004.01.

2.1.2 Dimension

Paths shall consist of 6 inches of hard tamped and rolled stone on compacted subgrade.

2.1.3 Selecting a Source

Before selecting a source, the Contractor shall be reasonably certain that the source is capable of meeting the quality requirements specified in IDOT Article 1004.01.

2.1.4 Geotextile

Refer to section 02373 GEOTEXTILES USED AS FILTERS AND UNDERLAYS for requirements.

PART 3 EXECUTION

3.1 LOCATION

The pathway shall be placed at locations as shown on the drawings and subjected to the approval of the Contracting Officer's Representative.

3.2 EXCAVATION

Excavations shall be to the dimensions and depths indicated for the completion of the work. Excavations carried below the depths indicated without specific directions, shall be refilled to the proper grade with thoroughly compacted suitable excavated earth, and all additional work of this nature shall be at the Contractor's expense.

3.3 PLACEMENT

The Contractor shall place a minimum of 6 inches of CA-6 material over the geotextile in one lift and shall be compacted in accordance with paragraph "Compaction".

3.3.1 Compaction

After the stone has been placed and spread to the thickness specified, the entire surface of the stone layer shall be compacted with not less than four (4) complete passes of the vibratory roller as specified in the paragraph "Vibratory Rollers". A complete compaction coverage shall

consist of the entire coverage of the area with one trip of the equipment specified. If in the opinion of the Contracting Officer's Representative, the desired compaction of any portion of the stone is not secured by the minimum number of coverages specified, additional complete coverages shall be made over the surface area until the desired compaction has been obtained.

a. Vibratory Rollers. Vibratory rollers for compacting stone shall be equipped with a smooth steel compaction drum and shall be operated at a frequency of vibration during compaction operations between 1100 and 1500 vpm. Vibratory rollers may be either towed or self propelled and shall have an unsprung drum weight that is a minimum of sixty (60) percent of the rollers' static weight. Towed rollers shall have at least ninety (90) percent of their weight transmitted to the ground through the compaction drum when the roller is standing in a level position hitched to the towing vehicle. Rollers for compacting stone shall have a minimum static weight of 8,000 pounds, a minimum dynamic force of 16,000 pounds when operating at 1400 vpm, and an applied force not less than 5,000 pounds nor greater than 9,000 pounds per foot of compaction drum length. The level of amplitude and vibration frequency during compaction will be maintained uniform throughout the structure zone within which it is operating. Rollers shall be operated at speeds not to exceed 1.5 mph. Vibratory rollers and other heavy equipment shall not be used within three (3) feet vertically or horizontally of piles or sheet piles. The equipment manufacture shall furnish sufficient data, drawings, and computation for verification of the above specifications, and the character and efficiency of this equipment shall be subject to approval.

b. Power Tampers. Compaction of material, in areas where it is impracticable to use a roller or tractor shall be performed by the use of approved power tampers.

3.4 DAMAGE TO ADJACENT AREAS

Care shall be taken not to damage adjacent areas. All damage to adjacent areas resulting from the Contractor's operations shall be repaired as directed by and to the satisfaction of the Contracting Officer's Representative at the Contractor's expense, whether any of the above are shown or are not shown on the drawings.

3.5 RESTORATION

Restoration of damaged areas due to placement of the pathway shall be restored to the standards described in Section 02920 SEEDING.

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03250

CONCRETE ANCHORS AND DOWELS

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03250

CONCRETE ANCHORS AND DOWELS

PART 1 GENERAL

1.1 GENERAL

This section covers the anchors and dowels employed for anchoring new concrete to existing concrete.

1.2 MEASUREMENT AND PAYMENT

Measurement and payment shall be in accordance with Section 01270, MEASUREMENT AND PAYMENT.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-03 Product Data

Grout

Manufacturer material specifications, installation instructions, and data sheets on selected grout.

SD-06 Test Reports

MANUFACTURER PULL-TEST DATA FOR ANCHORS; G, TS-D

Submit manufactuer data demonstrating proposed grout and proposed embedded lengths can develop the strength of the embedded bar for the concrete strength and dowel configuration specified.

PART 2 PRODUCTS

2.1 GROUT

Grout for dowels can be either polyester resin cartridges or non-shrink cementitious grout. Selected grout and embedded length shall be capable of developing the strength of the anchor in tension.

2.1.1 Polyester resin cartridges

If polyester resin cartridges are used, the cartridges shall have a casing of an unsaturated polyester providing an optimum resistance to moisture, with a relatively high frangibility for complete mixing during installation. The cartridges shall contain two distinct fractions of unsaturated polyester resin and catalyst without an intervening mechanical membrane to assure proper mixing. The resin shall be a high strength

polyester, highly filled with nonreactive inorganic aggregate of suitable mesh size. The catalyst shall contain peroxide, highly filled with a nonreactive inorganic filler. The compressive strength of the mixed and cured resin shall be a minimum of 10,000 p.s.i. Gel and cure times of cartridges shall be as specified by the manufacturer and as approved by the Contracting Officer. The material shall be thixotropic and of such viscosity that the anchor can adequately mix the material. All cartridges shall be inspected prior to insertion to see that the polyester resin components have not hardened and to see that they meet the above requirements. Cartridges that are older than six months shall not be used.

2.2 ANCHORS

All anchors shall be ASTM A615 Gr. 60 of the sizes indicated on the drawings.

PART 3 EXECUTION

3.1 INSTALLATION OF GROUT

Installation procedures shall be as recommended by the grout manufacturer and as specified hereinafter. Manufacturer's recommendations shall be in writing and will be submitted to the Contracting Officer for approval prior to installation of the anchors. The holes shall be drilled to the depth required to develop the stregth of the anchor for the selected grout. The holes shall be thoroughly washed prior to the insertion of cartridges. The diameter of the hole and hole preparation shall be in accordance with the recommendations of the manufacturer to develop the strength of the bar.

3.2 INSTALLATION OF RESIN GROUT AND CARTRIDGES

For the anchor portion in existing concrete, high viscosity, 3-minute set, cartridges shall be used (when applicable). Cartridges used shall be as recommended by the manufacturer, and as approved by the Contracting Officer, and shall be inserted and carefully pushed into the hole. Care shall be taken not to puncture the cartridges. Anchor rods shall be inserted into the cartridge filled hole and rotated at a speed of 120-160 revolutions per minute for a period of about 10 seconds. Before and during rotation, the anchor rod shall be fully inserted into the hole. After rotation is complete, the anchor shall be held in still position for a period of 50 seconds, or until the resin in existing concrete sets up. Then the drill or other rotating tool may be removed.

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SECTION 03300

CONCRETE

PART 1 GENERAL

1.1 REFERENCES

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

ACI INTERNATIONAL (ACI)

ACI 318/318R	(2005) Building Code Requirements for Structural Concrete and Commentary
ACI 347R	(1994; R 1999) Guide to Formwork for Concrete

APA - THE ENGINEERED WOOD ASSOCIATION (APA)

APA PS 1	(1995) Voluntary Product Standard for Construction and Industrial Plywood

ASTM INTERNATIONAL (ASTM)

ASTM A 185/A 185M	(2006; E 2006) Steel Welded Wire Reinforcement, Plain, for Concrete
ASTM A 615/A 615M	(2006a) Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement
ASTM C 143/C 143M	(2005a) Slump of Hydraulic Cement Concrete
ASTM C 150	(2005) Portland Cement
ASTM C 171	(2003) Standard Specification for Sheet Materials for Curing Concrete
ASTM C 172	(2004) Sampling Freshly Mixed Concrete
ASTM C 231	(2004) Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C 260	(2006) Standard Specification for Air-Entraining Admixtures for Concrete
ASTM C 309	(2003) Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C 31/C 31M	(2003a) Standard Practice for Making and Curing Concrete Test Specimens in the Field

ASTM C 33	(2003) Concrete Aggregates
ASTM C 39/C 39M	(2004) Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C 494/C 494M	(2005) Standard Specification for Chemical Admixtures for Concrete
ASTM C 618	(2005) Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete
ASTM C 685/C 685M	(2001) Concrete Made by Volumetric Batching and Continuous Mixing
ASTM C 78	(2002) Standard Test Method for Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading)
ASTM C 920	(1998) Elastomeric Joint Sealants
ASTM C 94/C 94M	(2004a) Standard Specification for Ready-Mixed Concrete
ASTM D 98	(2005) Calcium Chloride
ASTM E 96	(2005) Standard Test Methods for Water Vapor Transmission of Materials

CONCRETE REINFORCING STEEL INSTITUTE (CRSI)

CRSI 1 MSP	(2001e27) Manual of Standard Practice

INDIANA DEPARTMENT OF TRANSPORTATION (INDOT)

INDOT	Indiana Department of Highways Standard Specifications (1999) and Current Supplemental Specifications

U.S. ARMY CORPS OF ENGINEERS (USACE)

COE CRD-C 400	(1963) Requirements for Water for Use in Mixing or Curing Concrete
COE CRD-C 513	(1974) Specifications for Rubber Waterstops
COE CRD-C 572	(1974) Specifications for Polyvinylchloride Waterstops

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Reinforcing Steel; G, DT

Detail concrete reinforcement system drawings showing reinforcing steel schedules, sizes, grades, and splicing and bending details. Drawings shall show support details including types, sizes and spacing

SD-03 Product Data

Air-Entraining Admixture
Accelerating Admixture
Water-Reducing or Retarding Admixture
Curing Materials
Reinforcing Steel; G, DT
Formliners; G, DT
Waterstops

Manufacturer's literature is available from suppliers which demonstrates compliance with applicable specifications for the above materials.

On-Site Batching and Mixing Equipment; G, C

On-site batching and mixing equipment will be accepted on the basis of manufacturer's data which demonstrates compliance with the applicable specifications.

SD-06 Test Reports

Aggregates

Aggregates will be accepted on the basis of certificates of compliance and test reports that show the material(s) meets the quality and grading requirements of the specifications under which it is furnished.

Concrete Mixture Proportions; G, DT

Ten days prior to placement of concrete, the contractor shall submit the mixture proportions that will produce concrete of the quality required. Applicable test reports shall be submitted to verify that the concrete mixture proportions selected will produce concrete of the quality specified.

Mock Up Report; G, DT

The contractor shall submit the report and test results from the Mock Up of joint sealants. Report to include complete installation procedures, material descriptions with applicable ASTM designations, and results of three successful adhesion tests performed on the mock up joints. The report shall include the joint sealant supplier's confirmation that the Contractor's procedures, the test results and final sealant meet the requirements for issuance of the 5 year warranty. .

SD-07 Certificates

Cementitious Materials

Certificates of compliance attesting that the concrete materials meet the requirements of the specifications shall be submitted in accordance with the Special Clause "CERTIFICATES OF COMPLIANCE". Cementitious material will be accepted on the basis of a manufacturer's certificate of compliance, accompanied by mill test reports that the material(s) meet the requirements of the specification under which it is furnished.

Aggregates

Aggregates will be accepted on the basis of certificates of compliance and tests reports that show the material(s) meet the quality and grading requirements of the specifications under which it is furnished.

Reinforcing Steel; G, DT

Certified copies of mill reports attesting that the reinforcing steel furnished meets the requirements specified, prior to the installation of reinforcing steel.

SD-11 Closeout Submittals

Warranties; G, DT

At the completion of the project, Contractor shall provide signed copies of a 5-year warranty for the Joint Sealant. The Contractor shall provide a warranty for the joint sealant system for a period of 5 years to include material defects, sealant delamination or debonding from the concrete, and cohesive failure of the joint sealant itself. Cohesive failure occurs when the bond strength of the adhesive/sealant to the substrate or substrates is greater than the internal strength of the adhesive/sealant. Such an occurrence results in the loss of the material's ability to bond itself evidenced by the sealant/adhesive splitting or tearing apart from itself while keeping its bond to the substrate or substrates. The warranty shall start upon final acceptance of the work or the date the Government takes possession, whichever is earlier.

1.3 DESIGN AND PERFORMANCE REQUIREMENTS

1.3.1 Strength

Evaluation of Concrete Compressive Strength. Compressive strength specimens (6 by 12 inch cylinders) shall be fabricated by the Contractor and laboratory cured in accordance with ASTM C 31/C 31M and tested in accordance with ASTM C 78. The strength of the concrete will be considered satisfactory so long as the average of all sets of three consecutive test results equals or exceeds the specified compressive strength f'c and no individual test result falls below the specified strength f'c by more than 500 psi. A "test" is defined as the average of two companion cylinders, or if only one cylinder is tested, the results of the single cylinder test. Additional analysis or testing, including taking cores and/or load tests may be required at the Contractor's expense when the strength of the concrete in the structure is considered potentially deficient.

1.3.2 Concrete Mixture Proportions

Concrete mixture proportions shall be the responsibility of the Contractor. Mixture proportions shall include the dry weights of cementitious material(s); the nominal maximum size of the coarse aggregate; the specific gravities, absorptions, and saturated surface-dry weights of fine and coarse aggregates; the quantities, types, and names of admixtures; and quantity of water per cubic yard of concrete. All materials included in the mixture proportions shall be of the same type and from the same source as will be used on the project. Specified compressive strength f'c shall be 4,000 psi at 28 days (90 days if pozzolan is used). The maximum nominal size coarse aggregate shall be 3/4 inch, in accordance with ACI 318/318R. The air content shall be between 4 and 7 percent. The slump shall be between 2 and 5 inches. The maximum water cement ratio shall be 0.45.

1.5 QUALIFICATIONS

Joint Sealant Installer Qualifications: Contractor shall be qualified in the field of concrete joint sealant installation with a successful track record of 5 years or more. Contractor shall maintain qualified personnel who have received product training by a manufacturer's representative.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Cementitious Materials

Cementitious materials shall conform to the appropriate specifications listed:

2.1.1.1 Portland Cement

ASTM C 150, Type I or II.

2.1.1.2 Pozzolan

Pozzolan shall conform to ASTM C 618, Class F.

2.1.2 Aggregates

Aggregates shall meet the quality and grading requirements of ASTM C 33 Class Designations 4M or better.

2.1.3 Admixtures

Admixtures to be used, when required or approved, shall comply with the appropriate specification listed. Chemical admixtures that have been in storage at the project site for longer than 6 months or that have been subjected to freezing shall be retested at the expense of the contractor at the request of the Contracting Officer and shall be rejected if test results are not satisfactory.

2.1.3.1 Air-Entraining Admixture

Air-entraining admixture shall meet the requirements of ASTM C 260.

2.1.3.2 Accelerating Admixture

Calcium chloride shall meet the requirements of ASTM D 98. Other accelerators shall meet the requirements of ASTM C 494/C 494M, Type C or E.

2.1.3.3 Water-Reducing or Retarding Admixture

Water-reducing or retarding admixture shall meet the requirements of ASTM C 494/C 494M, Type A, B, or D. High-range water reducing admixture Type F may be used only when approved, approval being contingent upon particular placement requirements as described in the Contractor's Quality Control Plan.

2.1.4 Water

Water for mixing and curing shall be fresh, clean, potable, and free from injurious amounts of oil, acid, salt, or alkali, except that unpotable water may be used if it meets the requirements of COE CRD-C 400.

2.1.5 Reinforcing Steel

Reinforcing steel bar shall conform to the requirements of ASTM A 615/A 615M, Grade 60. Welded steel wire fabric shall conform to the requirements of ASTM A 185/A 185M. Details of reinforcement not shown shall be in accordance with ACI 318/318R, Chapters 7 and 12. Reinforcement and accessories shall be stored off the ground on platforms, skids, or other supports.

2.1.5.1 Wire Ties

Wire ties shall be 16 gauge or heavier black annealed steel wire.

2.1.5.2 Supports

Bar supports for formed surfaces shall be designed and fabricated in accordance with CRSI 1 MSP CRSI DA4 and shall be steel or pre-cast concrete blocks. Pre-cast concrete blocks shall be not less than 4 inches square when supporting reinforcement on ground. Pre-cast concrete block shall have compressive strength equal to that of the surrounding concrete. Where concrete formed surfaces will be exposed to weather or where surfaces are to be painted, steel supports within 1/2 inch of concrete surface shall be plastic protected or of stainless steel. Concrete supports used in concrete exposed to view shall have the same color and texture as the finish surface.

2.1.6 Waterstops

2.1.6.1 Polyvinylchloride Waterstops

Rubber waterstops shall conform to COE CRD-C 513. Polyvinylchloride waterstops shall conform to COE CRD-C 572.

2.1.6.2 Hydrophilic Waterstops

Hydrophilic waterstops shall be composed of modified chlorprene rubber and expand up to 8 times its original volume when exposed to water. Hydrophilic waterstops shall be installed per the manufacturer's recommendations.

2.1.7 Joint Sealants

Joint sealant shall conform to ASTM C 920, Class 100/50. Joint sealants, joint fillers and accessory joint material are to be compatible with one another and with joint substrates under project conditions. Sealant material shall be suitable to the environmental project conditions to include; freeze-thaw action, wetting and drying, and submersion. Joint sealant color shall match the concrete structure. All joint sealants shall be selected per the manufacturer recommendations for vertical or horizontal applications as required. Backer rods or back up materials for joint sealants shall be compressible, nonbonding with the sealant, nonshrink, nonreactive with the sealant, and non absorptive material type.

2.1.7 Formwork, Forms, and Form Liners

The design and engineering of the formwork as well as its construction, shall be the responsibility of the Contractor. Formwork shall be designed in accordance with methodology of ACI 347R for anticipated loads, lateral pressures, and stresses. Forms and form liners shall be fabricated with facing materials that will produce a finish meeting the specified irregularities in formed surface requirements as defined in ACI 347R. Forms and form liners shall be fabricated with facing materials as specified below. Forms shall be capable of withstanding the pressures resulting from placement and vibration of concrete.

2.1.7.1 Forms for Class A finish

A Class A finish is required where indicated on the drawings. The form facing material shall be composed of new, well-matched tongue-and-groove lumber or new plywood panels conforming to APA PS 1, Grade B-B concrete form, Class I.

2.1.7.2 Forms for Class B finish

This class of finish shall apply to all surfaces except those specified to receive a Class A finish. The form facing material shall be composed of tongue-and-groove or shiplap lumber, plywood conforming to APA PS 1, Grade B-B concrete form, tempered concrete form hard board or steel. Steel lining on wood sheathing will not be permitted.

2.1.7.3 Forms for Class D finish

Forms for Class D finished surfaces, except where concrete is placed against earth, shall be wood or steel or other approved concrete form material.

2.1.7.4 Fractured Fin Finish Formliner

The Fractured Fin formliner shall be a multi-use product with a fin spacing of one and one half inch (1 1/2") and a relief range of one half to one inch (1/2" to 1"). The Fractured Fin finish shall be used where indicated on the drawings.

2.1.8 Form Coatings

Forms for exposed surfaces shall be coated with a nonstaining form oil, which shall be applied shortly before concrete is placed. Form coating agents shall be commercial formulations that will not bond with, stain or adversely affect concrete surfaces. Agents shall not impair subsequent treatment of concrete surfaces depending upon bond or adhesion nor impede the wetting of surfaces to be cured with water or curing compounds.

2.1.9 Vapor Barrier

Vapor barrier shall be polyethylene sheeting with a minimum thickness of 6 mils or other equivalent material having a vapor permeance rating not exceeding 0.5 perms as determined in accordance with ASTM E 96.

2.1.10 Curing Materials

Curing materials shall conform to the following requirements.

2.1.10.1 Impervious Sheet Materials

Impervious sheet materials, ASTM C 171, type optional, except polyethylene film, if used, shall be white opaque.

2.1.10.2 Membrane-Forming Curing Compound

ASTM C 309, Type 1-D or 2, Class A or B.

2.1.11 Flowable Fill

Flowable fill shall conform to INDOT standard specification section 213.

2.1.12 Anti-Graffiti Coating

The anti-graffiti coating shall be either a two or three coat polyurethane system. The anti-graffiti coating shall be non-sacrificial. The anti-graffiti coating shall provide a clear, satin or flat finish to the protected surface.

PART 3 EXECUTION

3.1 PREPARATION

3.1.1 General

Construction joints shall be prepared to expose coarse aggregate, and the surface shall be clean, damp, and free of laitance. Ramps and walkways, as necessary, shall be constructed to allow safe and expeditious access for concrete and workmen. Snow, ice, standing or flowing water, loose particles, debris, and foreign matter shall have been removed. Earth foundations shall be satisfactorily compacted. Spare vibrators shall be available. The entire preparation shall be accepted by the Government prior to placing.

3.1.2 Embedded Items

Reinforcement shall be secured in place; joints, anchors, and other embedded items shall have been positioned. Internal ties shall be arranged so that when the forms are removed the metal part of the tie will be not

less than 2 inches from concrete surfaces permanently exposed to view or exposed to water on the finished structures. Embedded items shall be free of oil and other foreign matters such as loose coatings or rust, paint, and scale. The embedding of wood in concrete will be permitted only when specifically authorized or directed. All equipment needed to place, consolidate, protect, and cure the concrete shall be at the placement site and in good operating condition.

3.1.2.1 Reinforcement Fabrication

Reinforcement shall be fabricated to shapes and dimensions shown on the drawings, and shall conform to the requirements of ACI 318. Reinforcement shall be cold bent unless otherwise authorized. Bending may be accomplished in the field or at the mill. Bars shall not be bent after embedment in concrete.

3.1.2.2 Reinforcement Placement

Reinforcement shall be free from loose rust and scale, dirt, oil, or other deleterious coating that could reduce bond with the concrete. Reinforcement shall be placed in accordance with ACI 318 at locations shown plus or minus one bar diameter. Reinforcement shall be continuous through construction joints. Concrete coverage shall be as indicated or as required by ACI 318. If bars are moved more than one bar diameter to avoid interference with other reinforcement, conduits or embedded items, the resulting arrangement of bars, including additional bars required to meet structural requirements, shall be approved before concrete is placed. Safety caps shall be placed on all exposed ends of vertical concrete reinforcement bars that pose a danger to life safety.

3.1.2.3 Concrete Cover and Clearance

Minimum concrete cover over steel reinforcement shall be as shown on the drawings. Reinforcement shall be placed such that waterstop shall have a minimum clearance of 1 inch or as shown on the drawings.

3.1.2.4 Splicing Reinforcement

Splices of reinforcement shall conform to ACI 318 and shall be made only as required or indicated on the drawings. Splicing shall be by lapping. Lapped bars shall be placed in contact and securely tied or spaced transversely apart to permit the embedment of the entire surface of each bar in concrete. Lapped bars shall not be spaced farther apart than one fifth the required length of lap or 6 inches.

3.1.3 Formwork Installation

Forms shall be properly aligned, adequately supported, and mortar-tight. The form surfaces shall be smooth and free from irregularities, dents, sags, or holes when used for permanently exposed faces. Where concrete surfaces are to have a Class A or Class B finish, joints in form panels shall be arranged as approved. Where forms for continuous surfaces are placed in successive units, the forms shall fit over the completed surface to obtain accurate alignment of the surface and to prevent leakage of mortar. Forms shall not be reused if there is any evidence of surface wear and tear or defects which would impair the quality of the surface. Surfaces of forms to be reused shall be cleaned of mortar from previous concreting and of all other foreign material before reuse. Form ties that are to be completely withdrawn shall be coated with a nonstaining bond

breaker.

3.1.3.1 Chamfering

Except as otherwise shown, all exposed external corners shall be chamfered.

3.1.3.2 Coating

Forms for Class A and Class B finished surfaces shall be coated with a form releasing agent before the form or reinforcement is placed in final position. The coating shall be used as recommended in the manufacturer's printed or written instructions. Forms for Class C and D finished surfaces may be wet with water in lieu of coating immediately before placing concrete, except that in cold weather with probable freezing temperatures, coating shall be mandatory. Surplus coating on form surfaces and coating on reinforcing steel and construction joints shall be removed before placing concrete.

3.1.3.3 Flood Wall Sample Concrete Panels

Prior to construction of structural formwork, a sample concrete panel, for each style of form liner used, shall be constructed on the project site where directed by the Contracting Officer's Representative. The sample panel shall not be built in or be part of the structure. The panel shall be not less than 8 feet long and 4 feet high and constructed of concrete conforming to the approved mix design. The panel shall be built in 2 sections complete with waterstop, expansion joint material, and joint sealant at the joint. The panel shall include one joint and the top portion of wall to display the formliner spacing and arrangement. The panel shall be of typical wall thickness for the construction represented. Forming, form liner, reinforcement, waterstop, expansion joint, joint sealant, anti-graffiti coating and construction method shall reflect the proposed method to be used for the wall or section represented. After removal of forms, tie rod and form tie holes shall be patched. Patching and repair work and final finish of the panel shall be indicative of that proposed for the project. The approved panel shall be used as a standard of workmanship required. If the panel is not approved, the Contractor shall construct additional panels until an acceptable panel is produced. Sample panel shall be protected from weather and construction operations and shall not be removed until concrete work for which it represents is complete.

3.1.4 Vapor Barrier Installation

Unless otherwise indicated, subgrades for slab shall be covered with a vapor barrier. Edges shall be lapped not less than 6 inches. All joints shall be sealed with pressure-sensitive adhesive not less than 2 inches wide. The vapor barrier shall be protected at all times to prevent injury or displacement prior to and during concrete placement.

3.1.5 Production of Concrete

3.1.5.1 Ready-Mixed Concrete

Ready-mixed concrete shall conform to ASTM C 94/C 94M except as otherwise specified.

3.1.5.2 Concrete Made by Volumetric Batching and Continuous Mixing

Concrete made by volumetric batching and continuous mixing shall conform to ASTM C 685/C 685M.

3.1.5.3 Batching and Mixing Equipment

The contractor shall have the option of using an on-site batching and mixing facility. The facility shall provide sufficient batching and mixing equipment capacity to prevent cold joints. The method of measuring materials, batching operation, and mixer shall be submitted for review.

3.1.6 Waterstops

Waterstops shall be installed as directed by the manufacturer. Waterstops shall be carefully and correctly positioned during installation to eliminate faulty installation that may result in joint leakage. All waterstops shall be installed so as to form a continuous watertight diaphragm in each joint. Adequate provision shall be made to support and protect the waterstops during the progress of work. Any waterstop punctured or damaged shall be replaced or repaired at the Contractor's expense. The concrete shall be thoroughly consolidated in the vicinity of the waterstop. Suitable guards shall be provided to protect exposed projecting edges and ends of partially embedded waterstops from damage when concrete placement has been discontinued. Waterstops shall not be spliced.

3.1.6.1 Joint Sealant Installation

Joints shall not be sealed when the sealant, air or concrete temperature is less than 40 degrees F. Immediately prior to installation of field molded sealants, the joint shall be cleaned of all debris and further cleaned using water, chemical solvents or other means as recommended by the sealant manufacturer. The joints shall be dry prior to filling with sealant. Bond breaker and back-up material shall be installed where required or recommended by sealant manufacturer, adhering strictly to the manufacturer installation requirements. Installation shall be under the sealant manufacturer supervision. Install sealants to uniform cross-sectional shapes with depths relative to joint widths that allow optimum sealant movement capability as recommended by sealant manufacturer.

3.1.6 Joint Sealant Mock Up

Prior to final joint sealant installation, the contractor shall install a total of three successful "Mock-Ups" for each type of sealant and substrate in the project. Each "Mock-Up" shall be a minimum of 6 ft long installed in accordance with manufacturer recommendations and can be installed in the final structure. Sealant will be allowed to fully cure and sealant manufacturer will perform adhesion tests on each mock up specimen to verify cohesive failure of the sealant. For each "Mock-Up", the Contractor shall demonstrate the installation steps and perform adhesion tests under the supervision of the sealant manufacturer. Complete results of the "Mock Ups" outlining installation procedures, materials, preparation, and results of the adhesion tests shall be furnished to the Government for review and approval prior to installation of the final joint sealant. The "Mock-Ups" may be incorporated in to the final structure providing the adhesion tests and installation procedures are approved. The Contractor shall not proceed with sealant installation until the supplier confirms in writing by transmittal the Contractor's procedures, the test results and any revisions

in selection of sealant or installations procedures for issuance of the 5 year warranty.

3.1.7 Anti-Graffiti Coating

The Anti-Graffiti coating shall be applied per the manufacture's specifications. The anti-graffiti coating shall be applied to all concrete I-wall surfaces and any vertical concrete surface with one (1) foot or more of exposure.

3.2 CONVEYING AND PLACING CONCRETE

Conveying and placing concrete shall conform to the following requirements.

3.2.1 General

Concrete placement shall not be permitted when weather conditions prevent proper placement and consolidation without approval. When concrete is mixed and/or transported by a truck mixer, the concrete shall be delivered to the site of the work and discharge shall be completed within 1-1/2 hours or 45 minutes when the placing temperature is 85 degrees F or greater unless a retarding admixture is used. Concrete shall be conveyed from the mixer to the forms as rapidly as practicable by methods which prevent segregation or loss of ingredients. Concrete shall be in place and consolidated within 15 minutes after discharge from the mixer. Concrete shall be deposited as close as possible to its final position in the forms and be so regulated that it may be effectively consolidated in horizontal layers 18 inches or less in thickness with a minimum of lateral movement. The placement shall be carried on at such a rate that the formation of cold joints will be prevented.

3.2.2 Consolidation

Each layer of concrete shall be consolidated by internal vibrating equipment. Internal vibration shall be systematically accomplished by inserting the vibrator through the fresh concrete in the layer below at a uniform spacing over the entire area of placement. The distance between insertions shall be approximately 1.5 times the radius of action of the vibrator and overlay the adjacent, just-vibrated area by a few inches. The vibrator shall penetrate rapidly to the bottom of the layer and at least 6 inches into the layer below, if such a layer exists. It shall be held stationary until the concrete is consolidated and then withdrawn slowly at the rate of about 3 inches per second.

3.2.3 Cold-Weather Requirements

Special protection measures, approved by the Contracting Officer, shall be used if freezing temperatures are anticipated before the expiration of the specified curing period. The ambient temperature of the air where concrete is to be placed and the temperature of surfaces to receive concrete shall be not less than 40 degrees F. The temperature of the concrete when placed shall be not less than 50 degrees F nor more than 75 degrees F. Heating of the mixing water or aggregates will be required to regulate the concrete placing temperature. Materials entering the mixer shall be free from ice, snow, or frozen lumps. Salt, chemicals or other materials shall not be incorporated in the concrete to prevent freezing. Upon written approval, calcium chloride or chemical admixture conforming to ASTM C 494 Type C or E may be used. The amount of calcium chloride shall not exceed 2 percent by

weight of the cement, and it shall be batched in solution form. Calcium chloride shall not be used where concrete will be in contact with aluminum or zinc-coated items, or where sulfate resistant or prestressed concrete is specified.

3.2.4 Hot-Weather Requirements

The temperature of the concrete placed during warm weather shall not exceed 85 degrees F except where an approved retarder is used. The mixing water and/or aggregates shall be cooled, if necessary, to maintain a satisfactory placing temperature. In no case shall the placing temperature exceed 90 degrees F.

3.3 FORM REMOVAL

Forms shall not be removed before the expiration of 24 hours after concrete placement except where otherwise specifically authorized. Supporting forms and shoring shall not be removed until the concrete has cured for at least 5 days. When conditions on the work are such as to justify the requirement, forms will be required to remain in place for longer periods.

3.4 FINISHING

3.4.1 General

No finishing or repair will be done when either the concrete or the ambient temperature is below 50 degrees F.

3.4.2 Finishing Formed Surfaces

All fins and loose materials shall be removed, and surface defects including tie holes shall be filled. All honeycomb areas and other defects shall be repaired. All unsound concrete shall be removed from areas to be repaired. Surface defects greater than 1/2 inch in diameter and holes left by removal of tie rods in all surfaces not to receive additional concrete shall be reamed or chipped and filled with dry-pack mortar. The prepared area shall be brush-coated with an approved epoxy resin or latex bonding compound or with a neat cement grout after dampening and filled with mortar or concrete. The cement used in mortar or concrete for repairs to all surfaces permanently exposed to view shall be a blend of portland cement and white cement so that the final color when cured will be the same as adjacent concrete.

3.4.2.1 Class B Finish

A class B finish shall be used on surfaces exposed to view in the final structure. Fins shall be removed. Concrete surface shall be smooth with a texture at least equal to that obtained through the use of Grade B-B plywood forms.

3.4.2.2 Class D Finish

A class D finish shall be used on all surfaces which in the final structure, will not be exposed to view. Fins exceeding 1/4 inch in height shall be chipped or rubbed off. Concrete surfaces shall be left with the texture imparted by the forms used.

3.4.3 Finishing Unformed Surfaces

All unformed surfaces that are not to be covered by additional concrete or backfill shall be float finished to elevations shown, unless otherwise specified. Surfaces to receive additional concrete or backfill shall be brought to the elevations shown and left as a true and regular surface. Exterior surfaces shall be sloped for drainage unless otherwise shown. Joints shall be carefully made with a jointing tool. Unformed surfaces shall be finished to a tolerance of 3/8 inch for a float finish as determined by a 10 foot straightedge placed on surfaces shown on the plans to be level or having a constant slope. Finishing shall not be performed while there is excess moisture or bleeding water on the surface. No water or cement shall be added to the surface during finishing.

3.4.3.1 Float Finish

Surfaces to be float finished shall be screeded and darbied or bullfloated to eliminate the ridges and to fill in the voids left by the screed. In addition, the darby or bullfloat shall fill all surface voids and only slightly embed the coarse aggregate below the surface of the fresh concrete. When the water sheen disappears and the concrete will support a person's weight without deep imprint, floating should be completed. Floating should embed large aggregates just beneath the surface, remove slight imperfections, humps, and voids to produce a plane surface, compact the concrete, and consolidate mortar at the surface.

3.4.3.2 Broom Finish

A broom finish shall be applied to all horizontal surfaces subject to foot traffic, including the tops of I walls and headwalls. The concrete shall be screeded and floated to required finish plane with no coarse aggregate visible. After surface moisture disappears, the surface shall be broomed or brushed with a broom or fiber bristle brush in a direction transverse to that of the main traffic or as directed.

3.5 CURING AND PROTECTION

Beginning immediately after placement and continuing for at least 7 days, all concrete shall be cured and protected from premature drying, extremes in temperature, rapid temperature change, freezing, mechanical damage, and exposure to rain or flowing water. All materials and equipment needed for adequate curing and protection shall be available and at the site of the placement prior to the start of concrete placement. Preservation of moisture for concrete surfaces not in contact with forms shall be accomplished by one of the following methods:

a. Continuous sprinkling or ponding.

b. Application of absorptive mats or fabrics kept continuously wet.

c. Application of sand kept continuously wet.

d. Application of impervious sheet material conforming to ASTM C 171.

e. Application of membrane-forming curing compound conforming to ASTM C 309, Type 1-D, on surfaces permanently exposed to view and Type 2 on other surfaces shall be accomplished in accordance with manufacturer's instructions.

The preservation of moisture for concrete surfaces placed against wooden forms shall be accomplished by keeping the forms continuously wet for 7 days . If forms are removed prior to end of the required curing period, other curing methods shall be used for the balance of the curing period. During the period of protection removal, the temperature of the air in contact with the concrete shall not be allowed to drop more than 25 degrees F within a 24 hour period.

3.6 REMOVAL OF FORMS

Forms shall be removed in a manner that will prevent injury to the concrete and ensure the complete safety of the structure. Formwork for walls, and other parts not supporting the weight of concrete may be removed when the concrete has attained sufficient strength to resist damage from the removal operation but not before at least 24 hours has elapsed since concrete placement. Supporting forms and shores shall not be removed from walls until the structural units are strong enough to carry their own weight and any other construction or natural loads. In no case will supporting forms or shores be removed before the concrete strength has reached 70 percent of design strengths as determined by field cured cylinders or other approved methods. This strength shall be demonstrated by job cured test specimens, and by a structural analysis considering the proposed loads in relation to these test strengths and the strength of forming and shoring system. The job cured test specimens for form removal purposes shall be provided in numbers as directed and shall be in addition to those required for concrete quality control. The specimens shall be removed from molds at the age of 24 hours and shall receive, insofar as possible, the same curing and protection as the structures they represent.

3.7 TESTS AND INSPECTIONS

3.7.1 General

The individuals who sample and test concrete as required in this specification shall have demonstrated a knowledge and ability to perform the necessary test procedures equivalent to the ACI minimum guidelines for certification of Concrete Field Testing Technicians, Grade I.

3.7.2 Inspection Details and Frequency of Testing

3.7.2.1 Preparations for Placing

Foundation or construction joints, forms, and embedded items shall be inspected in sufficient time prior to each concrete placement by the Contractor to certify that it is ready to receive concrete.

3.7.2.2 Air Content

The air content shall be checked along with each slump test performed or at the direction of the Contracting Officer. Samples shall be obtained in accordance with ASTM C 172 and tested in accordance with ASTM C 231.

3.7.2.3 Slump

A minimum of 2 slump tests shall be made on randomly selected batches of each mixture of concrete during each day's concrete placement or at the direction of Contracting Officer. Additional tests may be required if the results of the specified slump tests do not meet the requirements of this specification. Samples shall be obtained in accordance with ASTM C 172 and

tested in accordance with ASTM C 143/C 143M.

3.7.2.4 Cylinders

Cylinders for concrete strength tests shall be taken in accordance with ASTM C 31/C 31M and ASTM C 172. Cylinders shall be tested in accordance with ASTM C 39/C 39M. One set of cylinders shall be taken along with each slump test.

3.7.2.5 Consolidation and Protection

The Contractor shall ensure that the concrete is properly consolidated, finished, protected, and cured.

3.7.3 Action Required

3.7.3.1 Placing

The placing foreman shall not permit placing to begin until he has verified that an adequate number of acceptable vibrators, which are in working order and have competent operators, are available. Placing shall not be continued if any pile is inadequately consolidated.

3.7.3.2 Air Content

Whenever a test result is outside the specification limits, the concrete shall not be delivered to the forms and an adjustment shall be made to the dosage of the air-entrainment admixture.

3.7.3.3 Slump

Whenever a test result is outside the specification limits, the concrete shall not be delivered to the forms and an adjustment should be made in the batch weights of water and fine aggregate. The adjustments are to be made so that the water-cement ratio does not exceed that specified in the submitted concrete mixture proportion.

3.7.4 Reports

The results of all tests and inspections conducted at the project site shall be reported informally at the end of each shift and in writing weekly and shall be delivered within 3 days after the end of each weekly reporting period. See Section 01451 CONTRACTOR QUALITY CONTROL.

-- End of Section --

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SECTION 05055

METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS

PART 1 GENERAL

1.1 REFERENCES

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

ALUMINUM ASSOCIATION (AA)

AA ADM1	(2000) Aluminum Design Manual

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1/D1.1M	(2006; Errata 2006) Structural Welding Code - Steel
AWS D1.2	(2003) Structural Welding Code - Aluminum

ASME INTERNATIONAL (ASME)

ASME B4.1	(1967; R 1999) Preferred Limits and Fits for Cylindrical Parts
ASME BPVC SEC IX	(2001) Boiler and Pressure Vessel Code; Section IX, Welding and Brazing Qualifications

ASTM INTERNATIONAL (ASTM)

ASTM A 123/A 123M	(2002) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 325	(2002) Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
ASTM A 490	(2002) Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength
ASTM A 514/A 514M	(2000a) High-Yield-Strength, Quenched and Tempered Alloy Steel Plate, Suitable for Welding
ASTM A 780	(2001) Repair of Damaged and Uncoated Areas of Hot-Dipped Galvanized Coatings
ASTM D 962	(1981; R 2003) Aluminum Powder and Paste Pigments for Paints

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Detail Drawings; G, DT

Detail drawings for metalwork and machine work, prior to fabrication.

SD-03 Product Data

Welding of Structural Steel; G, DT

Schedules of welding procedures for steel structures, prior to commencing fabrication.

Welding of Aluminum; G, DT

Schedules of welding processes for aluminum fabrications, prior to commencing fabrication.

SD-06 Test Reports

Tests, Inspections, and Verifications

Certified test reports for materials with all materials delivered to the site.

SD-07 Certificates

Qualification of Welders and Welding Operators

Certifications for welders and welding operators prior to commencing fabrication.

Application Qualification for Steel Studs; G, DT

Certified reports for the application qualification for steel studs prior to commencing fabrication.

Welding of Aluminum; G, DT

Certified report for aluminum welding qualification tests prior to commencing welding.

1.3 DETAIL DRAWINGS

Detail drawings for metalwork and machine work shall include catalog cuts, templates, fabrication and assembly details and type, grade and class of material as appropriate. Elements of fabricated items inadvertently omitted on contract drawings shall be detailed by the fabricator and indicated on the detail drawings.

1.4 QUALIFICATION OF WELDERS AND WELDING OPERATORS

The Contractor shall certify that the qualification of welders and welding operators and tack welders who will perform structural steel welding have been qualified for the particular type of work to be done in accordance with the requirements of AWS D1.1/D1.1M, Section 5, or ASME BPVC SEC IX, Section IX, prior to commencing fabrication. The certificate shall list the qualified welders by name and shall specify the code and procedures under which qualified and the date of qualification. Prior qualification will be accepted if welders have performed satisfactory work under the code for which qualified within the preceding three months. The Contractor shall require welders to repeat the qualifying tests when their work indicates a reasonable doubt as to proficiency. Those passing the requalification tests will be recertified. Those not passing will be disqualified until passing. All expenses in connection with qualification and requalification shall be borne by the Contractor.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Materials Orders

The Contractor shall furnish copies of purchase orders, mill orders, shop orders and work orders for all materials orders and items used in the work. Where mill tests are required purchase orders shall contain the test site address and the name of the testing agency.

2.1.2 Materials List

The Contractor shall furnish a materials list of the materials to be used in the fabrication of each item.

2.2 FABRICATION

2.2.1 Structural Fabrication

Material must be straight before being laid off or worked. If straightening is necessary it shall be done by methods that will not impair the metal. Sharp kinks or bends shall be cause for rejection of the material. Material with welds will not be accepted except where welding is definitely specified, indicated or otherwise approved. Bends shall be made by approved dies, press brakes or bending rolls. Where heating is required, precautions shall be taken to avoid overheating the metal and it shall be allowed to cool in a manner that will not impair the original properties of the metal. Proposed flame cutting of material other than structural steel shall be subject to approval and shall be indicated on detail drawings. Shearing shall be accurate and all portions of the work shall be neatly finished. Corners shall be square and true unless otherwise shown. Re-entrant cuts shall be filleted to a minimum radius of 3/4 inch unless otherwise approved. Finished members shall be free of twists, bends and open joints. Bolts, nuts and screws shall be tight.

2.2.1.1 Dimensional Tolerances for Structural Work

Dimensions shall be measured by an approved calibrated steel tape of approximately the same temperature as the material being measured. The overall dimensions of an assembled structural unit shall be within the tolerances indicated on the drawings or as specified in the particular

section of these specifications for the item of work. Where tolerances are not specified in other sections of these specifications or shown, an allowable variation of 1/32 inch is permissible in the overall length of component members with both ends milled and component members without milled ends shall not deviate from the dimensions shown by not more than 1/16 inch for members 30 feet or less in length and by more than 1/8 inch for members over 30 feet in length.

2.2.1.2 Structural Steel Fabrication

Structural steel may be cut by mechanically guided or hand-guided torches, provided an accurate profile with a surface that is smooth and free from cracks and notches is obtained. Surfaces and edges to be welded shall be prepared in accordance with AWS D1.1/D1.1M, Subsection 3.2. Where structural steel is not to be welded, chipping or grinding will not be required except as necessary to remove slag and sharp edges of mechanically guided or hand-guided cuts not exposed to view. Hand-guided cuts which are to be exposed or visible shall be chipped, ground or machined to sound metal.

2.2.1.3 Structural Aluminum Fabrication

Laying out and cutting of aluminum shall be in accordance with the AA ADM1, Section 6.

2.2.2 Welding

2.2.2.1 Welding of Structural Steel

a. Welding Procedures for Structural Steel - Welding procedures for structural steel shall be prequalified as described in AWS D1.1/D1.1M, Subsection 5.1 or shall be qualified by tests as prescribed in AWS D1.1/D1.1M, Section 5. Properly documented evidence of compliance with all requirements of these specifications for previous qualification tests shall establish a welding procedure as prequalified. For welding procedures qualified by tests, the test welding and specimen testing must be witnessed and the test report document signed by the Contracting Officer. Approval of any welding procedure will not relieve the Contractor of the responsibility for producing a finished structure meeting all requirements of these specifications. The Contractor will be directed or authorized to make any changes in previously approved welding procedures that are deemed necessary or desirable by the Contractor Officer. The Contractor shall submit a complete schedule of welding procedures for each steel structure to be welded. The schedule shall conform to the requirements specified in the provisions AWS D1.1/D1.1M, Sections 2, 3, 4, 7 and 9 and applicable provisions of Section 10. The schedule shall provide detailed procedure specifications and tables or diagrams showing the procedures to be used for each required joint. Welding procedures must include filler metal, preheat, interpass temperature and stress-relief heat treatment requirements. Each welding procedure shall be clearly identified as being prequalified or required to be qualified by tests.

b. Welding Process - Welding of structural steel shall be by an electric arc welding process using a method which excludes the atmosphere from the molten metal and shall conform to the applicable provisions of AWS D1.1/D1.1M, Sections 1 thru 7, 9, 10 and 11. Welding shall be such as to minimize residual stresses, distortion and shrinkage.

c. Welding Technique

(1) Filler Metal - The electrode, electrode-flux combination and grade of weld metal shall conform to the appropriate AWS specification for the base metal and welding process being used or shall be as shown where a specific choice of AWS specification allowables is required. The AWS designation of the electrodes to be used shall be included in the schedule of welding procedures. Only low hydrogen electrodes shall be used for manual shielded metal-arc welding regardless of the thickness of the steel. A controlled temperature storage oven shall be used at the job site as prescribed by AWS D1.1/D1.1M, Subsection 4.5 to maintain low moisture of low hydrogen electrodes.

(2) Preheat and Interpass Temperature - Preheating shall be performed as required by AWS D1.1/D1.1M, Subsection 4.2 and 4.3 or as otherwise specified except that the temperature of the base metal shall be at least 70 degrees F. The weldments to be preheated shall be slowly and uniformly heated by approved means to the prescribed temperature, held at that temperature until the welding is completed and then permitted to cool slowly in still air.

(3) Stress-Relief Heat Treatment - Where stress relief heat treatment is specified or shown, it shall be in accordance with the requirements of AWS D1.1/D1.1M, Subsection 4.4 unless otherwise authorized or directed.

d. Workmanship - Workmanship for welding shall be in accordance with AWS D1.1/D1.1M, Section 3 and other applicable requirements of these specifications.

(1) Preparation of Base Metal - Prior to welding the Contractor shall inspect surfaces to be welded to assure compliance with AWS D1.1/D1.1M, Subsection 3.2.

(2) Temporary Welds - Temporary welds required for fabrication and erection shall be made under the controlled conditions prescribed for permanent work. Temporary welds shall be made using low-hydrogen welding electrodes and by welders qualified for permanent work as specified in these specifications. Preheating for temporary welds shall be as required by AWS D1.1/D1.1M for permanent welds except that the minimum temperature shall be 120 degrees F in any case. In making temporary welds arcs shall not be struck in other than weld locations. Each temporary weld shall be removed and ground flush with adjacent surfaces after serving its purpose.

(3) Tack Welds - Tacks welds that are to be incorporated into the permanent work shall be subject to the same quality requirements as the permanent welds and shall be cleaned and thoroughly fused with permanent welds. Preheating shall be performed as specified above for temporary welds. Multiple-pass tack welds shall have cascaded ends. Defective tack welds shall be removed before permanent welding.

2.2.2.2 Welding of Aluminum

Welding of aluminum shall conform to AA ADM1 or AWS D1.2, Sections 1 through 7, 9 and 10. The welding process and welding operators shall be prequalified as required by AWS D1.2, Section 5 or AA ADM1, Subsection 7.2.4 in accordance with the methods described in ASME BPVC SEC IX, Section IX. A certified report giving the results of the qualifying tests shall be furnished for approval. A complete schedule of the welding process for each aluminum fabrication to be welded shall be furnished for approval.

2.2.2.3 Welding of Steel Studs

The procedures for welding steel studs to structural steel, including mechanical, workmanship, technique, stud application qualification, production quality control and fabrication and verification inspection procedures shall conform to the requirements of AWS D1.1/D1.1M, Section 7, except as otherwise specified.

a. Application Qualification for Steel Studs - As a condition of approval of the stud application process, the Contractor shall furnish certified test reports and certification that the studs conform to the requirements of AWS D1.1/D1.1M, Subsections 7.2 and 7.3, certified results of the stud manufacturer's stud base qualification test, and certified results of the stud application qualification test as required by AWS D1.1/D1.1M, Subsection 7.6, except as otherwise specified.

b. Production Quality Control - Quality control for production welding of studs shall conform to the requirements of AWS D1.1/D1.1M, Subsection 7.7, except as otherwise specified. Studs on which pre-production testing is to be performed shall be welded in the same general position as required on production studs (flat, vertical, overhead or sloping). If the reduction of the length of studs becomes less than normal as they are welded, welding shall be stopped immediately and not resumed until the cause has been corrected.

2.2.3 Bolted Connections

2.2.3.1 Bolted Structural Steel Connections

Bolts, nuts and washers shall be of the type specified or indicated. All nuts shall be equipped with washers except for high strength bolts. Beveled washers shall be used where bearing faces have a slope of more than 1:20 with respect to a plane normal to the bolt axis. Where the use of high strength bolts is specified or indicated the materials, workmanship and installation shall conform to the applicable provisions of ASTM A 325 or ASTM A 490.

a. Bolt Holes - Bolt holes shall be accurately located, smooth, perpendicular to the member and cylindrical.

(1) Holes for regular bolts shall be drilled or subdrilled and reamed in the shop and shall not be more than 1/16 inch larger than the diameter of the bolt.

(2) Holes for fitted bolts shall be match-reamed or drilled in the shop. Burrs resulting from reaming shall be removed. The threads of bolts shall be entirely outside of the holes. The body diameter of bolts shall have tolerances as recommended by ASME B4.1

for the class of fit specified. Fitted bolts shall be fitted in reamed holes by selective assembly to provide an LN-2 fit.

(3) Holes for high strength bolts shall have diameters of not more than 1/16 inch larger than bolt diameters. If the thickness of the material is not greater than the diameter of the bolts the holes may be punched. If the thickness of the material is greater than the diameter of the bolts the holes may be drilled full size or subpunched or subdrilled at least 1/8 inch smaller than the diameter of the bolts and then reamed to full size. Poor matching of holes will be cause for rejection. Drifting occurring during assembly shall not distort the metal or enlarge the holes. Reaming to a larger diameter of the next standard size bolt will be allowed for slight mismatching.

2.2.3.2 Bolted Aluminum Connections

Punching, drilling, reaming and bolting for bolted aluminum connections shall conform to the requirements of AA ADM1, Section 6.

2.2.4 Miscellaneous Provisions

2.2.4.1 Zinc Coatings

a. Zinc coatings shall be applied in a manner and of a thickness and quality conforming to ASTM A 123/A 123M. Where zinc coatings are destroyed by cutting, welding or other causes the affected areas shall be regalvanized. Coatings 2 ounces or heavier shall be regalvanized with a suitable low-melting zinc base alloy similar to the recommendations of the American Hot-Dip Galvanizers Association to the thickness and quality specified for the original zinc coating. Coatings less than 2 ounces shall be repaired in accordance with ASTM A 780.

2.3 TESTS, INSPECTIONS, AND VERIFICATIONS

The Contractor shall have required material tests and analyses performed and certified by an approved laboratory to demonstrate that materials are in conformity with the specifications. These tests and analyses shall be performed and certified at the Contractor's expense. Tests, inspections, and verifications shall conform to the requirements of the particular sections of these specifications for the respective items of work unless otherwise specified or authorized. Tests shall be conducted in the presence of the Contracting Officer if so required. The Contractor shall furnish specimens and samples for additional independent tests and analyses upon request by the Contracting Officer. Specimens and samples shall be properly labeled and prepared for shipment.

2.3.1 Inspection of Structural Steel Welding

The Contractor shall maintain an approved inspection system and perform required inspections in accordance with Contract Clause CONTRACTOR INSPECTION SYSTEM. Welding shall be subject to inspection to determine conformance with the requirements of AWS D1.1/D1.1M, the approved welding procedures and provisions stated in other sections of these specifications. Supplemental examination of any joint or coupon cut from any location in any joint may be required.

2.3.1.1 Visual Examination

All visual examination of completed welds shall be cleaned and carefully examined for insufficient throat or leg sizes, cracks, undercutting, overlap, excessive convexity or reinforcement and other surface defects to ensure compliance with the requirements of AWS D1.1/D1.1M, Section 3 and Section 9, Part D.

2.3.2 Structural Steel Welding Repairs

Defective welds in the structural steel welding repairs shall be repaired in accordance with AWS D1.1/D1.1M, Subsection 3.7. Defective weld metal shall be removed to sound metal by use of air carbon-arc or oxygen gouging. Oxygen gouging shall not be used on ASTM A 514/A 514M steel. The surfaces shall be thoroughly cleaned before welding. Welds that have been repaired shall be retested by the same methods used in the original inspection. Except for the repair of members cut to remove test coupons and found to have acceptable welds costs of repairs and retesting shall be borne by the Contractor.

2.3.3 Inspection and Testing of Steel Stud Welding

Fabrication and verification inspection and testing of steel stud welding shall conform to the requirements of AWS D1.1/D1.1M, Subsection 7.8 except as otherwise specified. The Contracting Officer will serve as the verification inspector. One stud in every 100 and studs that do not show a full 360 degree weld flash, have been repaired by welding or whose reduction in length due to welding is less than normal shall be bent or torque tested as required by AWS D1.1/D1.1M, Subsection 7.8. If any of these studs fail two additional studs shall be bent or torque tested. If either of the two additional studs fail all of the studs represented by the tests shall be rejected. Studs that crack under testing in either the weld, base metal or shank shall be rejected and replaced by the Contractor at no additional cost.

PART 3 EXECUTION

3.1 INSTALLATION

All parts to be installed shall be thoroughly cleaned. Packing compounds, rust, dirt, grit and other foreign matter shall be removed. Holes and grooves for lubrication shall be cleaned. Enclosed chambers or passages shall be examined to make sure that they are free from damaging materials. Where units or items are shipped as assemblies they will be inspected prior to installation. Disassembly, cleaning and lubrication will not be required except where necessary to place the assembly in a clean and properly lubricated condition. Pipe wrenches, cold chisels or other tools likely to cause damage to the surfaces of rods, nuts or other parts shall not be used for assembling and tightening parts. Bolts and screws shall be tightened firmly and uniformly but care shall be taken not to overstress the threads. When a half nut is used for locking a full nut the half nut shall be placed first and followed by the full nut. Threads of all bolts except high strength bolts, nuts and screws shall be lubricated with an approved lubricant before assembly. Threads of corrosion-resisting steel bolts and nuts shall be coated with an approved antigalling compound. Driving and drifting bolts or keys will not be permitted.

3.1.1 Alignment and Setting

Each machinery or structural unit shall be accurately aligned by the use of steel shims or other approved methods so that no binding in any moving parts or distortion of any member occurs before it is fastened in place.

3.1.2 Blocking and Wedges

All blocking and wedges used during installation for the support of parts to be grouted in foundations shall be removed before final grouting unless otherwise directed. Blocking and wedges left in the foundations with approval shall be of steel or iron.

3.2 PROTECTION OF FINISHED WORK

3.2.1 Machined Surfaces

Machined surfaces shall be thoroughly cleaned of foreign matter. All finished surfaces shall be protected by suitable means. Unassembled pins and bolts shall be oiled and wrapped with moisture resistant paper or protected by other approved means. Finished surfaces of ferrous metals to be in bolted contact shall be washed with an approved rust inhibitor and coated with an approved rust resisting compound for temporary protection during fabrication, shipping and storage periods. Finished surfaces of metals which shall be exposed after installation except corrosion resisting steel or nonferrous metals shall be painted as specified in Section 09964 PAINTING: HYDRAULIC STRUCTURES.

3.2.2 Aluminum

Aluminum that shall be in contact with grout or concrete shall be protected from galvanic or corrosive action by being given a coat of zinc-chromate primer and a coat of aluminum paint. Aluminum in contact with structural steel shall be protected against galvanic or corrosive action by being given a coat of zinc-chromate primer and a coat of aluminum paint. The aluminum paint shall consist of a aluminum paste conforming to ASTM D 962, spar varnish and thinner compatible with the varnish. The aluminum paint shall be field mixed in proportion of 2 pounds of paste, not more than one gallon of spar varnish and not more than one pint of thinner.

3.3 TESTS

3.3.1 Workmanship

Workmanship shall be of the highest grade and in accordance with the best modern practices to conform with the specifications for the item of work being furnished.

3.3.2 Production Welding

Production welding shall conform to the requirements of AWS D1.1/D1.1M or AWS D1.2as applicable. Studs on which pre-production testing is to be performed shall be welded in the same general position as required on production items (flat, vertical, overhead or sloping). Test and production stud welding will be subjected to visual examination or inspection. If the reduction of the length of studs becomes less than normal as they are welded, welding shall be stopped immediately and not resumed until the cause has been corrected.

-- End of Section --

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SECTION 05502

METALS: MISCELLANEOUS, STANDARD ARTICLES, SHOP FABRICATED ITEMS FOR CIVIL WORKS STRUCTURES

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1/D1.1M	(2006; Errata 2006) Structural Welding Code - Steel

ASME INTERNATIONAL (ASME)

ASME B16.3	(2006) Malleable Iron Threaded Fittings, Classes 150 and 300
ASME B16.5	(2003) Standard for Pipe Flanges and Flanged Fittings: NPS 1/2 Through NPS 24
ASME B16.9	(2003) Standard for Factory-Made Wrought Steel Buttwelding Fittings
ASME B18.2.1	(1996; Addenda A 1999; Errata 2003; R 2005) Square and Hex Bolts and Screws (Inch Series)
ASME B18.3	(2003) Socket Cap Shoulder and Set Screws, Hex and Spline Keys (Inch Series)
ASME B18.6.2	(1998; R 2005) Slotted Head Cap Screws, Square Head Set Screws, and Slotted Headless Set Screws: Inch Series
ASME B18.6.3	(2003) Machine Screws and Machine Screw Nuts

ASTM INTERNATIONAL (ASTM)

ASTM A 123/A 123M	(2002) Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 240/A 240M	(2007e1) Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
ASTM A 263	(2003) Standard Specification for

	Stainless Chromium Steel-Clad Plate
ASTM A 264	(2003) Standard Specification for Stainless Chromium-Nickel Steel-Clad Plate
ASTM A 27/A 27M	(2005) Standard Specification for Steel Castings, Carbon, for General Application
ASTM A 276	(2006) Standard Specification for Stainless Steel Bars and Shapes
ASTM A 325	(2007) Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
ASTM A 36/A 36M	(2005) Standard Specification for Carbon Structural Steel
ASTM A 500/A 500M	(2007) Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
ASTM A 502	(2003) Standard Specification for Rivets, Steel, Structural
ASTM A 519	(2006) Standard Specification for Seamless Carbon and Alloy Steel Mechanical Tubing
ASTM A 53/A 53M	(2007) Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
ASTM A 564/A 564M	(2004) Standard Specification for Hot-Rolled and Cold-Finished Age-Hardening Stainless Steel Bars and Shapes
ASTM A 668/A 668M	(2004) Standard Specification for Steel Forgings, Carbon and Alloy, for General Industrial Use
ASTM A 786/A 786M	(2005) Standard Specification for Hot-Rolled Carbon, Low-Alloy, High-Strength Low-Alloy, and Alloy Steel Floor Plates
ASTM B 152/B 152M	(2006a) Standard Specification for Copper Sheet, Strip, Plate, and Rolled Bar
ASTM B 209	(2007) Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
ASTM B 211	(2003) Standard Specification for Aluminum and Aluminum-Alloy Bar, Rod, and Wire
ASTM B 241/B 241M	(2002) Standard Specification for Aluminum and Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube

ASTM B 6	(2007) Standard Specification for Zinc

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2003) Safety -- Safety and Health Requirements

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

CID A-A-60005	(Basic; Notice 1) Frames, Covers, Gratings, Steps, Sump and Catch Basin, Manhole
FS RR-C-271	(Rev D; Am 1) Chains and Attachments, Welded and Weldless

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Miscellaneous Metals and Standard Metal Articles; G, DT

Shop Fabricated Metal Items; G, DT

SD-02 Shop Drawings

Miscellaneous Metal Items; G, DT

Detail drawings indicating material thickness, type, grade, and class; dimensions; and construction details. Drawings shall include catalog cuts, erection details, manufacturer's descriptive data and installation instructions, and templates. Detail drawings for the following items:

Handrail (Steel)
Ladders (Steel)
Cover Plates (Steel)
Recess Frames
Ladder Safety Devices
Trash Rack (Steel)
Trash Rake (Steel and Aluminum)
Eye & Snap Bolt Connection (Steel)
Access Cover Plate Retainer
Safety Chain (Stainless Steel)
Expansion Anchor (Stainless Steel)
Aluminum Shapes, Plates, Bars
Castings (Access Openings)
Grab Bar (Steel)
Pike Pole (Aluminum)

SD-03 Product Data

Miscellaneous Metals and Standard Metal Articles; G, DT
Shop Fabricated Metal Items; G, DT

Lists of materials, and records which identify the disposition of approved material and fabricated items in the work, shall be submitted for approval as specified and in Section 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

SD-04 Samples

Miscellaneous Metals and Standard Metal Articles; G, DT

Shop Fabricated Metal Items; G, DT

Samples of standard or fabricated items shall be full size, taken from manufacturer's stock, and shall be complete as required for installation in the structure. Samples may be installed in the work, and may be installed in the work, provided each sample is clearly identified and its location recorded.

SD-06 Test Reports

Miscellaneous Metals and Standard Metal Articles; G, DT

Shop Fabricated Metal Items; G, DT

Certified test reports for materials tests and analyses shall be submitted for approval as specified and in Section 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

1.3 QUALIFICATIONS OF WELDERS

Qualify welders in accordance with AWS D1.1/D1.1M. Use procedures, materials, and equipment of the type required for the work.

PART 2 PRODUCTS

2.1 MISCELLANEOUS METALS AND STANDARD METAL ARTICLES

Miscellaneous metal materials and standard metal articles shall conform to the respective specifications and other designated requirements. Sizes shall be as specified or shown. Where material requirements are not specified, materials furnished shall be suitable for the intended use and shall be subject to approval.

2.1.1 Structural Steel

ASTM A 36/A 36M.

2.1.2 Steel Tubing

2.1.2.1 Structural

ASTM A 500/A 500M, Grade B outside diameter and nominal wall thickness as shown.

2.1.2.2 Mechanical

ASTM A 519 , Grade A dimensions as shown.

2.1.3 Steel Pipes and Pipe Fittings

2.1.3.1 Pipes

ASTM A 53/A 53M, Type S, Grade A, seamless electric-resistance welded, galvanized, nominal size and weight class or outside diameter and nominal wall thickness as shown.

2.1.3.2 Pipe Fittings

a. Flanged - ASME B16.5, Class 150, faced and drilled.

b. Screwed - ASME B16.3, Type 150.

c. Butt-welding - ASME B16.9.

2.1.4 Stainless Steel

2.1.4.1 Plate, Sheet, and Strip

ASTM A 240/A 240M, UNS S30400, S40500 or S41008. Plate finish shall be hot-rolled and annealed or heat treated, and blast cleaned or pickled. Sheet and strip finish shall be No. 1.

2.1.4.2 Clad Plate

ASTM A 263, with cladding conforming to ASTM A 240/A 240M, UNS S40500 or S41008; or ASTM A 264, with cladding conforming to ASTM A 240/A 240M, UNS S30400. Cladding shall be bonded on one side of base metal. Nominal thickness of the cladding shall be 10 percent of the nominal total plate thickness or 1/16 inch, whichever is greater. The thickness of the cladding shall not vary under the thickness specified by more than 2 percent of the nominal thickness of the clad plate. Plate finish shall be sandblasted, pickled, or, blast-cleaned and pickled. Stainless steel plate specified above in paragraph PLATE, SHEET, AND STRIP may be used in lieu of clad plate at the option of the Contractor.

2.1.4.3 Bars and Shapes

Stainless steel bars and shapes shall conform to the following as specified or shown:

a. ASTM A 276, UNS S30400, S40500, or S41000 with a maximum carbon content of 0.08 percent S21800, Condition A, hot-finished or cold-finished, Class C.

b. ASTM A 564/A 564M, UNS S17400 or S45000, age-hardened heat treatment condition, hot-finished or cold-finished, Class C.

2.1.5 Steel Forgings

2.1.5.1 General Industrial Use

ASTM A 668/A 668M, Class to meet service,, carbon content not exceeding 0.35 percent, and an overall chemical composition which results in satisfactory weldability.

2.1.6 Steel Castings

ASTM A 27/A 27M, Grade 60-30, Class 1 or 2.

2.1.7 Aluminum

2.1.7.1 Sheets and Plates

ASTM B 209, Alloy 6061, Temper T6.

2.1.7.2 Bars, Rods and Wire

ASTM B 211, Alloy 6061, Temper T6.

2.1.7.3 Pipes and Tubes

ASTM B 241/B 241M, Alloy 6063, Temper T6, size and schedule number or outside diameter and wall thickness as shown.

2.1.8 Copper Flat Products

ASTM B 152/B 152M, Temper soft.

2.1.9 Zinc

ASTM B 6, Special High Grade.

2.1.10 Bolts, Nuts, and Washers

Bolts, nuts, and washers shall be of the material, grade, type, class, style and finish indicated or best suited for intended use.

2.1.10.1 High-Strength Bolts, Nuts, and Washers

ASTM A 325

2.1.11 Screws

Screws shall be of the material, grade, type, style, and finish indicated or best suited for use intended.

2.1.11.1 Cap Screws

ASME B18.2.1, ASME B18.3, or ASME B18.6.2 as required.

2.1.11.2 Machine Screws

ASME B18.6.3.

2.1.11.3 Set Screws

ASME B18.6.2.

2.1.12 Epoxy or Grouted Anchors

Type and installation as required, stainless steel unless otherwise indicated.

2.1.13 Rivets

Rivets shall conform to ASTM A 502, Grade 2.

2.1.14 Chains and Attachments

Unless otherwise specified or shown chains and attachments shall be FS RR-C-271, Type I, Grade C, Class 5, Style 2, Size 2, Finish 1/4", Finish galvanized. Snap hooks shall be galvanized weldless drop steel type with stainless steel spring safety latch. Snap hooks shall have a safe working load of 500 pounds.

2.1.15 Cast Iron Frames and Covers

CID A-A-60005, Type I, Style A frame, type C cover, bolted.

2.1.16 Steel Floor Plate

ASTM A 786/A 786M, Class 1, Pattern No. 4 or 5.

2.2 SHOP FABRICATED METAL ITEMS

Shop fabricated metal items shall conform to the requirements and details as specified or shown and to the workmanship provisions and other applicable fabrication requirements as specified in Section 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

2.2.1 Gratings

Shall be fabricated of the widths and lengths shown on the drawings to accurately fit within the supporting recess frames. Gratings shall conform to ASTM A 123/A 123M. Fastners shall be as indicated on the drawings or as recommended by the manufacturer, subject to the approval of the Contracting Officer.

2.2.2 Handrailing

Hand railings shall be of the type specified and shown and shall be furnished and installed complete with all fittings, brackets, fasteners, sleeves, anchors, and other appurtenances as shown and as required for proper installation. Handrails shall be designed at a minimum to resist a concentrated load of 200 lbf in any direction at any point of the top of the rail or 20 lb/ft applied horizontally to top of the rail, whichever is more severe. Steel handrails, including inserts in concrete, shall be steel pipe conforming to ASTM A 53/A 53M. Steel railings shall be 2 inch nominal size. Railings shall be hot-dip galvanized. Pipe collars shall be hot-dip galvanized steel. All fasteners shall be Series 300 stainless steel.

2.2.2.1 Fabrication

Rigid joints in hand railings shall be of welded assembly. Welded joints shall be reinforced with tight-fitting interior sleeves and shall be assembled by welding rails and posts to flush-type fittings, or by mitering and welding joining rails and posts. Fasteners for steel fittings shall be of stainless steel. Bends in railings shall be made in a manner that railings are not crushed and shall maintain their original cross-sectional shape. Welds shall be ground smooth. Railings shall be free of burrs, sharp corners, and sharp edges. Toe-boards/kick plates shall be minimum

1/4" thick steel plate.

2.2.3 Cover Plates

Grating and cover plates shall be of the material and size shown, and shall be fabricated in sectional panels of the width and length shown, or as appropriate, to accurately fit within the supporting recess frames. Openings through panels shall be provided as shown or as required. Hinged panels shall be provided with hinges of the type shown or suitable for the application. Cover plates shall be galvanized after fabrication.

2.2.3.1 Cover Plates

Cover plates shall be as specified in paragraph STEEL FLOOR PLATE. Cover plate panels shall be provided with 3/8 inch bar, flush, drop handles for removal as shown or as required. Sharp edges and burrs shall be removed from plates.

2.2.4 Recess Frames

Recess frames shall be fabricated of structural shapes of the type shown. Welded joints in frames shall be ground smooth. Steel frames shall be galvanized after fabrication. Frames shall be anchored to supports in the manner shown and shall not be continuous across contraction or expansion joints.

2.2.5 Ladders

Ladders shall be fixed-rail metal ladders conforming to the requirements of EM 385-1-1. Ladders shall be fabricated of structural steel and shall be galvanized after fabrication. Fabrication of ladders shall consist of solid-section rod rungs fitted into holes in bar side rails and welded. Splices in side rails shall be made using full penetration welds and shall provide a flush and smooth transition between connecting ends. All welds shall be ground smooth. Ladder rails shall be welded to bent-bar supporting brackets anchored to supporting structure.

2.2.6 Ladder Rungs

Ladder rungs, shall be fabricated from steel rods in accordance with the details and shall be galvanized after fabrication.

2.2.6.1 Ladder Safety Device

Shall be rung mounted, center rail type with locking sleeve and safety belt.

2.2.6.2 Safety Device Components

Provide one rail with hardware and one locking sleeve at the location specified. Provide one (1) safety belt to be stored at the pump station control building.

2.2.6.3 Installation

Install in accordance with manufacturer?s instructions and shop drawings: SAF-T-CLIMB (North Consumer Products, Inc) or equal.

2.2.7 GRAB BARS

Shall be fabricated from ASTM A 36/A 36M steel galvanized after fabrication in accordance with details shown on the drawings. Install where shown on the drawings and in accordance with EM 385-1-1.

2.3 TRASH RACK

Shall be fabricated from ASTM A 36/A 36M steel galvanized after fabrication in accordance with details shown on the drawings.

2.3.1 Trash Rack Components

All mounting angles, anchor straps, support beam, and bearing angles shall be fabricated from ASTM A 36/A 36M steel galvanized after fabrication in accordance with details shown on the drawings.

2.3.2 Support Beam Anchor Bolts

Support beam concrete anchor bolts shall be A-325-F high strength hex head bolt, galvanized.

2.4 TRASH RAKES AND PIKE POLES

Two (2) trash rakes and pike poles shall be furnished for the pump stations, one for each local sponsor (coordinate delivery and storage of rake and pike poles with Contracting Officers Representative). Rake head shall be of structural or tool steel, with teeth spaced to conform to trash rack bar spacing, and pike pole head shall have pike point and hook and shall be of cast or tool steel. The handles of each shall be schedule 40 aluminum. Rake head metal parts shall be painted. The rake handles shall be jointed as shown on the contract drawings. A standard product of an individual manufacturer differing somewhat but meeting the general requirements as specified herein may be accepted if details of construction, strength, durability, and appearance are equivalent to those specified and are approved by the Contracting Officer. The handle of pike pole shall be the same length as the rake. Shall be fabricated from aluminum alloy (6061-T6) and A36 steel galvanized after fabrication in accordance with details as shown on the drawings.

2.4.1 Eye and Snap Bolt Connection

Shall be fabricated form stainless steel in accordance with details as shown on the drawings.

2.4.2 Anchorage

Anchorage shall be provided where necessary for fastening miscellaneous metal items securely in place. Anchorage not otherwise specified or indicated shall include slotted inserts, expansion shields, and powder-driven fasteners when approved for concrete; toggle bolts and through bolts, lag bolts, and screws for wood. Slotted inserts shall be of types required to engage with the anchors and shall be approved.

2.4.3 Miscellaneous Inserts, Plates and Shapes

Miscellaneous plates and shapes for items that do not form a part of the structural steel framework, such as lintels, sill angles, miscellaneous mountings, and frames shall be provided to complete the work.

PART 3 EXECUTION

3.1 STRUCTURAL FABRICATION

Material must be straight before being laid off or worked. If straightening is necessary it shall be done by methods that will not impair the metal. Sharp kinks or bends shall be cause for rejection of the material. Material with welds will not be accepted except where welding is definitely specified, indicated on the drawings or otherwise approved. Bends shall be made by approved dies, press brakes or bending rolls. Where heating is required precautions shall be taken to avoid overheating the metal and it shall be allowed to cool in a manner that will not impair the original properties of the metal. Proposed flame cutting of material other than structural steel shall be subject to approval and shall be indicated on shop drawings. Shearing shall be accurate and all portions of the work shall be neatly finished. Corners shall be square and true unless otherwise shown on the drawings. Re-entrant cuts shall be filleted to a minimum radius of 3/4-inch unless otherwise approved. Finished members shall be free of twists, bends and open joints. Bolts, nuts and screws shall be tight.

3.1.1 Dimensional Tolerances for Structural Work

Dimensions shall be measured by an approved calibrated steel tape of approximately the same temperature as the material being measured at the time of measurement. The overall dimensions of an assembled structural unit shall be within the tolerances indicated on the drawings or as specified in these specifications for the item of work. Where tolerances are not specified in other sections of these specifications or shown on the drawings an allowable variation of 1/32-inch is permissible in the overall length of component members with both ends milled and component members without milled ends shall not deviate from the dimensions shown on the drawings by more than 1/16-inch for members
30 feet or less in length and by more than 1/8-inch for members over 30 feet in length.

3.2 Structural Steel Fabrication

Structural steel may be cut by mechanically guided or hand guided torches provided an accurate profile with a surface that is smooth and free from cracks and notches is obtained. Surfaces and edges to be welded shall be prepared in accordance with AWS D1.1/D1.1M, Subsection 3.2. Where structural steel is not to be welded chipping or grinding will not be required except as necessary to remove slag and sharp edges of mechanically guided or hand guided cuts not exposed to view. Hand guided cuts which are to be exposed or visible shall be chipped, ground or machined to sound metal.

3.3 WELDED CONNECTIONS

3.3.1 Welding Procedures for Structural Steel

Welding procedures for structural steel shall be prequalified as described in AWS D1.1/D1.1M, Subsection 5.1 or shall be qualified by tests as prescribed in AWS D1.1/D1.1M, Section 5. Properly documented evidence of compliance with all requirements of these specifications for previous qualification tests shall establish a welding procedure as prequalified. For welding procedures qualified by tests, the test welding and specimen

testing must be witnessed and the test report document signed by the Contracting Officer. Approval of any welding procedure will not relieve the Contractor of the responsibility for producing a finished structure meeting all requirements of these specifications. The Contractor will be directed or authorized to make any changes in previously approved welding procedures that are deemed necessary or desirable by the Contractor Officer. The Contractor shall submit a complete schedule of welding procedures for each steel structure to be welded. The schedule shall conform to the requirements specified in the provisions AWS D1.1/D1.1M, Sections 2, 3, 4, 7 and 9 and applicable provisions of Section 10. The schedule shall provide detailed procedure specifications and tables or diagrams showing the procedures to be used for each required joint. Welding procedures must include filler metal, preheat, interpass temperature and stress-relief heat treatment requirements. Each welding procedure shall be clearly identified as being prequalified or required to be qualified by tests. Welding procedures must show types and locations of welds designated or in the specifications to receive nondestructive examination.

3.3.2 Welding Process

Welding of structural steel shall be by an electric arc welding process using a method which excludes the atmosphere from the molten metal and shall conform to the applicable provisions of AWS D1.1/D1.1M, Sections 1 thru 7, 9, 10 and 11. Welding shall be such as to minimize residual stresses, distortion and shrinkage.

3.3.3 Welding Technique

3.3.3.1 Filler Metal

The electrode, electrode-flux combination and grade of weld metal shall conform to the appropriate AWS specification for the base metal and welding process being used or shall be as shown where a specific choice of AWS specification allowables is required. The AWS designation of the electrodes to be used shall be included in the schedule of welding procedures. Only low hydrogen electrodes shall be used for manual shielded metal-arc welding regardless of the thickness of the steel. A controlled temperature storage oven shall be used at the job site as prescribed by AWS D1.1/D1.1M, Subsection 4.5 to maintain low moisture of low hydrogen electrodes.

3.3.3.2 Preheat and Interpass Temperature

Preheating shall be performed as required by AWS D1.1/D1.1M, Subsection 4.2 and 4.3 or as otherwise specified except that the temperature of the base metal shall be at least 20 degrees C (70 degrees F). The weldments to be preheated shall be slowly and uniformly heated by approved means to the prescribed temperature, held at that temperature until the welding is completed and then permitted to cool slowly in still air.

3.3.3.3 Stress-Relief Heat Treatment

Where stress relief heat treatment is specified or shown, it shall be in accordance with the requirements of AWS D1.1/D1.1M, Subsection 4.4 unless otherwise authorized or directed.

3.3.4 Workmanship

Workmanship for welding shall be in accordance with AWS D1.1/D1.1M, Section 3 and other applicable requirements of these specifications.

3.3.4.1 Preparation of Base Metal

Prior to welding the Contractor shall inspect surfaces to be welded to assure compliance with AWS D1.1/D1.1M, Subsection 3.2.

3.3.4.2 Temporary Welds

Temporary welds required for fabrication and erection shall be made under the controlled conditions prescribed for permanent work. Temporary welds shall be made using low-hydrogen welding electrodes and by welders qualified for permanent work as specified in these specifications. Preheating for temporary welds shall be as required by AWS D1.1/D1.1M for permanent welds except that the minimum temperature shall be 50 degrees C (120 degrees F) in any case. In making temporary welds arcs shall not be struck in other than weld locations. Each temporary weld shall be removed and ground flush with adjacent surfaces after serving its purpose.

3.3.4.3 Tack Welds

Tacks welds that are to be incorporated into the permanent work shall be subject to the same quality requirements as the permanent welds and shall be cleaned and thoroughly fused with permanent welds. Preheating shall be performed as specified above for temporary welds. Multiple-pass tack welds shall have cascaded ends. Defective tack welds shall be removed before permanent welding.

3.4 BOLTED CONNECTIONS

3.4.1 Bolted Structural Steel Connections

Bolts, nuts and washers shall be of the type specified or indicated. All nuts shall be equipped with washers except for high strength bolts. Beveled washers shall be used where bearing faces have a slope of more than 1:20 with respect to a plane normal to the bolt axis. Where the use of high strength bolts is specified or indicated the materials, workmanship and installation shall conform to the applicable provisions of ASTM A 325 ASTM A 325.

3.4.2 Bolt Holes

Bolt holes shall be accurately located, smooth, perpendicular to the member and cylindrical.

3.4.2.1 Holes for regular bolts

Holes for regular bolts shall be drilled or subdrilled and reamed in the shop and shall not be more than 1/16 inch larger than the diameter of the bolt.

3.4.2.2 Holes for fitted bolts

Holes for fitted bolts shall be match-reamed or drilled in the shop. Burrs resulting from reaming shall be removed. The threads of bolts shall be entirely outside of the holes. The body diameter of bolts shall have

tolerances as recommended by ASME B4.1 for the class of fit specified. Fitted bolts shall be fitted in reamed holes by selective assembly to provide an LN-2 fit.

3.4.2.3 Holes for high strength bolts

Holes for high strength bolts shall have diameters of not more than 1/16 inch larger than bolt diameters. If the thickness of the material is not greater than the diameter of the bolts the holes may be punched. If the thickness of the material is greater than the diameter of the bolts the holes may be drilled full size or subpunched or subdrilled at least 1/8 inch smaller than the diameter of the bolts and then reamed to full size. Poor matching of holes will be cause for rejection. Drifting occurring during assembly shall not distort the metal or enlarge the holes. Reaming to a larger diameter of the next standard size bolt will be allowed for slight mismatching.

3.5 MACHINE WORK

3.5.1 Tolerances, allowances and gauges

Tolerances, allowances and gauges for metal fits between plain, non-threaded, cylindrical parts shall conform to ASME B4.1 for the class of fit shown or required unless otherwise shown on approved detail drawings. Where fits are not shown they shall be suitable as approved. Tolerances for machine-finished surfaces designated by non-decimal dimensions shall be within 1/64 inch. Sufficient machining stock shall be allowed on placing pads to ensure true surfaces of solid material. Finished contact or bearing surfaces shall be true and exact to secure full contact. Journal surfaces shall be polished and all surfaces shall be finished with sufficient smoothness and accuracy to ensure proper operation when assembled. Parts entering any machine shall be accurately machined and all like parts shall be interchangeable except that parts assembled together for drilling or reaming of holes or machining will not be required to be interchangeable with like parts. All drilled holes bolts shall be accurately located.

3.5.2 Unfinished Surfaces

All work shall be laid out to secure proper matching of adjoining unfinished surfaces unless otherwise directed. Where there is a large discrepancy between adjoining unfinished surfaces they shall be chipped and ground smooth or machined to secure proper alignment. Unfinished surfaces shall be true to the lines and dimensions shown and shall be chipped or ground free of all projections and rough spots. Depressions or holes not affecting the strength or usefulness of the parts shall be filled in an approved manner.

3.5.3 Pin Holes

Pin holes shall be bored true to gauges, smooth, straight and at right angles to the axis of the member. The boring shall be done after the member is securely fastened in position.

3.6 GALVANIZING

All galvanizing shall be performed in accordance with the requirements of ASTM A 123/A 123M.

-- End of Section --

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SECTION 09964

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SECTION 09964

PAINTING: HYDRAULIC STRUCTURES

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z87.1	(2003) Practice for Occupational and Educational Eye and Face Protection
ANSI Z358.1	(1998) Emergency Eyewash and Shower Equipment

ASTM INTERNATIONAL (ASTM)

ASTM D 153	(1984; R 2003) Specific Gravity of Pigments
ASTM D 281	(1995; R 2002) Oil Absorption of Pigments by Spatula Rub-Out
ASTM D 520	(2000) Zinc Dust Pigment
ASTM D 561	(1982; R 2003) Carbon Black Pigment for Paint
ASTM D 740	(1994; R 2001) Methyl Ethyl Ketone
ASTM D 841	(2002) Nitration Grade Toluene
ASTM D 1045	(1995; R 2001) Sampling and Testing Plasticizers Used in Plastics
ASTM D 1152	(1997; R 2001) Methanol (Methyl Alcohol)
ASTM D 1153	(1994; R 2001) Methyl Isobutyl Ketone
ASTM D 1186	(2001) Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to a Ferrous Base
ASTM D 1200	(1994; R 1999) Viscosity by Ford Viscosity Cup
ASTM D 1210	(1996) Fineness of Dispersion of Pigment-Vehicle Systems by Hegman-Type Gage
ASTM D 2917	(2002) Methyl Isoamyl Ketone

ASTM D 3721	(1983; R 1999) Synthetic Red Iron Oxide Pigment
ASTM D 4417	(2003) Field Measurement of Surface Profile of Blast Cleaned Steel
ASTM E 1347	(2003) Color and Color Difference Measurement by Tristimulus (Filter) Colorimetry

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2005) National Electrical Code

THE SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC SP 1	(1982; R 2000) Solvent Cleaning
SSPC SP 5	(2000) White Metal Blast Cleaning

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2003) Safety -- Safety and Health Requirements Manual

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

FED-STD-595	(Rev B; Am 1) Colors, Volume 1

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1910, Subpart I	Personal Protective Equipment
29 CFR 1910.134	Respiratory Protection
29 CFR 1910.146	Permit-required Confined Spaces
29 CFR 1910.20	Access to Employee Exposure and Medical Records
29 CFR 1910.94	Ventilation
29 CFR 1926	Safety and Health Regulations for Construction

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-03 Product Data

Safety and Health Provisions; G, CN

An Accident Prevention Plan in accordance with the requirements of Section 01 of EM 385-1-1. The plan shall include, but is not limited to, each of the topic areas listed in Appendix A therein and the specified requirements; each topic shall be developed in a concise manner to include management and operational aspects.
Medical Status; G, CN

A Medical Surveillance Plan and a statement from the examining physician indicating the name of each employee evaluated and any limitations which will preclude the employee from performing the work required. The statement shall include the date of the medical evaluation, the physician's name, signature, and telephone number.

SD-04 Samples

Special Paint Formulas; G, DM
Paint Formulations; G, DM

Samples of all special paint formula, Military, Master Painter Institute, Commercial Item Description, and SSPC paints. For products that are specified to be applied in accordance with the manufacturer's recommendations the Contractor shall also submit the paint producers product data sheet or other written instructions for those products.

Solvent and Thinners; G, DM

Samples of the thinners or solvents used to reduce the viscosity of the paint.

SD-06 Test Reports

Inspection; G, CN

Records of inspections and operations performed. Submittals shall be made on a daily basis.

SD-07 Certificates

Coating Thickness Gage Qualification; G, CN

Documentation of manufacturer's certification shall be submitted for all coating thickness gages.

1.3 QUALIFICATIONS

Qualifications and experience shall comply with the following.

1.3.1 Coating Thickness Gage Qualification

Documentation of certification shall be submitted for all coating thickness gages. Magnetic flux thickness gages as described in ASTM D 1186 shall be used to make all coating thickness measurements on ferrous metal substrates. Gages shall have an accuracy of +/- 3 percent or better. Gages to be used on the job shall be certified by the manufacturer as meeting these requirements.

1.4 SAMPLING AND TESTING

The Contractor shall allow at least 30 days for sampling and testing. Sampling may be at the jobsite or source of supply. The Contractor shall notify the Contracting Officer when the paint and thinner are available for sampling. Sampling of each batch shall be witnessed by the Contracting Officer unless otherwise specified or directed. A 1-quart sample of paint and thinner shall be submitted for each batch proposed for use. The sample shall be labeled to indicate formula or specification number and nomenclature, batch number, batch quantity, color, date made, and applicable project contract number. Testing will be performed by the Governmentat US Army CERL, ATTN: Paint Laboratory, 2902 Farber Drive, Champaign, IL 61821. Costs for retesting rejected material will be deducted from payments to the Contractor at the rate of $400 dollars for each paint sample retested and $100 dollars for each thinner retested.

1.5 SAFETY AND HEALTH PROVISIONS

Work shall be performed in accordance with the requirements of 29 CFR 1910, 29 CFR 1926, EM 385-1-1, and other references as listed herein. Matters of interpretation of the standards shall be submitted to the Contracting Officer for resolution before starting work. Where the regulations conflict, the most stringent requirements shall apply. Paragraph SAFETY AND HEALTH PROVISIONS supplements the requirements of EM 385-1-1, paragraph (1). In any conflict between Section 01 of EM 385-1-1 and this paragraph, the provisions herein shall govern.

1.5.1 Abrasive Blasting

The Contractor shall comply with the requirements in Section 06.H of EM 385-1-1.

1.5.1.1 Hoses And Nozzles

In addition to the requirements in Section 20 of EM 385-1-1, hoses and hose connections of a type to prevent shock from static electricity shall be used. Hose lengths shall be joined together by approved couplings of a material and type designed to prevent erosion and weakening of the couplings. The couplings and nozzle attachments shall fit on the outside of the hose and shall be designed to prevent accidental disengagement.

1.5.1.2 Workers Other Than Blasters

Workers other than blasting operators working in close proximity to abrasive blasting operations shall be protected by utilizing MSHA/NIOSH-approved half-face or full-face air purifying respirators equipped with high-efficiency particulate air (HEPA) filters, eye protection meeting or exceeding ANSI Z87.1 and hearing protectors (ear plugs and/or ear muffs) providing a noise reduction rating of at least 20 dBA or as needed to provide adequate protection.

1.5.2 Cleaning with Compressed Air

Cleaning with compressed air shall be in accordance with Section 20.B.5 of EM 385-1-1 and personnel shall be protected as specified in 29 CFR 1910.134.

1.5.3 Cleaning with Solvents

1.5.3.1 Ventilation

Ventilation shall be provided where required by 29 CFR 1910.146 or where the concentration of solvent vapors exceeds 10 percent of the Lower Explosive Limit (LEL). Ventilation shall be in accordance with 29 CFR 1910.94, paragraph (c)(5).

1.5.3.2 Personal Protective Equipment

Personal protective equipment shall be provided where required by 29 CFR 1910.146 and in accordance with 29 CFR 1910, Subpart I.

1.5.4 Mixing Epoxy and Polyurethane Resin Formulations

1.5.4.1 Exhaust Ventilation

Local exhaust ventilation shall be provided in the area where the curing agent and resin are mixed. This ventilation system shall be capable of providing at least 100 linear fpm of capture velocity measured at the point where the curing agent and resin contact during mixing.

1.5.4.2 Personal Protective Equipment

Exposure of skin and eyes to epoxy resin components shall be avoided by wearing appropriate chemically resistant gloves, apron, safety goggles, and face shields meeting or exceeding the requirements of ANSI Z87.1.

1.5.4.3 Medical Precautions

Individuals who have a history of sensitivity to epoxy or polyurethane resin systems shall be medically evaluated before any exposure can occur. Individuals who are medically evaluated as exhibiting a sensitivity to epoxy resins shall not conduct work tasks or otherwise be exposed to such chemicals. Individuals who develop a sensitivity shall be immediately removed from further exposure and medically evaluated.

1.5.4.4 Emergency Equipment

A combination unit, comprised of an eyewash and deluge shower, within close proximity to the epoxy or polyurethane resin mixing operation shall be provided in accordance with ANSI Z358.1, paragraph (9).

1.5.5 Paint Application

1.5.5.1 Explosion Proof Equipment

Electrical wiring, lights, and other equipment located in the paint spraying area shall be of the explosion proof type designed for operation in Class I, Division 1, Group D, hazardous locations as required by the NFPA 70. Electrical wiring, motors, and other equipment, outside of but within 20 feet of any spraying area, shall not spark and shall conform to the provisions for Class I, Division 2, Group D, hazardous locations. Electric motors used to drive exhaust fans shall not be placed inside spraying areas or ducts. Fan blades and portable air ducts shall be constructed of nonferrous materials. Motors and associated control equipment shall be properly maintained and grounded. The metallic parts of air-moving devices, spray guns, connecting tubing, and duct work shall be

electrically bonded and the bonded assembly shall be grounded.

1.5.5.2 Further Precautions

a. Workers shall wear nonsparking safety shoes.

b. Solvent drums taken into the spraying area shall be placed on nonferrous surfaces and shall be grounded. Metallic bonding shall be maintained between containers and drums when materials are being transferred.

c. Insulation on all power and lighting cables shall be inspected to ensure that the insulation is in excellent working condition and is free of all cracks and worn spots. Cables shall be further inspected to ensure that no connections are within 50 feet of the operation, that lines are not overloaded, and that they are suspended with sufficient slack to prevent undue stress or chafing.

1.5.5.3 Ignition Sources

Ignition sources, to include lighted cigarettes, cigars, pipes, matches, or cigarette lighters shall be prohibited in area of solvent cleaning, paint storage, paint mixing, or paint application.

1.5.6 Health Protection

1.5.6.1 Air Sampling

The Contractor shall perform air sampling and testing as needed to assure that workers are not exposed to contaminants above the permissible exposure limit. In addition, the Contractor shall provide the Contracting Officer with a copy of the test results from the laboratory within five working days of the sampling date and shall provide results from direct-reading instrumentation on the same day the samples are collected.

1.5.6.2 Protective Clothing and Equipment

All workers shall wear safety shoes or boots, appropriate gloves to protect against the chemical to be encountered, and breathable, protective, full-body covering during spray-painting applications. Where necessary for emergencies, protective equipment such as life lines, body harnesses, or other means of personnel removal shall be used during confined-space work.

1.6 MEDICAL STATUS

Prior to the start of work and annually thereafter, all Contractor employees working with or around paint systems, thinners, blast media, those required to wear respiratory protective equipment, and those who will be exposed to high noise levels shall be medically evaluated for the particular type of exposure they may encounter. Medical records shall be maintained as required by 29 CFR 1910.20. The evaluation shall include:

a. Audiometric testing and evaluation of employees who will work in a noise environment with a time weighted average greater than or equal to 90 dBA.

b. Vision screening (employees who use full-facepiece respirators shall not wear contact lenses).

c. Medical evaluation shall include, but shall not be limited to, the following:

(1) Medical history including, but not limited to, alcohol use, with emphasis on liver, kidney, and pulmonary systems, and sensitivity to chemicals to be used on the job.

(2) General physical examination with emphasis on liver, kidney, and pulmonary system.

(3) Determination of the employee's physical and psychological ability to wear respiratory protective equipment and to perform job-related tasks.

(4) Determination of baseline values of biological indices for later comparison to changes associated with exposure to paint systems and thinners or blast media, which include: liver function tests to include SGOT, SGPT, GGPT, alkaline phosphates, bilirubin, complete urinalysis, EKG (employees over age 40), blood urea nitrogen (bun), serum creatinine, pulmonary function test, FVC, and FEV, chest x-ray (if medically indicated), blood lead and ZPP (for individuals where it is known there will be an exposure to materials containing lead), other criteria that may be deemed necessary by the Contractor's physician, and Physician's statements for individual employees that medical status would permit specific task performance.

1.7 CHANGE IN MEDICAL STATUS

Any employee whose medical status has changed negatively due to work related chemical and/or physical agent exposure while working with or around paint systems and thinners, blast media, or other chemicals shall be evaluated by a physician, and the Contractor shall obtain a physicians statement as described in paragraph MEDICAL STATUS prior to allowing the employee to return to those work tasks. The Contractor shall notify the Contracting Officer in writing of any negative changes in employee medical status and the results of the physicians reevaluation statement.

1.8 PAINT PACKAGING, DELIVERY, AND STORAGE

Paints shall be processed and packaged to ensure that within a period of one year from date of manufacture, they will not gel, liver, or thicken deleteriously, or form gas in the closed container. Paints, unless otherwise specified or permitted, shall be packaged in standard containers not larger than 5 gallons, with removable friction or lug-type covers. Containers for vinyl-type paints shall be lined with a coating resistant to solvents in the formulations and capable of effectively isolating the paint from contact with the metal container. Each container of paint or separately packaged component thereof shall be labeled to indicate the purchaser's order number, date of manufacture, manufacturer's batch number, quantity, color, component identification and designated name, and formula or specification number of the paint together with special labeling instructions, when specified. Paint shall be delivered to the job in unbroken containers. Paints that can be harmed by exposure to cold weather shall be stored in ventilated, heated shelters. All paints shall be stored under cover from the elements and in locations free from sparks and flames.

PART 2 PRODUCTS

2.1 SPECIAL PAINT FORMULAS

Special paints shall have the composition as indicated in the formulas listed herein. Where so specified, certain components of a paint formulation shall be packaged in separate containers for mixing on the job. If not specified or otherwise prescribed, the color shall be that naturally obtained from the required pigmentation.

2.2 PAINT FORMULATIONS

Special paint formulas shall comply with the following:

2.2.1 Formula V-766e, Vinyl-Type White (or Gray) Impacted Immersion Coating

INGREDIENTS	PERCENT BY MASS
Vinyl Resin, Type 3	5.6
Vinyl Resin, Type 4	11.6
Titanium Dioxide and (for Gray) Carbon Black	13.0
Diisodecyl Phthalate	2.9
Methyl Isobutyl Ketone	32.0
Toluene	34.7
Ortho-Phosphoric Acid	0.2
	100.0

a. The dispersion of pigment shall be accomplished by means of pebble mills or other approved methods to produce a fineness of grind (ASTM D 1210) of not less than 7 on the Hegman scale. Grinding in steel-lined or steel-ball mills will not be permitted. No grinding aids, antisettling agents, or any other materials except those shown in the formula will be permitted. The paint shall show the proper proportions of specified materials when analyzed by chromatographic and/or spectrophotometric methods. The ortho-phosphoric acid shall be measured accurately and diluted with at least four parts of ketone to one part of acid and it shall be slowly incorporated into the finished paint with constant and thorough agitation.

b. The viscosity of the paint shall be between 60 and 90 seconds using ASTM D 1200 and a No. 4 Ford cup.

c. The white and gray paints shall be furnished in the volume ratio designated by the purchaser. The gray paint shall contain no pigments other than those specified. Enough carbon black shall be included to produce a dry paint film having a reflectance of 20-24 (ASTM E 1347). The resulting gray color shall approximate color 26231 of FED-STD-595.

2.2.2 Formula VZ-108d, Vinyl-Type Zinc-Rich Impacted Immersion Coating

INGREDIENTS	PERCENT BY WEIGHT	POUNDS	GALLONS
COMPONENT A			
Vinyl Resin, Type 3	16.6	109.2	9.65
Methyl Isobutyl Ketone	80.6	528.9	79.30
Suspending Agent E	0.7	4.6	0.28

INGREDIENTS	PERCENT BY WEIGHT	POUNDS	GALLONS
Suspending Agent F	0.4	2.7	0.19
Methanol	0.5	3.3	0.50
Synthetic Iron Oxide (Red)	1.2	7.9	0.19
	100.0	656.6	90.11
COMPONENT B			
Silane B	100.0	4.1	0.47
COMPONENT C			
Zinc Dust	100.0	550.0	9.42
			100.00 (mixed paint)

a. The iron oxide and suspending agents shall be dispersed into the vehicle (Component A) to a fineness of grind of not less than 4 on the Hegman scale (ASTM D 1210). Grinding in steel-lined containers or using steel-grinding media shall not be permitted. The sole purpose of the iron oxide pigment is to produce a contrasting color. A red iron oxide-type 3 vinyl resin vehicle paste may be used in place of dry iron oxide provided compensating adjustment are made in the additions of Type 3 resin and methyl isobutyl ketone. The finished product with zinc dust added shall produce a paint which has a red tone upon drying and a reflectance of not more than 16 (ASTM E 1347).

b. VZ-108d paint shall be supplied as a kit. Each kit shall consist of 4.5 gallons (33.1 pounds) of Component A in a 5-gallon lug closure type pail, 27.5 pounds of zinc dust (Component C) packaged in a 1-gallon plastic pail, and 3 fluid ounces of silane (Component B) packaged in a glass bottle of suitable size having a polyethylene lined cap. The bottle of silane shall be placed on the zinc dust in the 1-gallon pail. In addition to standard labeling requirements, each container of each component shall be properly identified as to component type and each container label of Component A shall carry the following: MIXING AND APPLICATION INSTRUCTIONS: WARNING - THIS PAINT WILL NOT ADHERE TO STEEL SURFACES UNLESS COMPONENT B IS ADDED. Remove the 3 ounces of bottled Component B (silane) from the Component C (zinc dust) container and add to the base paint Component A) with thorough stirring. Then sift the zinc dust into the base paint while it is being vigorously agitated with a power-driven stirrer and continue the stirring until the zinc dust has been dispersed. The mixed paint shall at some point be strained through a 30-60 mesh screen to prevent zinc dust slugs from reaching the spray gun nozzle. The paint shall be stirred continuously during application at a rate that will prevent settling. If spraying is interrupted for longer than 15 minutes, the entire length of the hose shall be whipped vigorously to redisperse the zinc. If the spraying is to be interrupted for more than 1 hour, the hose shall be emptied by blowing the paint back into the paint pot. Thinning will not normally be required when ambient temperatures are below about 80 degrees F, but when the ambient and steel temperatures are higher, methyl isoamyl ketone (MIAK) or methyl isobutyl ketone (MIBK) should be used. If paint is kept covered at all times, its pot life will be about 8 days.

2.3 INGREDIENTS FOR SPECIAL PAINT FORMULAS

The following ingredient materials and thinners apply only to those special paints whose formulas are shown above in detail.

2.3.1 Pigments and Suspending Agents

2.3.1.1 Carbon Black

Carbon black shall conform to ASTM D 561, Type I or II.

2.3.1.2 Zinc Dust

Zinc dust pigment shall conform to ASTM D 520, Type II.

2.3.1.3 Iron Oxide

Iron oxide, (Dry) synthetic (red), shall conform to ASTM D 3721. In addition, the pigment shall have a maximum oil absorption of 24 and a specific gravity of 4.90 to 5.20 when tested in accordance with ASTM D 281 and ASTM D 153, Method A, respectively. When the pigment is dispersed into specified vinyl paint formulation, the paint shall have color approximating FED-STD-595 color 10076 (dark red paint), and shall show no evidence of incompatibility or reaction between pigment and other components after 6 months storage.

2.3.1.4 Titanium Dioxide

Titanium dioxide in vinyl paint Formula V-766e shall be one of the following: Kronos 2160 or 2101, Kronos, Inc.; Ti-Pure 960, E.I. Dupont DeNemours and Co., Inc.

2.3.1.5 Suspending Agent E

Suspending Agent E shall be a light cream colored finely divided powder having a specific gravity of 2 to 2.3. It shall be an organic derivative of magnesium aluminum silicate mineral capable of minimizing the tendency of zinc dust to settle hard without increasing the viscosity of the paint appreciably. MPA-14, produced by RHEOX, Inc., has these properties.

2.3.1.6 Suspending Agent F

Suspending Agent F shall be a light cream colored finely divided powder having a specific gravity of approximately 1.8. It shall be an organic derivative of a special montmorillonite (trialkylaryl ammonium hectorite). Bentone 27, produced by RHEOX, Inc., has these properties.

2.3.2 Resins, Plasticizer, and Catalyst

2.3.2.1 Diisodecyl Phthalate

Diisodecyl Phthalate shall have a purity of not less than 99.0 percent, shall contain not more than 0.1 percent water, and shall have an acid number (ASTM D 1045) of not more than 0.10.

2.3.2.2 Vinyl Resin, Type 3

Vinyl resin, Type 3, shall be a vinyl chloride-acetate copolymer of medium average molecular weight produced by a solution polymerization process and shall contain 85 to 88 percent vinyl chloride and 12 to 15 percent vinyl acetate by weight. The resin shall have film-forming properties and shall, in specified formulations, produce results equal to Vinylite resin VYHH, as manufactured by the Union Carbide Corporation.

2.3.2.3 Vinyl Resin, Type 4

Vinyl resin, Type 4, shall be a copolymer of the vinyl chloride-acetate type produced by a solution polymerization process, shall contain (by weight) 1 percent interpolymerized dibasic acid, 84 to 87 percent vinyl chloride, and 12 to 15 percent vinyl acetate. The resin shall have film-forming properties and shall, in the specified formulations, produce results equal to Vinylite resin VMCH, as manufactured by the Union Carbide Corporation.

2.3.2.4 Ortho-phosphoric Acid

Ortho-phosphoric acid shall be a chemically pure 85-percent grade.

2.3.3 Solvent and Thinners

2.3.3.1 Methanol

Methanol (methyl alcohol) shall conform to ASTM D 1152.

2.3.3.2 Methyl Ethyl Ketone

Methyl ethyl ketone (MEK) shall conform to ASTM D 740.

2.3.3.3 Methyl Isobutyl Ketone

Methyl isobutyl ketone (MIBK) shall conform to ASTM D 1153.

2.3.3.4 Methyl Isoamyl Ketone

Methyl isoamyl ketone (MIAK) shall conform to ASTM D 2917.

2.3.3.5 Toluene

Toluene shall conform to ASTM D 841.

2.3.4 Silane B

Silane B for Formula VZ-108d shall be N-beta-(aminoethyl)-gamma-aminopropyltrimethoxy silane. Silane A-1120, produced by the C.K. Witco Corporation, and Silane Z-6020, produced by Dow Corning Corporation, are products of this type.

2.4 TESTING

2.4.1 Chromatographic Analysis

Solvents in vinyl paints and thinners shall be subject to analysis by programmed temperature gas chromatographic methods and/or spectrophotometric methods, employing the same techniques that give

reproducible results on prepared control samples known to meet the specifications. If the solvent being analyzed is of the type consisting primarily of a single chemical compound or a mixture or two or more such solvents, interpretation of the test results shall take cognizance of the degree of purity of the individual solvents as commercially produced for the paint industry.

2.4.2 Vinyl Paints

Vinyl paints shall be subject to the following adhesion test. When V-766 or V-106 formulations are tested, 5 to 7 mils (dry) shall be spray applied to mild steel panels. The steel panels shall be essentially free of oil or other contaminants that may interfere with coating adhesion. The test panels shall be dry blast cleaned to a White Metal grade which shall be in compliance with SSPC SP 5. The surface shall have an angular profile of 2.0 to 2.5 mils as measured by ASTM D 4417, Method C. When V-102 or V-103 formulations are tested, they shall be spray applied over 1.5 to 2.5 mils (dry) of V-766 or V-106 known to pass this test. When VZ-108 is tested, the coating shall be mixed in its proper proportions and then spray applied to a dry film thickness of 1.5 to 2.5 mils above the blast profile. The VZ-108 shall be top coated with a V-766 known to pass this test. In all cases, the complete system shall have a total dry film thickness of 5 to 7 mils above the blast profile. After being air dried for 2 hours at room temperature, the panel shall be dried in a vertical position for 16 hours at 120 degrees F. After cooling for 1 hour, the panel shall be immersed in tap water at 85 to 90 degrees F for 48 to 72 hours. Immediately upon removal, the panel shall be dried with soft cloth and examined for adhesion as follows: With a pocket knife or other suitable instrument, two parallel cuts at least 1 inch long shall be made 1/4 to 3/8 inch apart through the paint film to the steel surface. A third cut shall be made perpendicular to and passing through the end of the first two. With the tip of the knife blade, the film shall be loosened from the panel from the third cut between the parallel cuts for a distance of 1/8 to 1/4 inch. With the panel being held horizontally, the free end of the paint film shall be grasped between the thumb and forefinger and pulled vertically in an attempt to remove the film as a strip from between the first two cuts. The strip of paint film shall be removed at a rate of approximately 1/10 inch per second and shall be maintained in a vertical position during the process of removal. The adhesion is acceptable if the strip of paint breaks when pulled or if the strip elongates a minimum of 10 percent during its removal. Paints not intended to be self-priming shall exhibit no delamination from the primer.

PART 3 EXECUTION

3.1 CLEANING AND PREPARATION OF SURFACES TO BE PAINTED

3.1.1 General Requirements

Surfaces to be painted shall be cleaned before applying paint or surface treatments. Deposits of grease or oil shall be removed in accordance with SSPC SP 1, prior to mechanical cleaning. Solvent cleaning shall be accomplished with mineral spirits or other low toxicity solvents having a flash point above 100 degrees F. Clean cloths and clean fluids shall be used to avoid leaving a thin film of greasy residue on the surfaces being cleaned. Items not to be prepared or coated shall be protected from damage by the surface preparation methods. Machinery shall be protected against entry of blast abrasive and dust into working parts. Cleaning and painting shall be so programmed that dust or other contaminants from the cleaning process do not fall on wet, newly painted surfaces, and surfaces not

intended to be painted shall be suitably protected from the effects of cleaning and painting operations. Welding of, or in the vicinity of, previously painted surfaces shall be conducted in a manner to prevent weld spatter from striking the paint and to otherwise reduce coating damage to a minimum; paint damaged by welding operations shall be restored to original condition. Surfaces to be painted that will be inaccessible after construction, erection, or installation operations are completed shall be painted before they become inaccessible.

3.1.2 Ferrous Surfaces Subject to Severe Exposure

Ferrous surfaces subject to extended periods of immersion or as otherwise required shall be dry blast-cleaned to SSPC SP 5. The blast profile, unless otherwise specified, shall be 1.5 to 2.5 mils as measured by ASTM D 4417, Method C. Appropriate abrasive blast media shall be used to produce the desired surface profile and to give an angular anchor tooth pattern. If recycled blast media is used, an appropriate particle size distribution shall be maintained so that the specified profile is consistently obtained. Steel shot or other abrasives that do not produce an angular profile shall not be used. Weld spatter not dislodged by blasting shall be removed with impact or grinding tools and the areas reblasted prior to painting. Surfaces shall be dry at the time of blasting. Blast cleaning to SSPC SP 5 shall be done in the field and, unless otherwise specifically authorized, after final erection. Within 8 hours after cleaning, prior to the deposition of any detectable moisture, contaminants, or corrosion, all ferrous surfaces blast cleaned to SSPC SP 5 shall be cleaned of dust and abrasive particles by brush, vacuum cleaner, and/or blown down with clean, dry, compressed air, and given the first coat of paint. Upon written request by the Contractor, the Contracting Officer may authorize mill or shop cleaning of assembled or partially assembled components specified to receive one of the vinyl-type paint systems or Systems Nos. 6-A-Z and 21-A-Z employing the epoxy zinc-rich primer. The surfaces, if shop blasted, shall be shop coated with the first and second coats of the specified paint system except that the epoxy zinc-rich primed surfaces shall receive an extra single spray coat of the zinc primer at the time field painting is started, as specified in the paint system instructions. The shop coating shall be maintained in good condition by cleaning and touching up of areas damaged during the construction period. If pinpoint or general rusting appears, surfaces shall be reblasted and repainted at no added cost to the Government. Prior to the field application of subsequent coats, soiled areas of the shop coating shall be thoroughly cleaned and all welds or other unpainted or damaged areas shall be cleaned and coated in a manner to make them equivalent to adjacent, undamaged paint surfaces.

3.2 PAINT APPLICATION

3.2.1 General

The finished coating shall be free from holidays, pinholes, bubbles, runs, drops, ridges, waves, laps, excessive or unsightly brush marks, and variations in color, texture, and gloss. Application of initial or subsequent coatings shall not commence until the Contracting Officer has verified that atmospheric conditions and the surfaces to be coated are satisfactory. Each paint coat shall be applied in a manner that will produce an even, continuous film of uniform thickness. Edges, corners, crevices, seams, joints, welds, rivets, corrosion pits, and other surface irregularities shall receive special attention to ensure that they receive an adequate thickness of paint. Spray equipment shall be equipped with

traps and separators and where appropriate, mechanical agitators, pressure gauges, pressure regulators, and screens or filters. Air caps, nozzles, and needles shall be as recommended by the spray equipment manufacturer for the material being applied. Airless-type spray equipment may be used only on broad, flat, or otherwise simply configured surfaces, except that it may be employed for general painting if the spray gun is equipped with dual or adjustable tips of proper types and orifice sizes. Airless-type equipment shall not be used for the application of vinyl paints.

3.2.2 Mixing and Thinning

Paints shall be thoroughly mixed, strained where necessary, and kept at a uniform composition and consistency during application. Paste or dry-powder pigments specified to be added at the time of use shall, with the aid of powered stirrers, be incorporated into the vehicle or base paint in a manner that will produce a smooth, homogeneous mixture free of lumps and dry particles. Where necessary to suit conditions of the surface temperature, weather, and method of application, the paint may be thinned immediately prior to use. Thinning shall generally be limited to the addition of not more than 1 pint per gallon of the proper thinner; this general limitation shall not apply when more specific thinning instructions are provided. Paint that has been stored at low temperature, shall be brought up to at least 70 degrees F before being mixed and thinned, and its temperature in the spray tank or other working container shall not fall below 60 degrees F during the application. Paint that has deteriorated in any manner to a degree that it cannot be restored to essentially its original condition by customary field-mixing methods shall not be used and shall be removed from the project site. Paint and thinner that is more than 1 year old shall be resampled and resubmitted for testing to determine its suitability for application.

3.2.3 Atmospheric and Surface Conditions

Paint shall be applied only to surfaces that are above the dew point temperature and that are completely free of moisture as determined by sight and touch. Paint shall not be applied to surfaces upon which there is detectable frost or ice. Except as otherwise specified, the temperature of the surfaces to be painted and of air in contact therewith shall be not less than 45 degrees F during paint application nor shall paint be applied if the surfaces can be expected to drop to 32 degrees F or lower before the film has dried to a reasonably firm condition. During periods of inclement weather, painting may be continued by enclosing the surfaces and applying artificial heat, provided the minimum temperatures and surface dryness requirements prescribed previously are maintained. Paint shall not be applied to surfaces heated by direct sunlight or other sources to temperatures that will cause detrimental blistering, pinholing, or porosity of the film.

3.2.4 Time Between Surface Preparation and Painting

Surfaces that have been cleaned and/or otherwise prepared for painting shall be primed as soon as practicable after such preparation has been completed but, in any event, prior to any deterioration of the prepared surface.

3.2.5 Method of Paint Application

Unless otherwise specified, paint shall be applied by brush or spray to ferrous and nonferrous metal surfaces. Special attention shall be directed

toward ensuring adequate coverage of edges, corners, crevices, pits, rivets, bolts, welds, and similar surface irregularities. Other methods of application to metal surfaces shall be subject to the specific approval of the Contracting Officer. Paint on plaster, concrete, or other nonmetallic surfaces shall be applied by brush, roller, and/or spray.

3.2.6 Coverage and Film Thickness

Film thickness or spreading rates shall be as specified hereinafter. Where no spreading rate is specified, the paint shall be applied at a rate normal for the type of material being used. In any event, the combined coats of a specified paint system shall completely hide base surface and the finish coats shall completely hide undercoats of dissimilar color.

3.2.6.1 Measurement on Ferrous Metal

Where dry film thickness requirements are specified for coatings on ferrous surfaces, measurements shall be made with a gage qualified in accordance with paragraph Coating Thickness Gage Qualification. They shall be calibrated and used in accordance with ASTM D 1186. They shall be calibrated using plastic shims with metal practically identical in composition and surface preparation to that being coated, and of substantially the same thickness (except that for measurements on metal thicker than 1/4 inch, the instrument may be calibrated on metal with a minimum thickness of 1/4 inch). Frequency of measurements shall be as recommended for field measurements by ASTM D 1186 and reported as the mean for each spot determination. The instruments shall be calibrated or calibration verified prior to, during, and after each use.

3.2.7 Progress of Painting Work

Where field painting on any type of surface has commenced, the complete painting operation, including priming and finishing coats, on that portion of the work shall be completed as soon as practicable, without prolonged delays. Sufficient time shall elapse between successive coats to permit them to dry properly for recoating, and this period shall be modified as necessary to suit adverse weather conditions. Paint shall be considered dry for recoating when it feels firm, does not deform or feel sticky under moderate pressure of the finger, and the application of another coat of paint does not cause film irregularities such as lifting or loss of adhesion of the undercoat. All coats of all painted surfaces shall be unscarred and completely integral at the time of application of succeeding coats. At the time of application of each successive coat, undercoats shall be cleaned of dust, grease, overspray, or foreign matter by means of airblast, solvent cleaning, or other suitable means. Cement and mortar deposits on painted steel surfaces, not satisfactorily removed by ordinary cleaning methods, shall be brush-off blast cleaned and completely repainted as required. Undercoats of high gloss shall, if necessary for establishment of good adhesion, be scuff sanded, solvent wiped, or otherwise treated prior to application of a succeeding coat. Field coats on metal shall be applied after erection except as otherwise specified and except for surfaces to be painted that will become inaccessible after erection.

3.2.8 Contacting Surfaces

When riveted or ordinary bolted contact is to exist between surfaces of ferrous or other metal parts of substantially similar chemical composition, such surfaces will not be required to be painted, but any resulting

crevices shall subsequently be filled or sealed with paint. Contacting metal surfaces formed by high-strength bolts in friction-type connections shall not be painted. Where a nonmetal surface is to be in riveted or bolted contact with a metal surface, the contacting surfaces of the metal shall be cleaned and given three coats of the specified primer. Unless otherwise specified, corrosion-resisting metal surfaces, including cladding therewith, shall not be painted.

3.2.9 Drying Time Prior to Immersion

Minimum drying periods after final coat prior to immersion shall be: epoxy systems at least 5 days, vinyl-type paint systems at least 3 days, and cold-applied coal tar systems at least 7 days. Minimum drying periods shall be increased twofold if the drying temperature is below 65 degrees F and/or if the immersion exposure involves considerable abrasion.

3.2.10 Protection of Painted Surfaces

Where shelter and/or heat are provided for painted surfaces during inclement weather, such protective measures shall be maintained until the paint film has dried and discontinuance of the measures is authorized. Items that have been painted shall not be handled, worked on, or otherwise disturbed until the paint coat is fully dry and hard. All metalwork coated in the shop or field prior to final erection shall be stored out of contact with the ground in a manner and location that will minimize the formation of water-holding pockets; soiling, contamination, and deterioration of the paint film, and damaged areas of paint on such metalwork shall be cleaned and touched up without delay. The first field coat of paint shall be applied within a reasonable period of time after the shop coat and in any event before weathering of the shop coat becomes extensive.

3.2.11 Vinyl Paints

3.2.11.1 General

Vinyl paints shall be spray applied, except that areas inaccessible to spraying shall be brushed. All of the vinyl paints require thinning for spray application except the zinc-rich vinyl paint (Formula VZ 108d) which will normally require thinning only under certain weather conditions. Thinners for vinyl paints shall be as follows:

APPROXIMATE AMBIENT AIR TEMPERATURE (Degrees F)	
Below 50	MEK
50 - 70	MIBK
Above 70	MIAK

The amount of thinner shall be varied to provide a wet spray and avoid deposition of particles that are semidry when they strike the surface. Vinyl paints shall not be applied when the temperature of the ambient air and receiving surfaces is less than 35 degrees F nor when the receiving surfaces are higher than 125 degrees F. Each spray coat of vinyl paint shall consist of a preliminary extra spray pass on edges, corners, interior angles, pits, seams, crevices, junctions of joining members, rivets, weld lines, and similar surface irregularities followed by an overall double spray coat. A double spray coat of vinyl-type paint shall consist of applying paint to a working area of not less than several hundred square feet (meters) in a single, half-lapped pass, followed after drying to at

least a near tack-free condition by another spray pass applied at the same coverage rate and where practicable at right angles to the first. Rivets, bolts, and similar surface projections shall receive sprayed paint from every direction to ensure complete coverage of all faces. Pits, cracks, and crevices shall be filled with paint insofar as practicable, but in any event, all pit surfaces shall be thoroughly covered and all cracks and crevices shall be sealed off against the entrance of moisture. Fluid and atomization pressures shall be kept as low as practicable consistent with good spraying results. Unless otherwise specified, not more than 2.0 mils, average dry film thickness, of vinyl paint shall be applied per double spray coat. Except where otherwise indicated, an undercoat of the vinyl-type paint may receive the next coat any time after the undercoat is tack-free and firm to the touch, provided that no speedup or delay in the recoating schedule shall cause film defects such as sags, runs, air bubbles, air craters, or poor intercoat adhesion. Neither the prime coat nor any other coat shall be walked upon or be subjected to any other abrading action until it has hardened sufficiently to resist mechanical damage.

3.2.11.2 Vinyl Zinc-Rich Primer

Primer shall be field mixed combining components A, B, and C. Mixing shall be in accordance with label instructions. After mixing, the paint shall be kept covered at all times to avoid contamination and shall be applied within 8 days after it is mixed. When the ambient and/or steel temperature is below about 80 degrees F, the paint will not normally require thinning; however, the paint shall at all times contain sufficient volatiles (thinners) to permit it to be satisfactorily atomized and to provide a wet spray and to avoid deposition of particles that are semidry when they reach the surface. The paint shall be stirred continuously during application at a rate that will prevent the zinc dust from settling. When spraying is resumed after any interruption of longer than 15 minutes, the entire length of the material hose shall be whipped vigorously until any settled zinc is redispersed. Long periods of permitting the paint to remain stagnant in the hose shall be avoided by emptying the hoses whenever the painting operation is to be suspended for more than 1 hour. The material (paint) hoses shall be kept as short as practicable, preferably not more than 50 feet in length. Equipment used for spraying this zinc primer shall not be used for spraying other vinyl-type paints without first being thoroughly cleaned, since many of the other paints will not tolerate zinc contamination; no type of hot spray shall be used. An average dry film thickness of up to 2.5 mils may be applied in one double-spray coat. Unless specifically authorized, not more than 8 days shall elapse after application of a VZ-108d zinc-rich coat before it receives a succeeding coat.

3.2.11.3 Vinyl Paints

Vinyl Paints (Formulas V-102e, V-103c, V-106d, and V-766e) are ready-mixed paints designed to be spray applied over a wide range of ambient temperatures by field thinning with the proper type and amount of thinner. For spray application, they shall be thinned as necessary up to approximately 25 percent (1 quart per gallon of base paint) with the appropriate thinner; when ambient and steel temperatures are above normal, up to 40-percent thinning may be necessary for satisfactory application.

3.3 PAINT SYSTEMS APPLICATION

The required paint systems and the surfaces to which they shall be applied

are shown in this paragraph, and/or in the drawings. Supplementary information follows.

3.3.1 Fabricated and Assembled Items

Items that have been fabricated and/or assembled into essentially their final form and that are customarily cleaned and painted in accordance with the manufacturer's standard practice will be exempted from equivalent surface preparation and painting requirements described herein, provided that:

a. Surfaces primed (only) in accordance with such standard practices are compatible with specified field-applied finish coats.

b. Surfaces that have been primed and finish painted in accordance with the manufacturer's standard practice are of acceptable color and are capable of being satisfactorily touched up in the field.

c. Items expressly designated herein to be cleaned and painted in a specified manner are not coated in accordance with the manufacturer's standard practice if different from that specified herein.

3.3.2 Surface Preparation

The method of surface preparation and pretreatment shown in the tabulation of paint systems is for identification purposes only. Cleaning and pretreatment of surfaces prior to painting shall be accomplished in accordance with detailed requirements previously described.

3.3.3 System No. 5-E-Z

Paint shall be spray applied to an average dry film thickness of a minimum of 7.0 mils for the completed system, and the thickness at any point shall not be less than 5.5 mils. The dry film thickness of the zinc-rich primer shall be approximately 2.5 mils. The specified film thickness shall be attained in any event, and any extra coats needed to attain the specified thickness shall be applied at no additional cost to the Government. Attaining the specified film thickness by applying fewer than the prescribed number of coats or spray passes will be acceptable provided heavier applications do not cause an increase in pinholes, bubbles, blisters, or voids in the dried film and also provided that not more than 2.0 mils (dry film thickness) per double spray coat nor more than 1.0 mil per single spray pass of nonzinc paint shall be applied at one time.

3.3.4 Protection of Nonpainted Items and Cleanup

Walls, equipment, fixtures and all other items in the vicinity of the surfaces being painted shall be maintained free from damage by paint or painting activities. Paint spillage and painting activity damage shall be promptly repaired.

3.4 INSPECTION

The Contractor shall inspect, document, and report all work phases and operations on a daily basis. As a minimum the daily report shall contain the following:

a. Inspections performed, including the area of the structure involved and the results of the inspection.

b. Surface preparation operations performed, including the area of the structure involved, the mode of preparation, the kinds of solvent, abrasive, or power tools employed, and whether contract requirements were met.

c. Thinning operations performed, including thinners used, batch numbers, and thinner/paint volume ratios.

d. Application operations performed, including the area of the structure involved, mode of application employed, ambient temperature, substrate temperature, dew point, relative humidity, type of paint with batch numbers, elapsed time between surface preparation and application, elapsed time for recoat, condition of underlying coat, number of coats applied, and if specified, measured dry film thickness or spreading rate of each new coating.

3.5 PAINTING SCHEDULES

SYSTEM NO. 5-E-Z

Items or surfaces to be coated: Pump Accessories including but not limited to the discharge tube with elbow, lid, wall pipe/thimble, base plate, anti-swirl vortex and suppression cone and all other metal components associated with the pumps that are not corrision resistant.

SURFACE PREPARATION	1st COAT	2nd COAT	3rd COAT	4th COAT
White metal blast cleaning	Vinyl zinc-rich VZ-108d (double spray coat)	Gray Vinyl V-766e (double spray coat)	White Vinyl V-766e (double spray coat)	Gray Vinyl V-766e (double spray coat)

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SECTION 11280

SLUICE AND FLAP GATES

PART 1 GENERAL

1.1 REFERENCES

The following publications of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the references thereto.

ASTM INTERNATIONAL (ASTM)

ASTM A 108	(2007) Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished
ASTM A 126	(2004) Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings
ASTM A 194/A 194M	(2007) Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High-Pressure or High-Temperature Service, or Both
ASTM A 320	(1993) Alloy Steel Bolting Materials for Low-Temperature Service
ASTM A 276	(2006) Standard Specification for Stainless Steel Bars and Shapes
ASTM A 582/A 582M	(2005) Standard Specification for Free-Machining Stainless Steel Bars
ASTM B 21/B 21M	(2006) Standard Specification for Naval Brass Rod, Bar, and Shapes
ASTM B 584	(2006a) Standard Specification for Copper Alloy Sand Castings for General Applications
ASTM F 593	(2002e2) Stainless Steel Bolts, Hex Cap Screws, and Studs
ASTM F 594	(2002) Standard Specification for Staninless Steel Nuts

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C501	(1992) Cast Iron Sluice Gates

ASME INTERNATIONAL (ASME)

ASME B1.1	(2003) Unified Inch Screw Threads (UN and UNR Thread Form)

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA MG 1 (2007) Standard for Motors and Generators

1.2 GENERAL REQUIREMENTS

The contract drawings indicate the extent and general arrangement of the gate and pedestal (lift) system. See sheet M-05 for schedule of sizes and details for sluice and flap gates. The gate and pedestal (lift) shall fit into the allotted space and shall allow adequate acceptable clearances for installation, replacement, servicing and maintenance. All threads shall meet the requirements of ASME B1.1. The work covered by this section consists of fabrication, shop assembly, delivery, and installation of sluice gates, pedestal (lift), flap gates and appurtenant items as specified and shown on the drawings.

1.3 Standard Products

Material and equipment shall be the standard product of a reputable manufacturer having had at least 5 years of successful experience in the design and manufacture of such items. Upon installation, gates shall be watertight as specified in AWWA C501. Thimbles shall be sufficiently rigid to preclude distortion during installation.

1.4 Verification of dimensions

The contractor shall become familiar with all details of the work, verify all dimensions in the field, and advise the contracting Officer of any discrepancy, before performing any work.

1.5 SUBMITTALS

Government approval is required for all submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following items shall be submitted in accordance with SECTION 01330 SUBMITTAL PROCEDURES.

SD-02 Shop Drawings

Sluice Gates and Flap Gates; G,DT

Shop drawings shall be submitted for sluice gates and flap gates showing details for mounting, materials description, calculations (sluice gates opening and closing torque, stem buckling strength & pedestal (lift)), gate operating pedestal (lift), concrete reinforcement, anchorage, dimensions, and construction and manufacturer's installation procedures. The shop drawings shall show the clearance dimensions between stem couplings and stem guides and the end of the stem and the top of the stem cover, in both the open and closed positions of the sluice gates. Manufacturer's catalog data, including specifications and full descriptive data, shall be submitted for all materials and equipment furnished. Contractor shall be responsible for verifying that the specific manufacturers' sluice gates to be provided at the listed location will fit and function in the area available.

SD-03 Product Data

a. Sluice gates including stems and operating pedestal (lift)and manual gearbox.; G,DT

b. Portable operators and tripod support stands.; G,DT

c. Flap gates.; G,DT
Warranty for items as specified in Paragraph 3.4: WARRANTY.

SD-05 Design Data

Gate Stem and Pedestal (lift); G,DT

Appropriate design data and computations shall be submitted to substantiate the sizing of the gate stem and pedestal (lift). Design information as specified in Paragraph 2.2: DESIGN DATA.

SD-10 Operation and Maintenance Data

Repair Manuals; G,DT

The Contractor shall furnish six copies of installation, operation, maintenance, lubrication and repair manuals for all equipment installed. Maintenance data and operating instruction as specified in Paragraph 3.2: MAINTENANCE AND OPERATING MANUALS.

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

Materials shall meet the requirements of the following referenced publications. Use of other grades or alloys shall be requested in writing and will be subject to approval. As an alternative to the above requirements, the manufacturer may submit a standard computer product selection printout based on the manufacturer's certified test data. Manufacturer shall certify that the computer selected equipment meets the requirements of ASTM, NEMA MG 1, or AWWA and the requirements of the drawings and these specifications.

2.2 Iron Castings.

ASTM A 126, Class B.

2.3 Naval Brass.

ASTM B 21/B 21M, Copper Alloy UNS No. C 46400 or 48200 temper, optional.

2.4 Manganese Bronze.

ASTM B 584, high-strength yellow brass, Copper Alloy No. C 86500.

2.5 Cold Rolled Steel.

ASTM A 108, Grades 1010 through 1020.

2.6 Stainless Steel.

a. ASTM A 276, Type 304, Condition A or B, type of finish optional.

b. ASTM A 582/A 582M, Type 303, Condition A (annealed), type of finish optional.

2.7 Bolting Materials.

a. ASTM A 320, Grade B8 (ANSI 304) or B8F (ANSI 303).
b. ASTM A 194/A 194M, Grade 8 (ANSI 304) or 8F (ANSI 303).

2.8 Painting.

Machined surfaces shall be coated with a water resistant rust preventative compound. All cast iron parts shall be shop cleaned and painted in accordance with the manufacturer's standard protective epoxy coating.

2.2 DESIGN DATA

2.2.1 Gates

Design computation and technical data showing factors of safety, calculations of stresses, and other information necessary to assure compliance with the drawings and specifications shall be submitted to the Contracting Officer.

2.2.2 Pedestal (Lift)

The Contractor shall submit calculations, which clearly show how the size of the gate operator pedestal (lift) was chosen. For the sluice gate pedestal (lift), a friction factor of 0.6 shall be used for pedestal (lift) selection and a friction factor of 0.70 shall be used to unseat the gate from its wedge. The gate size and the heads shall be those specified below.

2.9 GENERAL DESIGN

Component parts shall be designed for the seating and unseating heads specified herein using a minimum safety factor of 5. The gate stem be sized and guided, so that, the slenderness ratio (L/R) shall not exceed 200. The opening and closing forces for design of the stem and stem block anchorage shall include friction load based on the operating face pressure (55 feet), back pressure (20 feet) and operating pressure (20 feet) with coefficient of friction of not less than 0.6 in addition to the weight of the gate and stem. Stem design shall include a factor of safety of 5 against failure in addition to the column buckling strength reduction effects as given by the Euler formula.

2.4 SLUICE GATES

Sluice gates and pedestal (lift) shall meet requirements of AWWA C501. Upon installation gates shall be watertight as specified in AWWA C501. Gates (sluice and flap) and accessories shall be of the following design:

a. Sluice gates shall be rising stem.
b. Sluice gates shall be standard or flush bottom as shown.
c. Sluice gate frames shall be flange back type unless otherwise shown.
d. Wall thimbles shall be standard type "F" with two vent holes locations as recommended by the gate manufactures and sufficiently rigid to preclude distortion during installation.

2.10 Installation

The sluice gate installations shall be furnished complete with frames, leaves, stems, adjustable stem guides, thimbles and anchor bolts, complete and operable in all respects as described herein and as indicated. The gates shall be of the pressure seating type, and shall be designed for the face pressures and back pressures specified in paragraph 2.3 "General Design". The operating head shall be based on the centerline of the gate. The capacities of the operating pedestal (lift) shall be based upon the pressures exerted on the entire area enclosed by the gate-sealing surface (seating faces).

2.11 Components

2.11.1 Wall Thimbles

Wall thimbles shall be one piece cast iron of the type "F" and length shown on the drawings. The thimbles shall meet the applicable requirements of AWWA AWWA C501. The thimble shall be of cast iron with the iron flange machined to a plane to provide a true seating surface for the sluice gate frame. Holes shall be drilled and tapped in the thimble to match the mounting hole pattern of the sluice gate frame. The gate frames shall be attached to the thimble by standard of the material specified. A gasket of uniform thickness shall be provided between the sluice gate and the thimble. The wall thimble shall be internally braced during concrete placement. Thimble shall be plumb in both planes within +/- 1/16 inch.

2.11.2 Frame and Guides

The frames and guides shall be cast iron of ample section to prevent distortion. Seat facings shall be naval brass and shall be machined to a smooth finish for making a tight seal meeting the requirements of AWWA C501. The frame guide shall be of one piece cast iron construction. The frame guides shall be equipped with bronze faced wedge seats or adjustable side wedges; and the guides shall be of sufficient length so that not less than one-half of the gate is within the guides when the gate is completely open. The side wedges shall be manganese bronze. Wedges shall be designed in such a manner that the wedge and fastening bolts may be replaced without the removal of the gate frame from the masonry or other setting, and their attachments adequate to resist tight closures of the gate. Gates to be operated under back pressure heads greater than 10 feet shall have: top and bottom wedges for standard bottom gates, and top wedges only for flush bottom gates.

2.11.3 Gate Leaves

Gate leaves shall be of cast iron, consisting of flat castings with horizontal and vertical ribs of ample section to withstand all of the specified conditions of operation with limited distortion to prevent leakage. The seating surfaces shall be of naval brass not less than 3/4" wide and shall be machined to a 63 micro-inch finish or better and attached by dovetail notching to make a watertight seal. The gate shall be guided in the frame with a tongue and groove construction. The tongue and grooves shall be machined full length with a 1/8-inch overall clearance in the frame guide groove.. Side wedges shall be faced with manganese bronze mounted and secured to prevent rotation that would interfere with their proper action or cause the gate to bind, in addition to meeting the requirements of AWWA C501.

2.11.4 Stems

The stems shall be of stainless steel conforming to ASTM A 276, Type 304 with a 63 micro-inch finish if machine cut or 32 micro-inch if rolled threads, and shall be of the sizes recommended by the manufacturer. No detectable flaws or surface imperfections will be permitted. The stems shall be provided with thrust nuts of corrosion resisting metal and shall have adjustable stop nuts to limit the upward and downward travel of the stems. The stems shall be of a size to withstand the axial compressive and tensile forces created during gate operation under the specified unbalanced heads and to transmit in compression at least two times rated output of the pedestal (lift) with a 25 pound effort on the crank or handwheel. Threads on stems shall be machine cut or rolled with single or double lead threads of the Acme type. The exterior corners of the threads shall be given a slight radius of approximately 0.015-inch in order to prevent them from acting as cutting edges as the stem passes through the pedestal (lift) nut.

2.11.5 Stem Guides

Stem guides shall be a manufacturer's standard product, except as specifically provided herein, and be adjustable in two directions to provide full adjustment for proper alignment of the stem. The stem bearing, in the stem guides, shall be brass or bronze bushed. The guides shall be anchored in an approved manner with not less than two bolts.

2.11.6 Stem Covers

Weathertight and dust-tight stem covers shall be provided to enclose and protect the threaded portion of the gate stem projecting above the operating stand. Stem covers shall be fabricated from schedule 40 pipe or approved equivalent. Plastic or thin gage metal type stem covers will not be accepted. The stem covers shall slotted vertically so that the top of the stem will be visible throughout its distance of travel during opening and closing the gate. The stem covers slot shall be covered by a removable transparent window securely mounted on the cover. The ferrous metal stem cover shall be painted with an exterior type epoxy in accordance with paragraph 3.3 of this section.

2.12 Operating Pedestal (Lift)

Sluice gates shall be provided with operating pedestal (lift) as shown.

2.12.1 General

The operating pedestal (lift) shall be designed for both weatherproof and outdoor service, totally enclosed gear type with center stem lubrication system, pedestal (lift) indicator, square manganese bronze lifting nut, ball bearings or tapered roller bearings above and below the flange, and machined friction surfaces. Manual gearbox operators shall be manufactured from high strength, high quality materials to provide maximum service and dependability. All gears in the manual gearboxes are to be machined generated from high strength alloy steel, ensuring minimum backlash and smooth operation. Input and output bevel gears are to be supported by anti-friction roller bearings to provide maximum efficiency. Output drive shall have a removable stem nut, made of high tensile bronze or other material compatible with the valve stem material, which maybe tapped or bored/keyed to suit application requirements. The nut arrangement, where possible, shall be of the two-piece type to simplify field replacement. Where input torques dictate, additional input spur gearing shall be

available and be of the same material as described above. The operating stand capacity shall be such that each gate can be operated under the operating pressure (head in feet) in accordance with paragraph 2.3 "General Design", with a maximum effort on the handle not in excess of 40 pounds or rim effort at the maximum required torque and the lever arm (hand crank radius) shall not exceed 15 inches. Cranks (metallic handwheels) shall be equipped with a smooth brass grip rotating freely on the handle of the crank. Cranks shall be removable and shall be provided with a 2" AWWA Hub Nut for use with a portable operator. . The stand shall be capable of being driven by a portable operator, specified in paragraph 2.12.4. The operating stand system shall be capable of opening and closing the gate within 5 minutes using portable operator. Gearbox and floor stand pedestal (lift) shall be made of fabricated steel or cast iron with smooth exterior surfaces, equipped with stem covers and vandal proof position indicators, be permanently lubricated and designed for both weatherproof and outdoor service.. Exposed fastenings of 1-1/2 inch diameter and less shall have American Standard hexagon socket (Allen) type wrench heads. Provisions shall be made to lubricate all working parts of the operating pedestal (lift), and to prevent rainwater and contaminants from entering the gear case. Approved means for lubrication of the threaded portion of the gate stem shall be provided in the stand or in the stem cover. The gear case shall be plainly marked in the vicinity of each shaft connection provided for the crank, with a raised arrow and the word "OPEN" indicating the correct direction to turn to open. Painting shall be in accordance with para. 3.4 of this section.

2.12.2 Position Indicators

Weathertight and dusttight stem position indicators shall be provided for each gate stand. The indicators shall be of the dial or counter type, mounted in a cast housing on the pedestal (lift), and with the face of the counter showing through a window in the housing easily read from the crank location.

2.12.3 Drawings for Approval

Drawings showing the dimensions and details required to locate and install the component assemblies shall be submitted for the engineer's approval prior to fabrication.

2.12.4 Portable Operator

Provide two portable operators for the sluice gates located in the various gate wells. The operator shall be equipped with an adjustable extension stem with socket for raising and lowering the rising stems on the sluice gates. The operator will be a heavy duty 1-1/4" electric drill with a heavy duty, double-pawl trigger and reversing switch. Reversing switch gives full power in forward or reverse. Hold-down on/off switch shuts off unit when released. Supply operator with a three-conductor cord and three-plate, grounding type plug, 120 voltage. Operator shall supply 50 foot lbs. of torque and have an adjustable, spring loaded drive, pawl-type, releasing instantly at preset, predetermined torque of 600 inch lbs. Provide a tripod support of welded tube construction with fully welded gusset plates. Jack screw with rotating nut for changing height of drill support. Complete operator with drill shall have a maximum weight of 100 lbs.

2.13 PUMP AND GRAVITY FLOW FLAP GATES, EXCEPT STRUCTURE 273, SEE PARAGRAPH 2.14 FOR INSERTABLE TYPE CHECK VALVE IN AN EXISTING PIPELINE

Flap gates and accessories shall be of the size, type, material and construction shown on the drawings and specified herein. All component parts shall be of the type and material indicated below. The gate shall be designed to allow free outflow and prevent back flow for up to maximum seating heads. For pump discharge type flap gates a spring steel and rubber bumping blocks will be used to prevent shock if gate opens beyond the horizontal position. Each gate shall be designed so that it will operate freely and function properly under all conditions of operation from minimum to maximum head and will seat true and be watertight when seated; and operating parts shall be designed and fitted so that under all conditions of operation the seat rings will be in contact in the entire perimeter, when gate is closed, and the actual bearing of the disc seat ring on the frame seat ring will be not less than 75 percent of the total bearing area at all points on the perimeter. The frames shall be designed so as to fasten securely to the concrete walls, or flanged end pipes, and shall be so attached that no leakage will occur between the frame and the wall when the gates are closed. Gates shall be designed to operate with 6-inch head differential. Gate pump discharge outlets shall be designed to withstand safely impact loads and heads to which they may be subjected in service due to starting and stopping of pumps.

2.13.1 Flap Gate Components

2.13.1.1 Seat

The seat shall be flat back one piece with a raised section around the perimeter of the waterway opening to provide for mounting the seating face. The raised section shall provide a seating plane to assist in positive closure of the cover. The seat shall be shaped to provide two bosses extended above the top of the waterway opening for mounting the top pivot lugs. Pivot lug bosses shall be drilled and tapped for mounting studs. Seat shall be flat back as shown in the Flap Gate details. The flat back gate shall be designed for attaching to the wall thimble.

2.13.1.2 Cover

The cover shall be one piece cast iron with necessary reinforcing ribs, with a lifting eye for manual operation, and with bosses to provide a pivot point connection with the links. Bosses shall be designed to place the hinge bolts in double shear when gate is assembled.

2.13.1.3 Seating Faces

The cast iron seating faces on the seat and the cover shall be machined to a plane with a minimum 63 micro inch finish.

2.13.1.4 Pivot Lugs

Each pivot lug shall be one-piece cast iron. Lugs shall have double bosses to place the top hinge bolts in double shear when they are assembled through the links. The lugs shall be adjustable in the horizontal plane without removal of the cover from the gate links. The adjustment shall allow the top pivots to be moved toward the gate seat for reduced sensitivity of the cover, or moved away from the gate seat to provide opening with a minimum differential head. Two studs shall be used to connect each pivot to the gate seat.

2.13.1.5 Links

The links connecting the cover and pivot lugs shall be one piece heavy-duty cast iron. Each link shall be provided with commercial grade bronze bushings at each pivot point. The bottom of the links shall be provided with an adjusting screw to properly align seating faces on the cover with respect to the seat. The links shall be designed to limit the double hinge action, preventing the cover from rotating sufficiently to become wedged in the open position.

2.13.1.6 Fasteners

All anchor bolts, assembly bolts, screws and nuts shall be of stainless steel of ample section to safety withstand the forces created by operation of the gate. Quantity and size of the fasteners shall be as recommended by the manufacturer. Anchor bolts shall be furnished with two nuts each to facilitate installation and alignment of the flat back gates when attached to concrete.

2.13.1.7 Materials

Materials shall conform to the requirements of the following Standards:
Cast Iron ASTM A 126, Class B
Stainless Steel (Fasteners) ASTM F 593, ASTM F 594

2.14 INSERTABLE (SLIP LINE) CHECK VALVE IN AN EXISTING PIPELINE FOR 18-INCH RCP PIPE IN STRUCTURE 273

Install a one piece insertable (slip line) elastomer silent, non-slamming type check valve in an existing 18-inch RCP pipeline located within Structure 273 found on sheet C-07 on contract drawings. The elastomer material of the check valve shall be Polyurethane to provide abrasion resistance, low temperature flexibility, tear resistance, ozone and weathering resistance and be resistant to oil, fuel, diluted acids, and many hydrocarbons. The elastomer check valve will be installed with an inner expansion type clamp with an interference type fit.

PART 3 EXECUTION

3.1 Services of Gate Manufacturer Erecting Engineer

The setting, installation, assembly, lubrication, and testing of the sluice gates and hoisting units shall be in accordance with the instructions of the gate manufacturer as approved by the Contracting Officer. An erecting engineer who is an employee of the manufacturer shall inspect and determine the adherence to the above instructions for the setting of the gate thimble or anchor bolts, the stem guide anchor bolts, and the hoisting unit; and observe the initial gate operations using the hoist. The Contractor shall make all arrangements for the presence of the erecting engineer for this inspection and shall bear all expenses incurred. The presence of the erecting engineer, however, will not relieve the Contractor of full responsibility.

3.2 INSTALLATION

3.2.1 Assembly

Prior to assembly, the gate stems shall be thoroughly cleaned, for inspection by the Contracting Officer or his representative. All parts of the gates and operating mechanisms shall be installed and fitted together so that after final assembly there will be no interference through bad alignment, or any warping or twisting of the members that would in any way interfere with operation. All finished contact or bearing surfaces shall be true and exact to insure full and complete contact. All bolts for attaching the gate frames, stem guides, and operating hoists shall be accurately embedded at the time of placing concrete. Provisions for lubrication of the operating mechanisms shall be made and the lubrication systems shall be properly filled with suitable lubricant as recommended by the manufacturer of the hoists. When the slide is in the fully closed position and wedged in position against the frame, maximum clearance between mating faces shall not exceed .004 inch.

3.2.2 Sluice gate units and operating pedestal (lift)

Gate units including operating pedestal (lift) shall be installed in accordance with the manufacturer's recommended written instructions for installation, as approved, and the requirements specified herein and indicated on the drawings. Wall thimbles and anchor bolts shall be set in place prior to the placing of concrete. Contractor shall be required to take vertical and horizontal readings over the seating surface at enough locations so as to ascertain that the requirements of specifications have been met. Unit shall be securely held in place during concrete placing by means of steel template or other approved method. Each unit shall be accurately aligned and, if upon completion of the work there is any misalignment or other defective workmanship which is likely to impede the operation of the gate, the necessary corrections shall be made by the Contractor at no additional expense to the Government. The bottom frame member of flush bottom sluice gates shall be embedded in an asphalt mixture as shown.

3.2.3 High Slump Concrete Grout

For high slump concrete grout fill mixture refer to concrete specification under structural sections.

3.2.4 Flap gate installation

Flap gates shall be installed in accordance with the approved shop drawings and the manufacturer's recommendations.

3.2.5 Test and Trial Operation

After final assembly, each gate shall be tested in the presence of the manufacturer erecting engineer and the Contracting Officer or his representative by raising and lowering it throughout its complete travel by means of its operating mechanism to demonstrate that it complies with the specifications. Any defective part, or error in the construction or alignment of the complete gate discovered during the tests and trials shall be immediately corrected by the Contractor without cost to the Government.

3.3 MAINTENANCE AND OPERATING MANUALS

The Contractor shall furnish ten (10) sets of maintenance data and operating instructions, including parts list, for the sluice gate equipment covering, servicing, and dismantling of the respective items. The manuals shall be furnished to the Contracting Officer not later than the date the equipment is shipped from the manufacturer's plant. Each set shall be permanently bound and shall have on the cover the following: (1) the words "Operating and Maintenance Instructions", (2) the name and location of the project, (3) the Contractor's name, (4) invitation number, and (5) the contract number. Flysheets shall be placed before instructions covering the subject. The sheet shall be approximately 8-1/2 by 11 inches, with large sheets of drawings folded in. Each set shall include, but not be limited to, the following:

a. Operation and maintenance instructions for each piece of equipment, including lubrication instructions.
b. Manufacturer's bulletins, cuts, and descriptive data.
c. Parts list and recommended spare parts.

3.4 FACTORY FINISHING

Painting for Flap and Sluice gates, Manual Gearbox Operator, Floor stand and Appurtenances

Ferrous surfaces, except galvanized or stainless steel surfaces, shall be cleaned and shop coated with the manufacturers standard protective epoxy coating. Items to be finished painted shall not be given a bituminous protective coating. Surface shall be cleaned with solvents to remove grease and oil. Then sandblasted (near white metal) to remove loose rust, loose mill scale, and other foreign substances. Surfaces of items embedded in concrete shall not be painted.

3.5 TOOLS

Two sets of wrenches, two portable operators with tripod support stands (para. 12.2.4) and special tools required for the operation and maintenance of the sluice gates installed under this contract shall be furnished at the time of the trial operation specified in Paragraph 3.1.4: Tests and Trials. All tools will be stored at main facilities of both local sponsors.

3.6 WARRANTY

The following items provided under this section of the specifications shall be guaranteed for a period of one year from the date of acceptance thereof, either for beneficial use or final acceptance, whichever is earlier, against defective material, design, and workmanship.

a. Sluice gates including stems and manual gearbox operator, operating pedestal (lift), floor stands, and appurtenances.
b. Flap gates.

Upon receipt of notice from the Government of failure of any part of the guaranteed equipment during the guarantee period, the effected parts shall be replaced promptly with new parts by the Contractor and at no additional cost to the Government.

3.7 QUALITY CONTROL

The Contractor shall establish and maintain quality control for work under this section to assure compliance with contract requirements and maintain records of his quality control for all construction operations including but not limited to the following:

a. Materials and workmanship.
b. Installation.
c. Trial operation of each gate.
d. Adjustment.

A copy of the records of inspections and tests, as well as the records of corrective action taken, shall be furnished to the Government as directed by the Contracting Officer.

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SECTION 11289

CLOSURE GATES

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN WELDING SOCIETY (AWS)

AWS A5.1	(2003) Carbon Steel Electrodes for Shielded Metal Arc Welding
AWS A5.5	(1996) Low-Alloy Steel Electrodes for Shielded Metal Arc Welding
AWS D1.1/D1.1M	(2004) Structural Welding Code - Steel
AWS D1.2	(2003) Structural Welding Code - Aluminum
AWS D6.1	(1999) Structural Welding Code - Stainless Steel

ASTM INTERNATIONAL (ASTM)

ASTM A 240/A 240M	(2007e1) Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
ASTM A 276	(2006) Standard Specification for Stainless Steel Bars and Shapes
ASTM A 325	(2007a) Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
ASTM A 36/A 36M	(2005) Standard Specification for Carbon Structural Steel
ASTM A 490	(2006) Standard Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength
ASTM A 53/A 53M	(2007) Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
ASTM A 500/A 500M	(2007) Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and

	Shapes
ASTM A 668/A 668M	(2004) Standard Specification for Steel Forgings, Carbon and Alloy, for General Industrial Use
ASTM B 22	(2002) Standard Specification for Bronze Castings for Bridges and Turntables
ASTM D 2240	(2005) Standard Test Method for Rubber Property - Durometer Hardness
ASTM D 395	(2003) Standard Test Methods for Rubber Property - Compression Set
ASTM D 412	(2006a) Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension
ASTM D 413	(1998; R 2002e1) Rubber Property - Adhesion to Flexible Substrate
ASTM D 471	(2006) Standard Test Method for Rubber Property - Effect of Liquids
ASTM D 572	(2004) Rubber Deterioration by Heat and Oxygen
ASTM F 593	(2002e2) Stainless Steel Bolts, Hex Cap Screws, and Studs
ASTM D 2137	(2000) Rubber Property - Brittleness Point of Flexible Polymers and Coated Fabrics

ILLINOIS DEPARTMENT OF TRANSPORTATION (IDOT)

IDOT	(2007) Standard Specifications for Road and Bridge Construction; and current Supplemental Specifications and Recurring Special Provisions

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

CID A-A-1928	(Rev C) Padlock (Combination)
FS RR-W-410	(Rev E) Wire Rope and Strand

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Detail Drawings; G, AE

Detail drawings shall be submitted as specified herein and in Section 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

SD-03 Product Data

Materials

System of identification which shows the disposition of specific lots of approved materials and fabricated items in the work shall be submitted before completion of the contract.

Materials orders, materials lists and materials shipping bills shall be submitted as specified in Section 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

Sequencing and Scheduling; G, AE

Sequencing and scheduling plan shall be submitted and approved before the work is commenced.

Welding; G, AE

Schedules of welding procedures for structural steel shall be submitted as specified in Section 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

Paint Color Chart; G, AE

Submit Munsell Paint Color Chart for final paint coat color to be selected by the Government.

Leak Test Procedures; G, AE

Submit procedure for leak testing gates and method of measuring leakage as evidence of conformance with the requirements of this specification.

SD-04 Samples

Materials; G, AE
Manufactured Units; G, AE
Fabrications; G, AE

Samples shall be submitted and approved prior to use of the represented materials or items in the work. Samples of standard and shop fabricated items shall be full size and complete as required for installation in the work. Approved samples may be installed in the work provided each sample is clearly identified and its location recorded.

SD-06 Test Reports

Tests, Inspections, and Verifications

Certified test reports for material tests shall be submitted with all materials delivered to the site.

1.3 QUALIFICATION OF WELDERS AND WELDING OPERATORS

Qualification of welders and welding operators shall conform to the requirements of Section 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

1.4 DELIVERY, STORAGE, AND HANDLING

Delivery, handling, and storage of materials and fabricated items shall conform to the requirements specified herein and in Section 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

1.4.1 Rubber Seals

Rubber seals shall be stored in a place which permits free circulation of air, maintains a temperature of 70 degrees F or less, and prevents the rubber from being exposed to the direct rays of the sun. Rubber seals shall be kept free of oils, grease, and other materials which would deteriorate the rubber. Rubber seals shall not be distorted during handling.

1.5 SEQUENCING AND SCHEDULING

A sequencing and scheduling plan which illustrates that work affecting roadways has been coordinated with IDOT and the City of Prospect Heights, shall be developed. The plan shall include schedules, lists of labor or materials to be provided the affected governing agencies, and any other aspects of the work that may impact on the operations of these entities as specified in Section 01320A PROJECT SCHEDULE FOR NORTHERN AREA AND MCCOOK FIELD OFFICES. The protection plan shall clearly demonstrate how all public or private roads, streets, or highways will be kept open to traffic at all times during the construction period, except as otherwise specified or directed. Refer to Section 01550 MAINTENANCE OF TRAFFIC for other requirements such as warning signs, flagmen, permits, and debris removal.] Road Closures for leak testing gates and for acceptance trial operation shall be coordinated with the Illinois Department of Transportation (IDOT) and the City.

PART 2 PRODUCTS

2.1 MATERIALS

Materials orders, materials lists and materials shipping bills shall conform with the requirements of Section 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

2.1.1 Metals

Structural steel, steel forgings, steel castings, stainless steel, bronze, and other metal materials used for fabrication shall conform to the requirements shown and specified herein and in Section 05502 METALS: MISCELLANEOUS, STANDARD ARTICLES, SHOP FABRICATED ITEMS.

2.1.1.1 Structural Steel

Structural steel shapes shall conform to ASTM A 36/A 36M and ASTM A 500/A 500M. Structural steel plates shall conform to ASTM A 36/A 36M.

2.1.1.2 Steel Pipe

Steel pipe shall conform to ASTM A 53/A 53M, Type S, Grade B, seamless, black, nominal size and weight class or outside diameter and nominal wall thickness as shown.

2.1.1.3 Bronze Castings

Bronze castings including bushings and thrust washers shall conform to ASTM B 22, Copper Alloy UNS No. C91300.

2.1.1.4 Stainless Steel Bars and Shapes

Stainless steel bars and shapes shall conform to ASTM A 276, UNS S 20910, Type XM-19, Fy=55ksi.

2.1.1.5 Stainless Steel Plate, Sheet, and Strip

Stainless steel plate, sheet, and strip shall conform to ASTM A 240/A 240M, UNS S 31600. Plate finish shall be hot-rolled, annealed or heat-treated, and blast-cleaned or pickled. Sheet and strip finish shall be No. 1.

2.1.1.6 Grout

Non-shrink type, premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing additives, capable of developing a minimum compressive strength of 7,000 psi at 28 days.

2.1.2 Rubber Seals

a. Rubber seals shall be fluorocarbon (Teflon) clad rubber seals of the mold type only and shall be compounded of natural rubber, synthetic polyisoprene, or a blend of both, and shall contain reinforcing carbon black, zinc oxide, accelerators, antioxidants, vulcanizing agents, and plasticizers. Physical characteristics of the seals shall meet the following requirements:

PHYSICAL TEST	TEST VALUE	TEST METHOD SPECIFICATION
Tensile Strength	2500 psi (min.)	ASTM D 412
Elongation at Break	450 percent (min.)	ASTM D 412
300 percent Modulus	550 psi (min.)	ASTM D 412
Durometer Hardness (Shore Type A)	45 to 55	ASTM D 2240
Water Absorption	5 percent by weight (max.)	ASTM D 471
Compression Set	30 percent (max.)	ASTM D 395, Method B
Tensile Strength (after aging 48 hrs.)	80 percent of tensile strength (min.)	ASTM D 572 Oxygen Bomb Method

PHYSICAL TEST	TEST VALUE	TEST METHOD SPECIFICATION
Low temperature	Non-Brittle after 3 feet @ -40C	ASTM D 2137 Method A

* The "Water Absorption" test shall be performed with distilled water. The washed specimen shall be blotted dry with filter paper or other absorbent material and suspended by means of small glass rods in the oven at a temperature of 70 degrees C plus or minus 2 degrees C for 22 plus or minus 1/4 hours. The specimen shall be removed, allowed to cool to room temperature in air, and weighed. The weight shall be recorded to the nearest 1 mg as M1 (M1 is defined in ASTM D 471). The immersion temperature shall be 70 degrees C plus or minus 1 degree C and the duration of immersion shall be 166 hours.

b. J-type seals shall be 7-inches long with a 1¾" solid bulb and 9/16" stem, molded (not extruded) from compounds of natural rubber, EPDM or neoprene, with overall length of 7 inches.

c. J-type seals shall be designed for a ¼" preset space between the seal and the sealing surface to ensure compression of the seal against the sealing surface.

d. Transitions from bottom to side seals shall be made with special molded corner pieces factory hot vulcanize spliced to the main seal pieces at approximately 1 foot from the corner in accordance with the seal manufacturer's recommendations.

e. Seals must form a continuous watertight envelope with factory hot vulcanized splices.

2.1.2.1 Fabrication of Seals

Rubber seals shall have a fluorocarbon film vulcanized and bonded to the sealing surface of the bulb. The film shall be 0.060 inch thick Huntington Abrasion Resistant Fluorocarbon Film No. 4508, or equal, and shall have the following minimum physical properties:

Tensile strength ..... 2,000 psi

Elongation..... 250 percent

The outside surface of the bonded film shall be flush with the surface of the rubber seal and shall be free of adhering or bonded rubber. Strips and corner seals shall be molded in lengths suitable for obtaining the finish lengths shown and with sufficient excess length to provide test specimens for testing the adequacy of the adhesion bond between the film and bulb of the seal. At one end of each strip or corner seal to be tested, the fluorocarbon film shall be masked during bonding to prevent a bond for a length sufficient to hold the film securely during testing. The teflon coating shall extend a minimum of 3 inches beyond the contact width on each side. Test of bond strength of the Teflon to the rubber shall be performed per ASTM D 413

2.1.3 Testing of Rubber Seals

The fluorocarbon film of rubber seals shall be tested for adhesion bond in accordance with ASTM D 413 using either the machine method or the deadweight method. A 1 inch long piece of seal shall be cut from the end of the seal which has been masked and subjected to tension at an angle approximately 90 degrees to the rubber surface. There shall be no separation between the fluorocarbon film and the rubber when subjected to the following loads:

Thickness of Fluorocarbon Film	Machine Method at 2 inches per minute	Deadweight Method
0.060 inch	30 pounds per inch width	30 pound per inch width

2.2 TESTS, INSPECTIONS, AND VERIFICATIONS

Tests, inspections, and verifications for materials shall conform to the requirements specified herein and in Section 05055 METALWORK FABRICATION, MACHINE WORK, AND MISCELLANEOUS PROVISIONS.

2.3 MANUFACTURED UNITS

Bolts, nuts, washers, screws and other manufactured units shall conform with the requirements shown and specified herein and in Section 05502 METALS: MISCELLANEOUS, STANDARD ARTICLES, SHOP FABRICATED ITEMS.

2.3.1 Bolts, Nuts and Washers

High-strength bolts, nuts, and washers shall conform to ASTM A 325, or ASTM A 490. Bolts, nuts, studs, stud bolts, anchor bolts and bolting materials other than high-strength shall conform to ASTM F 593, Type 316, condition A, Alloy and ASTM F 593, Group Z, Fy=30ksi, with matching nuts and washers. Bolts 1/2 inch and larger shall have hexagon heads. The finished shank of bolts shall be long enough to provide full bearing. Washers for use with bolts shall conform to the requirements specified in the applicable specification for bolts and to match the bolt material.

2.3.2 Screws

Screws shall be of the type indicated on the drawings.

2.3.3 Shackles, Turnbuckles and Clevises

Shackles, turnbuckles and clevises shall be of forged steel conforming to ASTM A 668/A 668M, zinc coated. Turnbuckles shall be end-threaded right and left hand and shall be of the size shown.

2.3.4 Hinges

Hinges shall be heavy duty stainless steel and shall be provided in accordance with details shown on the plans.

2.3.5 Grease Seals and V-rings

Grease seals and V-rings for the upper hinge and lower bearing shall be stainless steel and provided in accordance with the details shown on the plans.

2.3.6 Winches

Hand winches shall be worm gear of the type indicated on the drawings.

2.3.7 Sheaves

Sheaves shall be Type 316 stainless steel, sized for the wire rope used.

2.3.8 Wire Rope

Wire rope shall conform to FS RR-W-410, as shown on the drawings.

2.3.9 Chains and Attachments

Chains and attachments shall conform to Grade 70, 3/8", high strength poly coated alloy, steel transport chain.

2.3.10 Padlocks and Hasps

Padlocks shall conform to CID A-A-1928. Padlocks shall be keyed alike and provided with two keys. Hasps shall be of wrought steel and sized to accommodate padlocks.

2.4 FABRICATION

2.4.1 Detail Drawings

Detail drawings of closure gates and appurtenant items, including fabrication drawings, shop assembly drawings, delivery drawings, and field installation drawings, shall conform to the requirements specified herein and in Section 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

2.4.1.1 Fabrication Drawings

Fabrication drawings shall show complete details of materials, tolerances, connections, and proposed welding sequences which clearly differentiate shop welds and field welds.

2.4.1.2 Shop Assembly Drawings

Shop assembly drawings shall provide details for connecting the adjoining fabricated components in the shop to assure satisfactory field installation.

2.4.1.3 Delivery Drawings

Delivery drawings shall provide descriptions of methods of delivering components to the site, including details for supporting fabricated components during shipping to prevent distortion or other damages.

2.4.1.4 Field Installation Drawings

Field installation drawings shall provide a detailed description of the

field installation procedures. The description shall include the location and method of support of installation and handling equipment; provisions to be taken to protect concrete and other work during installation; method of maintaining components in correct alignment; method for installing hinge anchor plates, including checking and maintaining alignments of the plates during concreting, placement of grout and methods for installing other appurtenant items.

2.4.2 Structural Fabrication

Structural fabrication shall conform with the requirements shown and specified herein and in Section 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS. Components shall be shop-fabricated of the materials specified and shown. Dimensional tolerances shall be as specified and shown. Splices shall occur only where shown. Pin holes shall be bored in components after welding, straightening, stress-relieving, and threading operations are completed. Brackets, eye bar sections, and other components requiring straightening shall be straightened by methods which will not damage the material. Bronze bushings shall be press-fitted with supporting components. Bolt connections, lugs, clips, or other pick-up assembly devices shall be provided for components as shown and required for proper assembly and installation.

2.4.3 Welding

Welding shall conform with the requirements specified herein and in Section 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS. Welds shall be in accordance with AWS D1.1/D1.1M and AWS D1.2, and of the type shown and approved detail drawings. Radiographic examination is required on all shop and field welds of the type and location indicated. Welds which have been designated to receive radiographic examination and are found to be inaccessible to a radiation source or film, or are otherwise so situated that radiographic examination is not feasible may be examined, with written approval, by dye penetrant, magnetic particle tests, or ultrasonic tests. Components shall be stress-relief heat treated after welding where shown. Stress-relieving of components shall be performed prior to the attachment of miscellaneous appurtenances. All welded connections shall be made with AWS A5.1 or AWS A5.5, minimum 70 ksi strength welds.

All welding of stainless steel to stainless steel and stainless steel to carbon steel shall conform to the latest specification of the American Welding Society, AWS D6.1, using austenitic stainless electrodes, minimum 70 ksi tensile strength and the Boiler and Pressure Vessel Code (American Society of Mechanical Engineers (ASME). Use low carbon content weld consumables to prevent intergrannular corrosion E304L, E309L OR E316L for stainless to stainless welding or E309L for stainless to mild steel welding.

2.4.3.1 Nondestructive Examination

Welds to be subject to Nondestructive Examination are as follows:
(1) Main Framing (attachments to main girder): 20 percent of welds;
(2) All other welding for the gate: 10 percent of welds;
(3) Designated full penetration welds shall be tested by Ultrasonic Inspection or Radiographic testing;
(4) Designated fillet welds shall be tested by Magnetic Particle Inspection.

The location of welds to be tested shall be as specified by the Contracting

Officer's Representative (COR). Test method proposed or undesignated welds shall be the method best suited to selected welds, subject to approval by the COR.

2.4.4 Bolted Connections

Bolted connections shall conform with the requirements specified in Section 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

2.4.5 Machine Work

Machine work shall conform with the requirements specified in Section 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

2.4.6 Miscellaneous Provisions

Miscellaneous provisions for fabrication shall conform with the requirements specified herein and in Section 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

2.4.7 Fabrications

Fabrications shall conform to the following requirements.

2.4.7.1 Gate Leaf

Gate leaf shall be of welded structural steel fabrication. Gate leaf shall be provided complete with posts,hinge assemblies, seal assemblies, and other appurtenant components as specified and shown. The overall height of gate leaf shall not vary from the nominal dimension or differ from mating gate leaf by more than 1/4 inch. The surfaces of framing elements to which skin plates are to be welded shall not vary from a true plane by more than 1/4 inch.

2.4.7.2 Hinge Assembly

Outer cylinder of the hinge assembly shall be of steel pipe conforming to ASTM A 53/A 53M, Type S, Grade B. Cylinder bushing and thrust washer shall be of bronze casting conforming to ASTM B 22, Copper Alloy UNS No. C91300. Hinge pintle, base plate and masonry plate for the lower hinge assembly shall be of stainless steel conforming to ASTM A 276, UNS S 20910, Type XM-19, Fy=55ksi. The hinge pintle, pintle support box and stiffener plates, back plate and shim pack for the upper hinge assembly shall be of stainless steel conforming to ASTM A 276, UNS S 20910, Type XM-19, Fy=55ksi. After all welding is completed, the hinge assembly shall be stress-relieved by heat-treating. Stress-relieving shall be performed prior to machining.

2.4.7.3 Seal Assembly

Seal assembly shall consist of rubber seals, steel retainer and spacer bars, retractable support, and fasteners. Rubber seals shall be continuous over the full length. Seals shall be accurately fitted and drilled for proper installation. Bolt holes shall be drilled in the rubber seals by using prepared templates or the retainer bars as templates. Splices in the seals shall be fully molded, develop a minimum tensile strength of 50 percent of the unspliced seal, and occur only at locations shown. All vulcanizing of splices shall be done in the shop. The vulcanized splices between molded corners and straight lengths shall be located as close to

the corners as practicable. Splices shall be on a 45 degree bevel related to the thickness of the seal. The surfaces of finished splices shall be smooth and free of irregularities. Steel retainer bars shall be field-spliced only where shown and machine-finished after splicing. The retractable support shall be provided complete with hinge and operating winch.

2.4.7.4 Miscellaneous Embedded Metals

Wall armor, shear anchors, protection and seal plates and shapes, and other miscellaneous embedded metals shall be of structural steel or stainless steel conforming with the details specified herein and shown.

2.4.8 Shop Assembly

Shop assembly requirements for gates and appurtenant items shall be as shown and specified herein and in Section 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS. Gates and appurtenant items shall be assembled completely in the shop, unless otherwise approved, to assure satisfactory field installation. Adjoining components shall be fitted and bolted together to facilitate field connections. The matchmarking of unassembled items shall be carefully preserved until the items are assembled. Mating surfaces and machined surfaces shall be covered with a rust preventive until assembly. Assembled components shall be shop-welded in their final positions as much as delivery and field installation conditions will permit. Rubber seals shall be fitted and drilled to match the seal retainers, match-marked, and removed for shipment. Shop assembly and disassembly work shall be performed in the presence of the Contracting Officer unless waived in writing. The presence of the Contracting Officer will not relieve the Contractor of any responsibility under this contract.

2.4.9 Fits and Finishes

Fits and finishes for bearings shall be as specified on the plans and in accordance with the American Association of State Highway and Transportation Officials (AASHTO) Standard Specifications for movable Bridges and the American National Standards Institute (ANSI) B4.1 and B46.1.

PART 3 EXECUTION

3.1 QUALITY ASSURANCE

Fabricate and erect structural steel members and perform work in accordance with the American Institute of Steel Construction (AISC) and the Illinois Department of Transportation (IDOT) Standard Specifications for Road and Bridge Construction.

Fabricator shall be a company specializing in fabricating and performing the work specified in this Special Provision and as shown on the Plans with minimum 5 years documented experience and holding current AISC Certification for Category III: Major Steel Bridges.

Erector shall be a company specializing in performing the work specified in this Special Provision and as shown on the Plans with minimum 5 years documented experience.

3.2 MOCK UP

To ensure smooth operation of the gate, the Contractor must fabricate and install in the field one leaf of the Flood Gate, including concrete foundation and all necessary connections to the gate, for field review and approval by the Engineer. Any field or shop modifications required to correct deficiencies in the operation or fabrication of the gates as a result of this field mock-up shall be made at no additional cost to the Government.

3.3 FIELD MEASUREMENTS

Verify in field all measurements shown on the Plans and Shop Drawings prior to fabrication of material.

3.4 INSTALLATION

Installation shall conform with the requirements specified herein and in Section 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS. Gates and appurtenant items shall be assembled for installation in strict accordance with the contract drawings, approved installation drawings, and shop match-markings. Before assembly and installation, all bearing surfaces requiring lubrication shall be thoroughly cleaned and lubricated with an approved lubricant. All components to be field-welded shall be in correct alignment before welding is commenced.

The Contractor shall fabricate and install the movable steel plate at the bottom of the gate using a template to match the profile of the road, curb and sidewalk for a watertight seal.

Fabricate gate frame to be flat within 1/16".

Field adjust operating parts to ensure smooth and unhindered operation.

Dissimilar metals shall be separated from each other with approved gaskets or coatings to prevent galvanic corrosion.

3.4.1 Embedded Metals

Corner protection angles, sill angles, seal plates, frames, pedestals, bases and other embedded metal items required for proper and complete installation shall be accurately installed to the alignment and grade required to ensure accurate fitting and matching of components. Embedded metals shall be given a primer coat of the required paint on all surfaces prior to installation in concrete forms. Anchors for embedded metals shall be installed as shown. Items requiring two concrete pours for installation shall be attached to the embedded anchors after the initial pour, adjusted to the proper alignment, and concreted in place with the second pour. Welded field splices in sealing surfaces of embedded items shall be ground smooth.

3.4.2 Gate Leaf

Gate leaf components not assembled in the shop shall be assembled in the field as required for installation. Lower hinge assembly bearings and Pintle shall be coated with grease prior to setting the gate leaf in place. Grease fittings shall be flushed prior to connecting to bearing. All necessary precautions shall be taken to avoid distortion of the gate

leaf or any component parts. Special care shall be exercised during installation to prevent any sag of the ends of the gate leaf due to compression of blocking or other causes. After the top hinge assembly has been installed and adjusted, the gate leaf shall be attached to the bearings, plumbed and brought into correct position.

3.4.3 Top Hinge Assembly

By adjusting the shim pack and set screws, the upper pintle must be aligned and plumbed exactly with the lower pintle so as to prevent binding of the bearings when the truss is attached to them.

3.4.4 Painting and Paint Color Chart

Cleaning and painting shall conform to the IDOT Standard Specifications, CLEANING AND PAINTING NEW METAL STRUCTURES, and the paint manufacturer's recommendations.

Provide a 3 coat system, with all coats shop applied, consisting of an organic zinc rich primer coat, an epoxy intermediate coat and a urethane paint topcoat. The system shall be for full shop application of the coating system.

Color shall be as selected by the Government from the submitted Munsell Paint Color Chart

3.4.5 Seal Assemblies

Rubber seal assemblies shall be installed after the embedded metal components have been concreted in place and the gate installation, including painting, completed. Rubber seals shall be fastened securely to metal retainers. Before operating the gate, a suitable lubricant shall be applied to the rubber seal rubbing plates to protect the rubber.

3.5 PROTECTION OF FINISHED WORK

Protection of finished work shall conform to the requirements of Section 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

3.6 ACCEPTANCE TRIAL OPERATION

After completion of the gate installation, the Contracting Officer will examine the gates for final acceptance. The gates will be examined first to determine whether or not the workmanship conforms to the specification requirements. The Contractor will then be required to operate the gates from the fully-opened to the fully-closed position a sufficient number of times to demonstrate that all parts are functioning properly. The workmanship in the fabrication and installation of gates shall be such that the gates in the closed position will form a watertight barrier across the opening. Required repairs or replacements to correct defects, shall be made at no additional cost to the Government. The trial operation shall be repeated after defects are corrected. Prior to final acceptance of the gates, the Contractor shall provide temporary restraints to prevent unauthorized operation of the gates. The contractor shall coordinate the road closure with the Illinois Department of transportation (IDOT) and the City.

3.7 LEAKAGE AND LEAK TEST PROCEDURES

a. The steel flood gates, including connections to the concrete foundations, shall be substantially watertight with the water level up to the top of the topping over elevation.

b. Leak test the gates for a period of 4 hours, on a Saturday between the hours of midnight and 8 am. The leakage shall not exceed 0.1 gallons per minute per foot of periphery. Failure to pass the leak test will require repair and retest of the flood gate at no additional cost to the Government.

c. Leak test shall be monitored and certified by an independent testing agency, cost of which shall be paid for by the Contractor. Leak test will be approved by the Government.

3.8 TRAINING

The Contractor shall provide one training session for the Government and the City of Prospect Heights for instructing the staff on the operation, both opening and closing, and maintenance of the gate.

3.9 SUGGESTED SEQUENCE OF OPERATION

a. Unlock gate from Locking Structures.

b. Grease bearings.

c. Oil movable plate hinges.

d. Swing gates into closed position.

e. Remove manhole lids from the gate support foundations at the center of the gate and near the center of each leaf.

f. Remove the steel drive wedges stored inside the post pockets at each post support foundation.

g. Drop gate support posts into post pockets in the gate support foundations and install drive wedges on the dry side of the support posts to hold the support posts in position.

h. Install center seal tube and tighten swing bolts to close off the center of the gate.

i. Tightens nuts on threaded studs at center of gate.

j. Install crank handles on winches and lower movable plate at bottom of gate making seals rest firmly on supporting pavement, sidewalk and curb.

k. Install closure wedges and tap them into position so as to seal them against the strip seal along the end of the movable plate at the bottom of the gate and against the J-seal at the bottom. The top of the closure wedges must be seated against the bar that extends below the far side of the trusses and is part of the movable ends of the trusses. The bottom of the closure wedge must rest on the pavement.

l. Sand bag along sides and end of closure wedges at the center joint and ends of gate for a watertight seal.

m. After flood has receded and before moving gate leafs back to the open position, remove the hex socket pipe plugs in the lower bearing (the bearing will have been submerged during flooding), 4 in the outer cylinder and 4 above the thrust bearing, to check for water in the bearings. If water has infiltrated the bearing, flush clean and relubricate before moving the gate. Perform the above steps in opposite order and lock the gates to the locking structures and pump or vacuum mud and water from the post pockets.

n. Remove the crank handles from the winches and the closure wedges and seal tube at the center of the gate for storage by the City.

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SECTION 11310

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SECTION 11310

SUBMERSIBLE DEWATERING PUMPS (DWP);

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN BEARING MANUFACTURERS ASSOCIATION (ABMA)

ABMA 11	(1990; R 1999) Load Ratings and Fatigue Life for Roller Bearings
ABMA 9	(1990; R 2000) Load Ratings and Fatigue Life for Ball Bearings

ASTM INTERNATIONAL (ASTM)

ASTM A 153/A 153M	(2004) Zinc Coating (Hot-Dip) on Iron and Steel Hardware

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA ICS 1	(2000) Industrial Control and Systems: General Requirements
NEMA MG 1	(2003; R 2004) Motors and Generators

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2005) National Electrical Code

1.2 MEASUREMENT AND PAYMENT

1.2.1 Submersible Pumps, Sewage Type

1.2.1.1 Payment

Payment will be made for costs associated with furnishing and installing the submersible pumps, sewage type, as specified.

1.2.1.2 Unit of Measure

Unit of measure: lump sum.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be

submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Equipment Installation; G, DT

Drawings containing complete wiring and schematic diagrams and any other details required to demonstrate that the system has been coordinated and will properly function as a unit. Drawings shall show proposed layout and anchorage of equipment and appurtenances, and equipment relationship to other parts of the work including clearances for maintenance and operation.

SD-03 Product Data

Materials and Equipment
Framed Instructions

Pump characteristic curves showing capacity in gpm, net positive suction head (NPSH), head, efficiency, and pumping horsepower from 0 gpm to 110 percent (100 percent for positive displacement pumps) of design capacity. A complete list of equipment and material, including manufacturer's descriptive data and technical literature, performance charts and curves, catalog cuts, and installation instructions. Diagrams, instructions, and other sheets proposed for posting.

Spare Parts

Spare parts data for each different item of material and equipment specified.

SD-06 Test Reports

Field Testing and Adjusting Equipment

Performance test reports in booklet form showing all field tests performed to adjust each component and all field tests performed to prove compliance with the specified performance criteria, upon completion and testing of the installed system. Each test report shall indicate the final position of controls.

SD-10 Operation and Maintenance Data

Operating and Maintenance Manuals; G, DT

10 copies of operation and six copies of maintenance manuals for the equipment furnished. One complete set prior to performance testing and the remainder upon acceptance. Operation manuals shall detail the step-by-step procedures required for system startup, operation, and shutdown. Operation manuals shall include the manufacturer's name, model number, parts list, and brief description of all equipment and their basic operating features. Maintenance manuals shall list routine maintenance procedures, possible breakdowns and repairs, and troubleshooting guides. Maintenance manuals shall include piping and equipment layout and simplified wiring and control diagrams of the system as installed. Manuals shall be approved prior to the field training course.

1.4 DELIVERY AND STORAGE

All equipment delivered and placed in storage shall be stored with protection from the weather, excessive humidity and excessive temperature variation; and dirt, dust, or other contaminants.

1.5 FIELD MEASUREMENTS

The Contractor shall become familiar with all details of the work, verify all dimensions in the field, and shall advise the Contracting Officer of any discrepancy before performing the work.

1.6 SPARE PARTS

The Contractor shall submit spare parts data for each different item of material and equipment specified, after approval of the related submittals, and not later than one months prior to the date of beneficial occupancy. The data shall include a complete list of parts and supplies, with current unit prices and source of supply

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

Materials and equipment shall be the standard products of a manufacturer regularly engaged in the manufacture of such products and shall essentially duplicate items that have been in satisfactory use for at least 2 years prior to bid opening. Equipment shall be supported by a service organization that is, in the opinion of the Contracting Officer, reasonably convenient to the site. Pump casings shall be constructed of cast iron of uniform quality and free from blow holes, porosity, hard spots, shrinkage defects, cracks, and other injurious defects. Impellers shall be cast iron.

2.1.1 Nameplates

Each major item of equipment shall have the manufacturer's name, address, type or style, model or serial number, and catalog number on a plate secured to the item of equipment.In addition, pumps nameplate shall show the capacity in gpm at rated speed in rpm and head in feet of water. Electric motors nameplate shall show at least the minimum information required by . Include other information as the manufacturer may consider necessary to complete identification shall be shown on the nameplate.

2.1.2 Equipment Guards

Belts, pulleys, chains, gears, projecting setscrews, keys, and other rotating parts so located that any person may come in close proximity thereto shall be enclosed or guarded.

2.1.3 Special Tools

One set of special tools, calibration devices, and instruments required for operation, calibration, and maintenance of the equipment shall be provided.

2.1.4 Electric Motors

Motors shall conform to NEMA MG 1.

2.1.5 Motor Controls

Controls shall conform to NEMA ICS 1.

2.1.6 Bolts, Nuts, Anchors, and Washers

Bolts, nuts, anchors, and washers shall be steel; galvanized in accordance with ASTM A 153/A 153M.

2.2 SUBMERSIBLE CENTRIFUGAL PUMPS

Submersible centrifugal pumps shall be centrifugal type pumps designed to pump solids up to 3 inches in diameter and shall be capable of withstanding submergence as required for the particular installation.

2.2.1 Pump Characteristics

Three pumps known as DWP-1 located in Pumping Station Nos. 1 thru 3 shall have the following operating characteristics:

a. Pump Service: Floodwater.

b. Design Operating Point: Indicated by a pump schedule on the contract drawings for each pump station on sheet M-01 thru M-03. See schedule for flow, total head and operating range head. Pump shall have a minimum of 45 percent efficiency (wire to water).

c. Impeller Type: Minimum two vane, non-clogging.

d. Operating Speed: 1700 rpm.

e. Depth of Submergence: As indicated on mechanical drawings. (Start/Stop Elevations) feet.

f. Motor Type: MG; Approximately 3 Horsepower.

g. Electrical Characteristics: 460 volts ac, 3 phase, 60 Hz.

h. Size: Within rated load driving pump at specified rpm.

i. Pump Control: As indicated on electrical drawings.

2.2.2 Pump Casing

The casing shall be capable of withstanding operating pressures 50 percent greater than the maximum operating pressures. The volute shall have smooth passages which provide unobstructed flow through the pump.

2.2.3 Mating Surfaces

Mating surfaces where watertight seal is required, including seal between discharge connection elbow and pump, shall be machined and fitted with nitrile rubber O-rings. Fitting shall be such that sealing is accomplished by metal-to-metal contact between mating surfaces, resulting in proper compression of the O-rings without the requirement of specific torque limits.

2.2.4 Coatings

Exterior surfaces of the casing in contact with floodwater shall be protected by the manufacturer's standard epoxy coating for submersible stormwater/sewage applications. All exposed nuts and bolts shall be stainless steel.

2.2.5 Impeller

The impeller shall be of the single shrouded non-clogging design to minimize clogging of solids, fibrous materials, heavy sludge, or other materials found in sewage. The impeller shall be statically, dynamically, and hydraulically balanced within the operating range and to the first critical speed at 150 percent of the maximum operating speed. The impeller shall be securely keyed to the shaft with a locking arrangement whereby the impeller cannot be loosened by torque from either forward or reverse direction.

2.2.6 Wearing Rings

Wearing rings, when required, shall be renewable type and shall be provided on the impeller and casing and shall have wearing surfaces normal to the axis of rotation. Material for wear rings shall be standard of pump manufacturer. Wearing rings shall be designed for ease of maintenance and shall be adequately secured to prevent rotation.

2.2.7 Pump Shaft

The pump shaft shall be of high grade alloy steel and shall be of adequate size and strength to transmit the full driver horsepower with a liberal safety factor.

2.2.8 Seals

A tandem mechanical shaft seal system running in an oil bath shall be provided. Seals shall be of tungsten or silicon carbide with each interface held in contact by its own spring system. Conventional mechanical seals which require a constant pressure differential to effect sealing will not be allowed.

2.2.9 Bearings

Pump bearings shall be ball or roller type designed to handle all thrust loads in either direction. Pumps depending only on hydraulic balance end thrust will not be acceptable. Bearings shall have an ABEMA L-10 life of 50,000 hours minimum, as specified in ABMA 9 or ABMA 11.

2.2.10 Motor

The pump motor shall have Class F insulation, NEMA B design, in accordance with NEMA MG 1, and shall be watertight. The motor shall be either oil filled, air filled with a water jacket, or air filled with cooling fins which encircles the stator housing.

2.2.11 Power Cable

The power cable shall comply with NFPA 70, Type SO, and shall be of standard construction for submersible pump applications. The power cable shall enter the pump through a heavy duty entry assembly provided with an

internal grommet assembly to prevent leakage. The cable entry junction chamber and motor shall be separated by a stator lead sealing gland or terminal board which shall isolate the motor interior from foreign material gaining access through the pump top. Epoxies, silicones, or other secondary sealing systems are not acceptable.

2.2.12 Installation Systems

2.2.12.1 Rail Mounted Systems

Rail mounted installation systems shall consist of stainless steel guide rails, a sliding bracket, and a discharge connection elbow. Guide rails shall be of the size and type standard with the manufacturer and shall not support any portion of the weight of the pump. The sliding guide bracket shall be an integral part of the pump unit. The discharge connection elbow shall be permanently installed in the wet well along with the discharge piping. The pump shall be automatically connected to the discharge connection elbow when lowered into place and shall be easily removed for inspection and service without entering the pump well.

2.2.12.2 Lifting Cable

Lifting cable to raise and lower the pump from the discharge elbow at the bottom of the sump to the opening at the top of the pump station for pump removal and maintenance. The cable shall be stainless steel and shall be capable of supporting the pump.

2.3 BALL CHECK VALVE

Check valves shall permit free flow of floodwater forward and provide a positive check against backflow. Check valves shall be designed for a minimum working pressure of 150 psi. The body shall be iron. The manufacturer name, initials, or trademark and also the size of the valve, working pressure, and direction of flow shall be directly cast on the body.

Ball Check Valves shall be iron body, shall have flanged ends, and shall be the non-slam type. Flanges shall be the 125-pound type complying with ASME B16.1. Ball shall be hollow steel with a vulcanized Nitrile Rubber Covering. Valve shall be mounted in horizontal position as shown on the contract drawings

2.4 ELECTRICAL WORK

Electrical motor driven equipment specified shall be provided complete with motors, motor starters, and controls. Electric equipment and wiring shall be in accordance with Section 16415 ELECTRICAL WORK. Electrical characteristics shall be as specified or indicated. Motor starters shall be provided complete with thermal overload protection and other appurtenances necessary for the motor control specified. Manual or automatic control and protective or signal devices required for the operation specified, and any control wiring required for controls and devices but not shown, shall be provided.

PART 3 EXECUTION

3.1 EQUIPMENT INSTALLATION

3.1.1 Pump Installation

Pumping equipment and appurtenances shall be installed in the position indicated and in accordance with the manufacturer's written instructions. All appurtenances required for a complete and operating pumping system shall be provided, including such items as piping, conduit, valves, wall sleeves, wall pipes, concrete foundations, anchors, grouting, pumps, drivers, power supply, seal water units, and controls.

3.1.2 Concrete

Concrete shall conform to Section 03300 CONCRETE.

3.2 PAINTING

Shall be cleaned and shop coated with the manufacturer's standard protective coating. Surface shall be cleaned. Pumps and motors shall be thoroughly cleaned with solvents to remove grease and oil and sandblasting to remove loose rust, loose mill scale, and other foreign substances. Pumps and motors shall then be primed, and given a the required amount of (minimum of two) finish coats of standard epoxy coating paint at the factory in accordance with the recommendations of the manufacturer for submersible stormwater/sewage applications.

3.3 FIELD TESTING AND ADJUSTING EQUIPMENT

3.3.1 Operational Test

Prior to acceptance, an operational test of all pumps, drivers, and control systems shall be performed to determine if the installed equipment meets the purpose and intent of the specifications. Tests shall demonstrate that the equipment is not electrically, mechanically, structurally, or otherwise defective; is in safe and satisfactory operating condition; and conforms with the specified operating characteristics. Prior to applying electrical power to any motor driven equipment, the drive train shall be rotated by hand to demonstrate free operation of all mechanical parts. Tests shall include checks for excessive vibration, leaks in all piping and seals, correct operation of control systems and equipment, proper alignment, excessive noise levels, and power consumption.

3.3.2 Retesting

If any deficiencies are revealed during any test, such deficiencies shall be corrected and the tests shall be reconducted.

3.4 MANUFACTURER'S SERVICES

Services of a manufacturer's representative who is experienced in the installation, adjustment, and operation of the equipment specified shall be provided. The representative shall supervise the installation, adjustment, and testing of the equipment.

3.5 FRAMED INSTRUCTIONS

Framed instructions containing wiring and control diagrams under glass or

in laminated plastic shall be posted where directed by the contracting officers representative. Condensed operating instructions, prepared in typed form, shall be framed as specified above and posted beside the diagrams. The framed instructions shall be posted before acceptance testing of the system.

3.6 FIELD TRAINING

A field training course shall be provided for designated operating and maintenance staff members. Training shall be provided for a total period of two (2) hours of normal working time and shall start after the system is functionally complete but prior to final acceptance tests. Field training shall cover all of the items contained in the operating and maintenance manuals.

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SECTION 15060

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SECTION 15060

4-INCH AND 12-INCH DISCHARGE PIPING AND FITTINGS

PART 1 GENERAL

1.1 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Drawings; G, CN

Within 60 days of notice of award of contract, submit drawings for discharge piping installation. Submit drawings of sufficient size to be easily read. Submit information in the English language. Dimensions shall be in English.

SD-03 Product Data

Lists of Materials; G, CN

Furnish two copies of purchase orders, shop orders for materials, and work orders, including orders placed or extended by each supplier. Contractor shall at time of submittal of drawings furnish list designating materials to be used for each item.

Materials and Procedures; G, CN

Prior to installation of discharge piping, Contractor shall furnish within 60 days of notice of award, names of manufacturers and the procedures necessary to be incorporated in the work, together with any information pertaining to the discharge piping including flexible couplings and pipe coatings

SD-06 Test Reports

Hydrostatic Tests; G, CN

Copies of test results.

1.2 WELDING QUALIFICATIONS

Welding operators, welders, and tack welders shall be qualified and, as necessary, requalified for the particular type of work. Qualification shall be in accordance with one of the following codes: Part III, Section 5 of AWS D1.1; or Section IX of ASME BPVC. Contractor shall certify by name to Contracting Officer the welders and welding operators so qualified, including date of qualification, code, and procedures under which each qualified. Prior qualification may be accepted provided the welder has

performed satisfactory work under the code for which he qualified within the preceding three months. Contractor shall require welder or welding operator to repeat qualifying tests when, in the opinion of Contracting Officer, work indicates reasonable doubt as to welder's proficiency. In such cases, welder shall be recertified as required above. The welder shall be considered disqualified until successful completion of retest. All expenses in connection with qualification and requalification shall be borne by Contractor.

1.3 GENERAL

The Contractor shall furnish and install all discharge piping as shown on the contract drawings including bends, flexible couplings, lugs, bolts and all other items necessary to complete the piping. The 12-inch diameter steel discharge pipes will attach to the 12-inch tee from the 24-inch pump discharge tube and the pass through the station sump wall to a flap gate as indicated on the contract drawings. The 4-inch diameter ductile iron discharge pipes will pass through the station sump wall to a flap gate as shown on the contract drawings. The Contractor shall be responsible for field measurements to verify pipe lengths required to accomplish the layout shown. The discharge lines shall be constructed absolutely airtight and in the manner shown on plans and details.

1.4 DELIVERY AND STORAGE

All material delivered and stored shall be handled and stored in such a manner that pipe, fittings and accessories, and pipe coatings are not damaged.

PART 2 PRODUCTS

2.1 PIPE

2.1.1 Steel Pipe

Discharge piping from the pump discharge tube tee/elbow through the sump wall shall be steel spiral weld pipe, 12 inch inside diameter, 1/2-inch thick, and shall conform to the applicable American Society for Testing and Materials (ASTM) and American Water Works Association (AWWA) Standards listed in the Applicable Publications. The pipe shall be plain end with the weld bend ground flush at ends for flexible coupling connections. To minimize damage to the factory applied protective coatings, field welding will be permitted only with the Contracting Officer's written approval. Piping shall be electrically bonded.

2.1.2 DUCTILE-IRON PIPE

Ductile-iron pipe shall conform to AWWA C151, working pressure not less than 150 psi, unless otherwise shown or specified. Pipe shall be cement-mortar lined in accordance with AWWA C104. Linings shall be standard. The 4-inch pipe shall have plain ends for flexible coupling connections and the 4-inch line will have mechanical joint connections.

2.2 FITTINGS AND SPECIALS

2.2.1 Flexible Coupling for Steel Pipes

Flexible couplings shall be equal to Straub Flex-2 couplings, complete with gaskets, and bolts for use with steel pipes.

2.2.2 Fittings for Ductile-Iron Pipe

Fittings and special shall be suitable for 150 psi pressure rating, unless otherwise specified. Fittings and specials for mechanical joint pipe shall conform to AWWA C110. Mechanical joints shall be of the stuffing box type and shall conform to AWWA C111. Fittings and specials shall be cement-mortar lined (standard thickness) in accordance with AWWA C104. Rubber gaskets and lubricant used for the flexible couplings shall conform to the applicable requirements of AWWA C111.

PART 3 EXECUTION

3.1 INSTALLATION

Pipe, pipe fittings, and appurtenances shall be installed at the locations indicated or recommended by the manufacturer.

3.1.1 Cutting of Pipe

Cutting of pipe shall be done in a neat and workmanlike manner without damage to the pipe. Unless otherwise recommended by the manufacturer and authorized by the Contracting Officer, cutting shall be done with an approved type mechanical cutter. Wheel cutter shall be used when practicable. Squeeze type mechanical cutters shall not be used for ductile iron.

3.1.2 Joint Deflection

The maximum allowable joint deflection for ductile-iron pipe shall be as given in AWWA C600. If the alignment requires deflection in excess of the above limitations, special bends or a sufficient number of shorter lengths of pipe shall be furnished to provide angular deflections within the limit set forth.

3.1.3 Placing and Laying

Pipe and accessories shall be carefully lowered into the sump by means of derrick, ropes, belt slings, or other authorized equipment. Under no circumstances shall any of the storm water discharge-line materials be dropped or dumped into the sump. Care shall be taken to avoid abrasion of the pipe coating. When work is not in progress, open ends of pipe and fittings shall be securely closed so that no water, or other substance will enter the pipes or fittings. Where any part of the coating or lining is damaged, the repair shall be made by the Contractor at his expense in a satisfactory manner.

3.1.4 Jointing For Ductile-Iron Pipe

Mechanical type joints shall be installed in accordance with manufacturers recommendations.

3.2 HYDROSTATIC TESTS

The pipeline shall be subjected to a pressure test. The method proposed for disposal of waste water from hydrostatic tests shall be approved by the Contracting Officer. Testing shall be the responsibility of the Contractor. The test may be witnessed by the Contracting Officer. The Contracting Officer shall be notified at least 7 days in advance of

equipment tests. The final test report shall be delivered to the Contracting Officer within 30 days of the test.

3.2.1 Pressure Test

After the pipe has been installed, joints completed, the pipe shall be filled with water in a manner to expel all air. The pipeline shall be subjected to a test pressure of 100 psi for a period of at least one hour. The exposed pipe, joints and fittings shall be examined for leaks. Visible leaks shall be stopped or the defective pipe, fitting or joints shall be replaced.

3.2.2 Retesting

If any deficiencies are revealed during any test, such deficiencies shall be corrected and the tests shall be reconducted until the results of the tests are within specified allowances without additional cost to the Government.

3.3 CLEANUP

Upon completion of the installation of storm water discharge lines, and appurtenances, all debris and surplus materials resulting from the work shall be removed.

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SECTION 15132

SUBMERSIBLE PUMP, MIXED-FLOW TYPE

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN BEARING MANUFACTURERS ASSOCIATION (ABMA)

ABMA 11	(1990; R 1999) Load Ratings and Fatigue Life for Roller Bearings
ABMA 9	(1990; R 2000) Load Ratings and Fatigue Life for Ball Bearings

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI S2.19	(1999) Mechanical Vibration - Balance Quality Requirements of Rigid Rotors, Part 1: Determination of Permissible Residual Unbalance, Including Marine Applications (Note: was ASA86, but that document refers to ANSI S2.19.)

AMERICAN WATER WORKS ASSOCIATION(AWWA)

AWWA C200	(1997) Steel Water Pipe - 6 In. (150 mm) and Larger
AWWA C203	(2002; A C203a-99) Coal-Tar Protective Coatings and Linings for Steel Water Pipelines - Enamel and Tape - Hot-Applied
AWWA C207	(2001) Steel Pipe Flanges for Waterworks Service - Sizes 4 In. Through 144 In. (100 mm Through 3,600 mm)
AWWA C208	(2001) Dimensions for Fabricated Steel Water Pipe Fittings

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1/D1.1M	(2004) Structural Welding Code - Steel

ASME INTERNATIONAL (ASME)

ASME B46.1	(2002) Surface Texture, (Surface Roughness, Waviness and Lay)

ASTM INTERNATIONAL (ASTM)

ASTM A 108	(2007) Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished
ASTM A 167	(2004) Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip
ASTM A 176	(1999; R 2004) Stainless and Heat-Resisting Chromium Steel Plate, Sheet, and Strip
ASTM A 242/A 242M	(2004) High-Strength Low-Alloy Structural Steel
ASTM A 27/A 27M	(2005) Standard Specification for Steel Castings, Carbon, for General Application
ASTM A 276	(2004) Stainless Steel Bars and Shapes
ASTM A 297/A 297M	(1997; R 2003) Steel Castings, Iron-Chromium and Iron-Chromium-Nickel, Heat Resistant, for General Application
ASTM A 312/A 312M	(2004b) Seamless and Welded Austenitic Stainless Steel Pipes
ASTM A 36/A 36M	(2004) Carbon Structural Steel
ASTM A 48/A 48M	(2003) Gray Iron Castings
ASTM A 516/A 516M	(2004) Pressure Vessel Plates, Carbon Steel, for Moderate- and Lower-Temperature Service
ASTM A 576	(1990b; R 2000) Steel Bars, Carbon, Hot-Wrought, Special Quality
ASTM A 668/A 668M	(2004) Steel Forgings, Carbon and Alloy, for General Industrial Use
ASTM B 148	(1997; R 2003) Aluminum-Bronze Sand Castings
ASTM B 584	(2004) Copper Alloy Sand Castings for General Applications
ASTM D 2000	(2003ae1) Rubber Products in Automotive Applications

HYDRAULIC INSTITUTE (HI)

HI 1.1-1.4	(2000) Centrifugal Pumps
HI 2.1-2.4	(2000) Vertical Pumps
HI 2.6	(2000) Vertical Pump Tests

HI 9.1-9.5	(2000) Pumps - General Guidelines for Types, Applications, Definitions, Sound Measurements and Documentation
HI 9.6.4	(2000) Centrifugal and Vertical Pumps, Vibration Measurements and Allowable Values

ISA - THE INSTRUMENTATION, SYSTEMS AND AUTOMATION SOCIETY (ISA)

ISA RP2.1	(1978) Manometer Tables

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA MG 1	(2003; R 2004) Motors and Generators
NEMA WC 7	(1988; Rev 3 1996) Cross-Linked-Thermosetting-Polyethylene-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Submersible Pump; G, DM

Within 90 days of Notice of Award, submit drawings listed below. Submitted drawings shall be of sufficient size to be easily read. Submit information in the English language. Dimensions shall be in metric with English conversion.

a. Outline drawings of the pump showing dimensions and weight of the pump/motor.

b. Drawings showing details and dimensions of pump mounting design and layout including any embedded items.

c. Cross-sectional drawings of the pump, showing each component, should show major or complicated sections of the pump in detail. On each drawing indicate an itemized list of components showing type, grade, class of material used, and make and model of the standard component used. Include detail and assembly drawings of entire pumping unit assembly.

d. Provide drawings covering the installation that the Contractor intends to furnish to the erecting engineer.

e. The capacity-head curve should indicate efficiency, bhp, and NPSHR.

f. Motor characteristic curves or tabulated data (test or calculated) should indicate the speed, power factor, efficiency, current, and kilowatt input, all plotted or tabulated against

percent load as abscissas.

SD-03 Product Data

Materials

Submit a list designating materials to be used for each pump part along with the submittal of the drawings.

If deviation from specified materials is desired, submit complete specifications for the proposed deviating materials after award of the contract.

Equipment; G, DM

Within 60 days of Notice of Award, submit a list of equipment as specified in paragraph Equipment.

Spare Parts

Submit 10 copies of manufacturers complete parts list showing all parts, spare parts, and bulletins for pump. Clearly show all details, parts, and adequately describe parts or have proper identification marks. The parts lists shall be printed on good quality 8 1/2 by 11 inch paper, bound separately of the Operation and maintenance manual with a flexible, durable cover. Drawings incorporated in the parts lists may be reduced to page size provided they are clear and legible, or they may be folded into the bound lists to page size. Photographs or catalog cuts of components may be included for identification.

Computations; G, DM

Submit sufficient hydraulic computations to substantiate pump selection and demonstrate that the selected pump can meet the project design and operating requirements as specified.

Installation Instruction Manual; G, DM

No later than 30 days prior to time of pump delivery, submit three copies of a typed and bound manual describing procedures to be followed by the installation engineer in assembling, installing, and dry- and/or wet-testing the pump. Coordinate and consolidate the description of the pump with similar descriptions for other specified pump parts. The description shall be of such a nature that it may be comprehended by an engineer or mechanic without extensive experience in erecting or installing pumps of this type. The description shall be a step-by-step explanation of operations required, and shall include, where applicable, such things as alignment procedures, bolt torque values, recommended instrument setups, recommended gauges and instruments, and similar details.

Factory Test

Submit a description of the factory test setup and test procedure proposed. Submit data and drawings sufficient to demonstrate that testing is in compliance with HI 2.6.

Pump Field Tests; G, DM

Submit the field test plan prior to field testing.

SD-06 Test Reports

Factory Test Report; G, DM

Within 30 days of receipt of approval of the witnessed field test, submit nine bound copies of a report covering test setup and performance tests. The factory test report shall include the specified information.

Field Test Report; G, DM

Submit five (5) copies of the field test report.

Installation and Start-Up Engineer

Submit the installation report.

SD-10 Operation and Maintenance Data

Operating and Maintenance Instructions; G, DM

Submit 10 copies of the manual containing complete information on operation, lubrication, adjustment, routine and special maintenance disassembly, repair, reassembly, and trouble diagnostics of pump and auxiliary equipment. The operation and maintenance manual shall be printed on good quality 8 1/2 by 11 inch paper, bound separately from the parts list, and bound between a flexible, durable cover. Drawings incorporated in manual may be reduced to page size provided they are clear and legible, or they may be folded into the manual to page size. Photographs or catalog cuts of components may be included for identification.

1.3 SYSTEM DESCRIPTION AND PERFORMANCE REQUIREMENTS

1.3.1 General Project Requirements

Design, furnish, and install seven (7) identical pumping units for the Des Plaines River Local Flood Protection Project Levee 37, Three Pumping Station shown in the contract drawings. Water pumped will not exceed 70°F degreesF, will be relatively turbid, and may contain sand, silt, and trash capable of passing the trashrack, having 1 5/8 in. clear openings.

1.3.2 Pumping Unit Description

In general, each pumping unit includes a pump/motor, discharge tube, discharge elbow, air vent, lifting cable, and controls. Each pump shall be of the vertical, mixed-flow submersible type for storm water flood control attached to the same shaft with a submersible electric motor . The pump/motor shall be electrically operated and installed in a discharge tube. Except as otherwise stated or noted, the terms pump and pump/motor both refer to a pump/motor integral unit.

1.3.3 General Design Requirements

a. The pump shall meet head, capacity, speed, efficiency, pump sump design, range of operation, cavitation, and vibration requirements as specified.

b. The pump shall be designed for runaway speed as calculated by the Contractor for the system shown and specified. Waterhammer calculations shall be included when long discharge lines exist. The reverse speed shall be calculated assuming power failure and discharge valves fail to close.

c. The pump shall, as a minimum, meet the applicable design, materials, and manufacture requirements of HI 1.1-1.4, HI 2.1-2.4, HI 9.1-9.5 and these specifications.

d. The pumping unit design and performance shall have been demonstrated by previous successful operation of pumps of the required type and of equal design complexity by the manufacturer.

e. The pump shall operate in a discharge tube. The discharge tube shall fit within the dimensions shown so that installation and maintenance can be carried out by an mobile crane. The weight of the pump/motor integral unit shall not exceed 750 lb.

f. The pump shall be designed for the calculated hydraulic pressure including waterhammer to which the pump parts are exposed.

g. The pump losses, as calculated by the Contractor, are in addition to the specified head and shall be allowed for when computing the pump system output.

h. The pump shall have a continuously rising head characteristic with decreasing capacity over the required range of operation specified. The pump shall not have an unstable operating characteristic over the required range of operation.

i. The pump shall meet all requirements for net positive suction head required (NPSHR) and operate without surging.

j. Associated pumping equipment including, but not limited to, electrical controls, instrumentation, and pump control center shall be suitable for outdoor operation.

1.3.4 Computations and Design of Discharge System

a. The pumping unit shall discharge into the discharge system shown. The system loss curve is included as FIGURE 1 at the end of this section to permit determination of total head. Losses within the pumping unit shall be determined by the Contractor. The pumping unit shall discharge into the discharge chamber shown. The system loss curve(s) furnished includes all losses beyond the pumping unit. Losses within the pumping unit shall be determined by the Contractor.

1.3.5 Operating Conditions

a. The pump shall be capable of operating in the dry (for the purpose of maintenance and operating checks) for short periods of time as stated in the manufacturer's operating instruction.

b. The pump manufacturer shall establish and state in the operating manual the procedures for starting and stopping the pumps, including setting of valves or any sequential operations.

1.3.6 Performance Requirements

a. When operated in the dry, the maximum level of vibration of the assembled pumping unit shall not be greater than the value of the lower limit of the good range of the "General Machinery Vibration Severity Chart". This chart can be obtained from Entek IRD, 1700 Edison Drive, Cincinnati, Ohio 45150. Measurements shall be taken at pump operating speed during the Factory Test and the field start-up test.

b. The pump shall be capable of operating without instability over the required range of head.

1.3.7 Capacities

a. Discharge shall not be less than 2600 gpm against total design head 9 ft with water surface in the sump at elevation 629.75 ft. for Pump Station No. 1.

b. Discharge shall not be less than 2600 gpm against total rated head 9 ft with water surface in the sump at elevation 630.0 ft. for Pump Station No. 2.

c. The pump shall deliver a minimum capacity of 2600 gpm at a total minimum head of 9 ft, plus pump losses with water surface in the sump at elevation 631.5 ft. for Pump Station No. 3

1.3.8 Efficiency

The pump shall have an overall efficiency of not less than 55 percent at design capacity as indicated in Sub-paragraph CAPACITIES.

1.3.9 Equipment

The Contractor shall submit the names of the manufacturers, performance capacities, and other relevant information for the machinery and other equipment contemplated to be incorporated into the work.

1.4 PUMP SUPPLIER EXPERIENCE AND RESPONSIBILITY

The pumps shall be designed and manufactured by a firm that is regularly engaged in the manufacture of the type of pump described in these specifications. The pump manufacturer shall have overall responsibility to supply the pumping unit (submersible pump/motor, , discharge tube, discharge elbow, cables, instrumentation and accessories) that meet the requirements of this specification. Thus, during start-up, installation, and performance evaluation, the pump manufacturer is the sole responsible party. The pump manufacturer shall supply a list of installations at which pumps of his manufacture, and ones similar to those specified, have been operating for at least 2 years. The components and materials of the pumping unit may occur at different facilities, and be the product of other manufacturers.

1.5 SHIPPING AND STORAGE

The pump will be inspected for damage or other distress when received at the project site. The pump and associated equipment shall be stored indoors as recommended by the pump manufacturer, protected from construction or weather hazards at the project site. The pump and equipment shall have adequate short-term storage in a covered, dry, and ventilated location prior to installation. The manufacturer's instructions shall be followed for extended storage. Proper equipment for handling the pump shall be supplied and shall be considered as special tools if not completely standard.

1.6 SPECIAL TOOLS

Furnish one set of all special tools required to completely assemble, disassemble, or maintain the pumps. Special tools refers to oversized or specially dimensioned tools, special attachment or fixtures, or any similar items. Lifting devices required for use in conjunction with the truck crane shall be furnished.

1.7 INSTALLATION AND START-UP ENGINEER

The Contractor shall furnish a competent installation engineer fluent in the English language who is knowledgeable and experienced with the installation and start-up procedures for submersible pumps and the associated equipment specified. Installation/erecting engineers provided by this section shall include those from Contractor's suppliers. When so requested, the installation engineer shall be responsible for providing complete and correct direction during installation, initial starting, and subsequent operation of equipment until field tests are completed. The installation engineer shall initiate instructions for actions necessary for proper receipt, inspection, handling, uncrating, assembly, and testing of equipment. The installation engineer shall also keep a record of measurements taken during erection and shall furnish one copy to the Contracting Officer on request or on the completion of the installation of assembly or part. The erecting engineer shall instruct the Contracting Officer or others as designated in the operation and maintenance features of the pump units.

PART 2 PRODUCTS

2.1 MATERIALS AND METALWORK FABRICATION

Materials and fabrication shall conform to the requirements provided herein and to Section 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS and Section 05502 METALS: MISCELLANEOUS, STANDARD ARTICLES, SHOP FABRICATED ITEMS and to additional specified requirements. Classifications and grade of material incorporated in the work shall be in accordance with designated specifications. Deviations from the specified materials shall be submitted in accordance with paragraph SUBMITTALS. The materials of construction shall comply with the following:

TABLE 1 - MATERIALS OF CONSTRUCTION

PART	MATERIAL
Discharge Bowl	Cast iron, cast steel or steel plate
Suction Bell	Cast iron, cast steel or steel plate
Pump bowl	Cast iron, cast steel or steel plate

TABLE 1 - MATERIALS OF CONSTRUCTION

PART	MATERIAL
Impeller	Stainless steel or aluminum bronze
Shaft	Cold-rolled carbon steel or stainless steel
Wearing ring	Manufacturer's standard
Bolts, key, etc.	Stainless steel
O-rings	Nitrile rubber
Mechanical seals	Tungsten carbide
Discharge tube	Steel plate
Discharge elbow	Steel plate

2.1.1 Designated Materials

Designated materials shall conform to the following specifications, grades, and classifications.

MATERIALS	SPECIFICATION, GRADE, CLASS
Aluminum-Bronze	ASTM B 148, Alloy No. C95500 Castings
Cast Iron	ASTM A 48/A 48M, Class Nos. 30A, 30B, and 30C
Cast Steel	ASTM A 27/A 27M Grade 65-35, annealed
Coal Tar Protective Coatings	AWWA C203
Cold-Rolled Steel Bars	ASTM A 108, min, Wt. Strm 65,000 psi
Copper Alloy Castings	ASTM B 584, Alloy No. C93700
Corrosion-Resistant Alloy Castings	ASTM A 297/A 297M, Grade CA-15, CAGNN and CF-8M
Dimensions for Steel Water Pipe Fittings	AWWA C208
Hot-Rolled Stainless	ASTM A 576, Graded G10200, G10450, and G11410
Ring Flanges	AWWA C207, Class B
Rubber Products in Automotive Applications	ASTM D 2000
Seamless and Welded Austenitic Stainless Steel Pipe	ASTM A 312/A 312M
Stainless Bars and Shapes	ASTM A 276, Grades S30400 and S41000
Steel Forging	ASTM A 668/A 668M, Class F
Steel Pipe 6 in. and Larger	AWWA C200
Steel Plates, Pressure Vessel	ASTM A 516/A 516M, Grade 55

MATERIALS	SPECIFICATION, GRADE, CLASS
Steel Plate	ASTM A 242/A 242M
Stainless Steel Plate	ASTM A 167, UNS S30400 or ASTM A 176, UNS S40500
Quality Steel	ASTM A 36/A 36M
Surface Texture	ASME B46.1

2.1.2 Bolted Connections

2.1.2.1 Bolts, Nuts, and Washers

Bolts, nuts, and washers shall conform to requirements herein specified and the paragraphs SUBMERSIBLE PUMP, DISCHARGE TUBE AND DISCHARGE ELBOW, and the subparagraph, NUTS AND BOLTS for types required. Use beveled washers where bearing faces have a slope of more than 1:20 with respect to a plane normal to bolt axis.

2.1.2.2 Materials Not Specifically Described

Materials not specifically described shall conform to the latest ASTM specification or to other listed commercial specifications covering class or kinds of materials to be used.

2.1.3 Flame Cutting of Material

Flame cutting of material other than steel shall be subject to the approval of the Contracting Officer. Shearing shall be accurately done, and all portions of work neatly finished. Steel may be cut by mechanically guided or hand-guided torches, provided an accurate profile with a smooth surface free from cracks and notches is secured. Surfaces and edges to be welded shall be prepared in accordance with Section 3 of AWS D1.1/D1.1M. Chipping and/or grinding will not be required except where specified and as necessary to remove slag and sharp edges of technically guided or hand-guided cuts not exposed to view. Visible or exposed hand-guided cuts shall be chipped, ground, or machined to metal free of voids, discontinuities, and foreign materials.

2.1.4 Alignment of Wetted Surfaces

Exercise care to ensure that the correct alignment of wetted surfaces being joined by a flanged joint is being obtained. Where plates of the water passage change thickness, a transition shall occur on the outer surface, leaving the inner surface properly aligned. When welding has been completed and welds have been cleaned, but prior to stress relieving, joining of plates shall be carefully checked in the presence of a Government inspector for misalignment of adjoining parts.

2.2 SUBMERSIBLE PUMP

2.2.1 Design and Manufacture

At the Contractor's option, the submersible pump may be either of cast or fabricated construction. The level of manufacture skill shall be consistent with the standards referenced in the specifications. All work

performed in the manufacture of the pumps shall be performed in a skillful and workmanlike manner in accordance with the best modern shop practice and manufacture of finished products similar in nature to those specified herein. The Government reserves the right to observe and witness the manufacture of the pumps and to inspect the pumps for compliance with contract requirements during factory assembly.

2.2.2 Speed

2.2.2.1 Pump Speed

Rotative speed of the pump shall not be greater than 1200 rpm.

2.2.2.2 Runaway Speed

The pump shall be designed to sustain full runaway speed without damage at maximum head difference across the pump. Based on the system design as shown by the drawings the manufacturer shall compute the maximum reverse runaway speed, and the pump and motor shall be designed to sustain that reverse rotation without damage.

2.2.3 Pump Construction

2.2.3.1 General

The major pump components shall be of materials as described in Table 1. All the exposed nuts and bolts shall be stainless steel. All mating surfaces where watertight sealing is required shall be machined and fitted with nitrile rubber O-rings. The fitting shall be such that the sealing is accomplished by metal-metal contact between machined surfaces which results in controlled compression of the O-rings. Sealing compounds, grease, or secondary devices are not acceptable.

2.2.3.2 Pump Lifting Handle And Lifting Lugs

The lifting handle shall be designed to bear the entire weight of the pumping unit at a conservative factor of safety. Lifting lugs shall be provided where the weight of the separate part requires a lug. The contractor shall follow the manufacturers recommendations for handling of the pump.

2.2.3.3 Pump and Motor Bearing Arrangement

The pump and motor bearings shall be the standard design of the manufacturer for the pump supplied under this specification. The type and number shall be of proven design as used in previous operating units supplied by the manufacturer. The bearings shall be of the grease lubricated and sealed type. The bearings shall have a minimum B-10 bearing life of 50,000 hr. Each bearing shall be of the correct design to resist the radial and thrust loads applied. Enough bearings shall be provided to ensure the pump rotating elements are supported so that the possibility of excessive vibration is eliminated. Ball and roller bearings life and load ratings shall conform to ABMA 9 and ABMA 11.

2.2.3.4 Mechanical Seals

A mechanical rotating shaft seal system shall be provided between the impeller and motor to ensure the motor housing seal. The mechanical seals shall be in tandem, lapped and face type seals running in lubricant

reservoirs for cooling and lubrication. The mechanical seals shall contain both stationary and rotating tungsten carbide face rings unless otherwise specified. In order to avoid seal failure from sticking, clogging, and misalignment from elements contained in the mixed media, only the seal faces of the outer seal assembly and its retaining clips shall be exposed to the mixed media. All other components shall be contained in the lubricant housing. All seal faces must be solid material capable of being relapped. The seals shall require neither maintenance nor adjustment, but shall be easy to check and replace. Shaft seals without positively driven rotating members shall not be considered acceptable or equal.

2.2.3.5 Lubricant Housing

An oil housing shall be provided with oil, as recommended by the pump manufacturer, to lubricate the shaft sealing system and to dissipate the heat generated by the motor and bearings.

2.2.3.6 Impeller

The impeller design and manufacture shall be the manufacturer's standard. The impeller surface shall be smooth, without holes and fabrication offsets. The attachments to shaft shall be with keys or other fasteners which are to be made of stainless steel. The attachment should be of sturdy construction designed to not loosen, but be easily removed for maintenance. The impeller construction may be cast or fabricated. At the time of assembly the impeller clearances shall be those shown on assembly drawings and may be checked in the field or at the factory at the Contracting Officer's option. The impeller shall be balanced at the design operating speed. The standard balance quality grade is G6.3 in accordance with ANSI S2.19. Balancing procedure shall be in accordance with HI 9.6.4, except that a two-plane balance shall be required.

2.2.3.7 Shaft

The shaft shall be one piece integral with the motor of high-strength cold-rolled carbon steel or stainless steel with a factor of safety of five measured against the ultimate strength. The shaft shall be designed for all torque conditions during normal operation and for runaway speed during reverse flow.

2.2.3.8 Bowl Assembly

The bowl assembly may be of cast or fabricated manufacture. The hydraulic design shall be the manufacturer's standard design as used in previous operating installations. The general manufacture quality relating to flange design, drilling, bolts, alignments, etc., shall be in accordance with industry standard practice.

2.2.4 Motor

The motor shall be submersible and conform to the requirements of NEMA MG 1. The motor shall be sized to avoid overload when operating at any point along the characteristic curve of the pump. The motors shall be 3-phase, 60-Hz, 460 V, squirrel cage induction type, NEMA Design B Type. The stator windings and stator leads shall be insulated with a moisture-resistant Class F insulation with temperature resistance of 311 degrees F. The service factor shall be 1.0. The temperature rise above ambient for continuous full load rated conditions and for the class of insulation used shall not exceed the values in NEMA MG 1. The motor shall be rated for

continuous duty when submerged and shall also be capable of operation in the dry for short periods of time for testing and maintenance purposes.

2.2.4.1 Torque

Starting torque shall be sufficient to start the pump, but in no case less than 60 percent of full-load torque. Break-down torque shall not be less than 150 percent of full-load torque.

2.2.4.2 Support

Thrust bearing support shall have sufficient strength and rigidity to support the weight of the entire rotating element of the motor, pump impeller and shaft, and the hydraulic thrust.

2.2.5 Cable

Power and instrumentation cable shall be specifically designed for use with a submersible pump application and shall conform to the requirements of NEMA WC 7. Submersible cable shall be suitable for continuous immersion in water at the maximum depth encountered. Cable shall have an ampacity of not less than 125 percent of the motor full load current. The cable length shall be determined by the pump manufacturer for the installation shown but shall not be less than 30 ft.

2.2.5.1 Cable Entry

Power and instrumentation cables shall enter the motor through a sealing system that prevents water entry into the unit and provides strain relief. The cable entry may be comprised of rubber bushings, flanked by stainless steel washers, having a close tolerance fit against the cable outside diameter and the entry inside diameter for sealing by compression of the bushing, or the entry may be sealed by other gland compression methods.

2.2.6 Pump Control and Monitoring

A self-contained pump control and monitoring system shall be provided. Pump controls and control panels shall be provided in accordance with Section 16415. Independent local indication of the alarm and separate contacts for the remote indication of each alarm and local reset shall be provided. Sensors shall alarm and shut down the pump at an abnormal operating condition. Separate red alarm indicator lamps and green pump running lamps shall be provided and labeled in the enclosure specified in Section 16415. The following sensors shall be provided:

b. Temperature sensors in the stator windings to protect the motor against overheating.

c. Temperature sensors to monitor the main and support bearings.

d. Float-switch sensor positioned between the bearings and the stator-end coils to detect if liquid penetrates the stator housing.

2.2.7 Air Vent

An air vent shall be provided, located as shown on the contract drawings, and shall be a combination air and vacuum valve type. The valve shall be a minimum 125 lb class and sized for the design flow rate. An isolation valve shall be provided at the valve's inlet. Materials of construction

shall be cast iron for the valve body; stainless steel for the internal linkage, float, and float stem; and Buna-N for the needle and seat. The valve shall provide a dual function to release air during pump start-up and to permit air to re-enter to break the vacuum during pump shutdown.

2.3 DISCHARGE TUBE AND DISCHARGE ELBOW

2.3.1 General

The design, manufacture and installation of the discharge tube and discharge elbow shall be in accordance with the pump manufacturer's instructions. For purposes of performance and this specification it shall be treated as part of the pumping unit. The discharge tube shall be of such size to accommodate the dimensions of the pump supplied in accordance with the manufacturer's requirements. It shall be permanently installed in the pump sump as shown on the drawings. The design shall be such that the pumps will be automatically and firmly connected to the discharge tube when lowered into place and shall be in accordance with the pump manufacturer's instructions. A locking device shall be provided that prohibits rotational movement of the pump within the tube. The pumps shall be easily removable for inspection or service without need to enter the pump sump. The pumps shall not require any bolts, nuts, or fasteners for connection to the discharge housing. Stiffening, guides, or other features shall be provided at the pump support to ensure concentric positioning of the pump in the discharge tube. Means shall be provided such that an effective seal is obtained between the pump and discharge tube. Power cable penetrations shall be watertight.

A sole plate, as shown on the drawings, shall be installed.

2.3.2 Flanged Joints

Design flanged joints to be airtight and watertight, without the use of preformed gaskets, except that the use of a gasketing compound will be permitted. Mating flanges shall be male/female rabbet type or doweled with not less than four tapered dowels equally spaced around the flange. Flanges and drill bolt holes shall be machined concentric with the centerline, having a tolerance of plus or minus 1/4 of the clearance between the bolt and the bolt hole. When fabricated from steel plate, flanges shall not be less than 1 1/2 in. thick after machining. Flange machining shall not vary more than 10 percent of the greatest flange thickness. Fabricated flanges, as a minimum, shall be constructed to the dimensions of AWWA C207, Class B. Flanges shall be connected to the column tube with two continuous fillet welds, one at the inside diameter of flange-to-pump-tube and the other at the outside diameter of pump-tube-to-flange. Weld design is the pump manufacturer's responsibility. Mating flanges shall be machined parallel to a tolerance of 0.002 in. The machine mating flange surface shall be finished to 125 microns or better.

2.3.3 Nuts and Bolts

Nuts and bolts shall be of the hexagonal type. Bolts, including assembly, anchor, harness, and dowels, shall be 300 stainless steel. Nuts shall be bronze; washers shall be 300 series stainless steel.

2.3.4 Bolted Lid

A watertight lid shall be provided, hinged and bolted to the top of the

discharge tube. Bolted lid shall also have at the hinge a 120 degree stop as indicated on the contract drawings.

2.3.5 Flexible Coupling

Flexible mechanical coupling shall be provided connecting the pumping unit discharge elbow to the wall thimble and the discharge piping equal to Straub Flex coupling or approved equal. The middle ring shall be finished without pipe stop to facilitate the installation and removal of coupling.

2.3.6 Wall Thimble

The wall thimble shall have one plain end to accommodate flexible mechanical coupling and one flanged end to mate with the flap gate. The plain end shall match the discharge elbow in thickness and diameter, and the flanged end shall be drilled to match and shall be capable of supporting, without distortion, the flap gate. A seal ring will be provided on the wall thimble, located so that it is centered in the wall when embedded, see mechanical drawing for detail of anchor ring. The wall thimble shall be fabricated from steel plates.

2.3.7 Dissimilar Metals

When dissimilar metals are used in intimate contact, suitable protection against galvanic corrosion shall be applied. The anodic member shall be protected by proper electrical insulation of the joint.

2.4 INTAKE DESIGN

2.4.1 General

The intake sump design is the Contracting Officer's responsibility. It is the responsibility of the contractor to supply a pump that will meet the performance requirements without undue modifications to the sump as shown on the drawings. Any such modifications shall be at no cost to the Government and must receive prior approval.

2.5 PAINTING

The pump/motor shall be painted in accordance with the pump manufacturer's standard coating system. The painting of the discharge tube and discharge elbow and appurtenances shall be in accordance with Section 09964 PAINTING: HYDRAULIC STRUCTURES.

2.6 SPARE PARTS

The Contractor shall furnish the following spare parts:

a. One complete set of bearings and seals.

b. Replacement wearing rings and O-rings.

2.7 SHOP ASSEMBLY

The discharge tube and discharge elbow shall be assembled in the manufacturer's plant to ensure the proper fitting and alignment of all parts. Prior to disassembly, all parts shall be match-marked to facilitate the correct assembly in the field.

2.8 NAMEPLATE

The pumping unit shall be identified by means of a separate nameplate permanently affixed in a conspicuous location. The plate shall bear the manufacturer's name, model designation, serial number if applicable, and other pertinent information such as horsepower, speed, capacity, type, and direction of rotation. The plate shall be made of corrosion-resistant metal with raised or depressed lettering and a contrasting background.

2.9 INSTRUCTION PLATES

The pumping unit shall be equipped with suitably located instruction plates, including any warnings and cautions, describing any special and important procedures to be followed in starting, operating, and servicing the equipment. Plates shall be made of corrosion-resistant metal with raised or depressed lettering and a contrasting background.

2.10 FACTORY TEST

2.10.1 Performance Test

The pump shall be tested at the manufacturer's shop to demonstrate that the proposed pump operates without instability and complies with specified performance. Instability is defined when any point in usable range of the head-capacity curve cannot be repeated within 3 percent. When this occurs, the test shall be rerun. Compliance with specifications will be determined from curves required by the paragraph TEST RESULTS. Test procedures, except as herein specified, shall be in accordance with applicable provisions of HI 2.6. The temperature of the water used for testing shall be approximately the same for all tests run and shall be recorded during test runs.

2.10.1.1 Performance of the Pump

Performance of the pump shall be determined by a series of test points sufficient in number to develop a constant speed curve over the range of total heads corresponding to the requirements of the paragraph CAPACITIES. The test range shall include additional testing at total heads of2 ft higher than that specified. The lowest total head for testing shall be, as a minimum, the total head determined from the referenced paragraph. If the test setup permits testing at lower total heads, the range of total heads shall be extended 2 ft lower. Testing shall be inclusive for the speed involved. Tests shall be made using heads and a suction water elevation specified in the paragraph CAPACITIES. Test results with this sump elevation shall meet all specified conditions of capacity, head, and bhp. Head differentials between adjacent test points shall not exceed 3 ft, but in no case shall less than 10 points be plotted in the pumping range. If the plot of data indicates a possibility of instability or a dip in the head-capacity curve, a sufficient number of additional points on each side of the instability shall be made to clearly define the head-capacity characteristics.

2.10.1.2 Test Results

Test results shall be plotted to show the total head, static heads, bhp, and efficiency as ordinates. The results should be plotted against pump discharge in gpm as the abscissa. Curves shall be plotted showing pump performance to a scale that will permit reading the head directly to 0.5 ft, capacity to 200 gpm, efficiency to 1 percent, and power input to 5 bhp. It

shall be established that the performance requirements of these specifications and the warranties under this contract have been fulfilled. The performance test shall be made with the pump and motor assembled as an operating unit to simulate field installation unless otherwise approved in writing by the Contracting Officer. Readings shall include one point each within 2 percent of the rated total head, minimum expected head, and maximum expected head. The test shall be conducted in accordance with accepted practices at full speed; and, unless otherwise specified, the procedure and instruments used shall conform to HI 2.6.

2.10.2 Instrumentation and Procedures

Each instrument shall be described in detail, giving all data applicable, such as manufacturer's name, type, model number, certified accuracy, coefficient, ratios, specific gravity of manometer fluid to be used, and smallest scale division. When necessary for clarity, a sketch of the instrument or instrument arrangement shall be included. A fully detailed narrative description of each proposed method of instrumentation, procedures to be used, and a sample set of computation shall be included. The lowest equivalent static head that is obtainable with the testing when operating along the head-capacity curve of the proposed pump shall be stated.

2.10.2.1 Head Measurements

Head measurements shall be made using either a direct reading water column, mercury-air, mercury-water, a Meriam fluid manometer, or a pressure transducer. Vacuums shall be measured with either a mercury-air manometer, a mercury-water manometer, or a pressure transducer. Fluctuations shall be dampened sufficiently to permit column gauges or a differential pressure transducer to be read to either the closest one one-hundredth (0.01) of 1 ft of water or Meriam fluid or one-tenth (0.1) of 1 in. of mercury. Manometers shall be used as indicated by ISA RP2.1. When pressure transducers are used, their accuracy shall be checked with a manometer.

2.10.2.2 Pump Capacity

Capacity shall be determined by a calibrated venturi flowmeter or a long-radius ASME flow nozzle. Orifice plates shall not be used. Venturi or nozzle taps shall be connected to column gauges equipped with dampening devices that will permit the differential head to be determined to either the closest one-hundredth (0.01) of 1 ft or water or one-tenth (0.1) of 1 in. of mercury. Magnetic flowmeters and flowmeters utilizing ultrasonic flow measurements will be acceptable if the calibration of the flowmeter has been completed within the last 6 months.

2.10.2.3 Rotational Speed of Pump

Rotational speed of the pump shall be measured in accordance with measurement of speed in HI 2.6, except that revolution counters shall not be used. The device used shall permit the speed to be determined to 1 rpm.

2.10.2.4 Power Input

Power input to the pump shall be measured in accordance with power measurements in HI 2.6. A method to permit bhp to be determined to the closest 0.5 bhp shall be used.

2.10.3 Factory Test Report

Each factory test report shall include, as a minimum, the following:

a. Statement of the purpose of test, name of project, contract number, and design conditions. Instances where guaranteed values differ from specified values should be given.

b. Resume of preliminary studies, if such studies were made.

c. Description of pump and motor, including serial numbers, if available.

d. Description of test procedure used, including dates, test personnel, any retest events, and witness test data.

e. List of all test instruments with model numbers and serial numbers.

f. Sample computations (complete).

g. A discussion of test results.

h. Conclusions.

i. Photographic evidence in the form of either 24 color photographs of test equipment, test setup and representative test segments, or a VHS videotape, at least 30 minutes in length, covering the same information as photographs. All photographic evidence should be labeled with contract number, location, date/time, and test activity. Videotape shall be voice annotated with the same information.

j. Copies of instrument calibration.

k. Copies of all recorded test data.

l. Curves required by the paragraph TESTS RESULTS.

m. Curves showing the performance of the prototype pump.

n. Drawings of the test set-up showing all pertinent dimensions, elevations and cross section of the pump.

PART 3 EXECUTION

3.1 INSTALLATION

Correct installation and assembly of the pumping unit shall be the Contractor's responsibility and shall be in accordance with the drawings and with the manufacturer's installation instruction manual. The Contractor shall furnish all bolts, shims, tools, and other devices necessary for installing the pumping units. The manufacturer's representative(s) familiar with the equipment being installed shall supervise the handling, installation, start-up, and testing of the equipment as required in the paragraph INSTALLATION AND START-UP ENGINEER.

3.2 CLEANUP PRIOR TO START

After the pumping unit is installed and prior to start-up, complete clean up of the sump area of any accumulated construction debris shall be done.

This final cleaning of the sump area will be witnessed by a representative of the Government. Any damage to the pumping units or related equipment during initial start-up due to foreign objects left in the sump areas shall be corrected at the Contractor's expense.

3.3 PUMP FIELD TESTS

Field testing shall be conducted by an experienced field test engineer and will be witnessed by the Contracting Officer. Before initially energizing the pump/motors, the Contractor shall have successfully tested all pumping plant control, monitoring, and protective circuits. This thorough electrical checkout procedure shall have followed a detailed step-by-step approved test plan. The motor and other pumping unit elements undergoing tests should also be checked at this time.

3.3.1 Dry Test

Each pumping unit shall be tested in the dry in accordance with the pump manufacturer's instructions to determine whether it has been properly installed. Such tests shall be made when, and as, directed by the Contracting Officer. The pump shall be operated at full rated speed. Should tests reveal a design or installation deficiency or a manufacturing error in pumping unit components, the problem shall be promptly corrected by and at the expense of the Contractor.

3.3.2 Wet Test

Each unit shall be given an operating test under load for a period of at least 1 hr or as directed by the Contracting Officer. The tests shall be conducted by the Contractor and will be witnessed by the Government. During the tests, the operation of the pumping units shall be observed and measurement of noise (in accordance with HI 9.1-9.5), motor-bearing temperatures, voltage, and current shall be recorded for each pump. Measured parameters shall be within the pump manufacturers published limits. Vibration measurements shall be made at the top of the discharge tube for each pump. Vibration limits shall not exceed those recommended by HI 9.6.4. Without additional cost to the Government, the Contractor shall make all changes and correct any errors for which the Contractor is responsible.

3.3.3 Field Test Report

A test report of the field testing and a manual of Operating and Maintenance Instructions for the completed system shall be prepared and submitted in accordance with paragraph SUBMITTALS.

-- End of Section --

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DIVISION 16 - ELECTRICAL

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PART 3 EXECUTION

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SECTION 16225

PUMP CONTROLLER

PART 1 GENERAL

1.1 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-03 Product Data

Pump Controller and Telemetry Units; G, DT

Manufacturer's data for the pump controller/telemetry units proposed to be incorporated in the work, together with other relevant information pertaining to the equipment.

SD-02 Shop Drawings

Shop Drawings; G, DT

Job-specific wiring diagrams, parts lists, enclosure dimensional and door layout drawings and instructions shall be provided for approval. Drawings shall be provided with materials lists, parts lists, and other equipment data. Manufacturer's general wiring diagrams that are not job specific are not acceptable. This requirement applies to all field mounted instrumentation control and telemetry equipment. Interconnection details shall be shown for all field mounted instrumentation. A description of operation shall be provided detailing the operation of the complete system, including the control and alarm handling.

SD-08 Manufacturer's Instructions

Installation Instructions

Installation instructions for the controller/telemetry units and instructions on operation, with recommended field tests and adjustments.

SD-10 Operation and Maintenance Data

Operating and Maintenance Instructions for Controller/Telemetry Units; G, DT

The Contractor shall furnish for approval information for inclusion into each pump station's "Operation and Maintenance Manuals", as specified in Section 16415 for items furnished under this Section of the Specifications. Pump controller/telemetry unit information for inclusion shall include complete information on wiring diagrams both controller/telemetry and combination motor controller, programs, software manuals, configuration, operation,

adjustment, and troubleshooting procedures

1.2 GENERAL REQUIREMENTS

The Contractor shall furnish, install and place into operation a comprehensive control and monitoring system for the pump station system as described herein. All equipment shall be completely factory assembled, wired, and tested prior to shipment. The system described hereafter shall be similar or equal to a US Filter Control Systems Bulletin A1000/B100/D620i/-TAH lift station monitoring and control system. The equipment supplier shall provide all control and level sensing equipment and employ full time manufacturing, engineering, service and support personnel necessary to provide and support the complete system.

1.3 QUALITY CONTROL

The equipment supplier shall maintain quality in both design and workmanship as well as materials used in the manufacture of the equipment supplied. All equipment supplied under this contract shall be of new manufacture. The supplier shall be a firm that is engaged in the manufacturing of multiple function control and monitoring systems. The proposed system shall be in regular production with pre-designed hardware and software for process control. When the Specification conflicts with a manufacturer's standard system, the standard system may be proposed if the intention of the Specification is met. The control system shall be a standard system. Custom, one-of-a-kind application software and customized hardware components will not be accepted. A standard system is defined as one which is available, at time of bid, with fully tested hardware and software, full documentation, and prepared training classes such that no development must be done beyond system configuration. The supplier shall be responsible for detailed engineering, manufacture, programming, test, start-up and demonstration of all equipment and software programs to provide a complete operating system. The supplier shall have been continuously involved in the design and manufacture of monitoring and control systems for the past ten (10) years. The supplier shall have successfully built and placed into operation, systems similar to the one proposed herein and shall furnish a list of at least ten (10) operating installation so installed. The supplier shall have on staff qualified instrument technicians and shall maintain a stock inventory of spare parts for all major components in the system. The supplier shall not subcontract system software preparation, application software preparation or systems engineering. The supplier shall be responsible for engineering and implementing necessary interface between the supplied equipment and the existing equipment or interface junction boxes. Supplier shall document this interface, including point-to-point wiring diagrams. The supplier shall provide all engineering and render coordination assistance, necessary for calibration of overall control system and to resolve interface discrepancies between microprocessor I/O subsystem, panels, equipment, instrumentation and final control devices provided by other suppliers. When interface conflicts exist, the supplier shall document conflicts in writing to the Contracting Officer providing absolute information such as terminal numbers, device name, test performed and diagnosis of problem. All equipment supplied shall be of the most current and proven design at the time of delivery. Specifications and drawings call attention to certain features, but do not purport to cover all details entering into the design of the completed pump station system. The complete system and equipment provided by the supplier shall be compatible with the functions required and shall be a complete working system. All electrical components of the system shall operate on 120 volt, single phase, 60 Hz, except as otherwise

noted in the Specifications and on the drawings. The drawings and Specifications indicate the energy sources that will be provided. Any other devices necessary to obtain proper operation of the system from these energy sources shall be provided by the supplier.

1.4 SYSTEM COORDINATION AND SINGLE SOURCE RESPONSIBILITY

The equipment provided shall be a completely integrated microprocessor based automatic control and monitoring system consisting of the required controller, power equipment, level monitoring and alarm monitoring equipment in a factory wired and tested assembly. The automatic control and alarm/monitoring system components shall be standard, catalogued, stocked products of the system supplier to assure one source responsibility, immediately available spare/replacement parts, proper system interconnections and reliable long term operation. All equipment and materials shall be subjecting to the Government's review and shall not be purchased or manufactured until the review is complete. The supplier shall prepare detailed design information, procure, configure, start up, make ready for use, the complete instrumentation systems as indicated on the drawings and in the Specifications. These Specifications and drawings include descriptions of functional operation and performance, as well as standards, but do not necessarily enumerate detailed specifications for all components and devices which are essential for system operation. However, all components and devices shall be furnished and installed as required to provide complete and operable systems for accomplishing the functions and meeting the performance requirements set forth hereinafter. The system shall be installed complete and ready to operate, including all necessary connections to sources of electrical power, interconnection between field equipment and input/output cabinets, and accessories as specified or as recommended for best operation for the equipment furnished. The hardware, which is installed in the control system, shall be readily available. None of the hardware in the system shall be part of a discontinued line or classified as hardware that is on repair status only. The supplier shall provide documentation verifying the continuing availability of the system hardware for full integration of the original hardware with future hardware improvements. All necessary mounting panels, stands, hanger, and brackets shall be furnished and installed and shall comply with the applicable provisions of the Specifications. The supplier shall include in his price allowance for factory trained service personnel to supervise, test and adjust all the equipment until the system has been completely accepted.

1.5 WARRANTY

The Contractor shall furnish to the Contracting Officer the manufacturer's standard warranty or guaranty for the equipment and materials installed under this Section of the SPECIFICATIONS. The manufacturer's standard warranty shall be for a minimum period of 1 year and shall start upon the turn-over of the pump station to the government. Upon receipt of notice from the Government of failure of any part of the guaranteed materials or equipment during the warranty period, new replacement part or parts shall be furnished and installed promptly at no additional cost to the Government.

PART 2 PRODUCTS

2.1 GENERAL EQUIPMENT REQUIRMENTS

2.1.1 UL Approval

The control panels shall be constructed in compliance with Underwriter's

Laboratories Category 913 enclosed industrial control panel relating to hazardous locations with intrinsically safe circuit extensions listing and following up service. The control panels shall bear the Underwriter's Laboratories serialized "913" label. Prior to shipment from the manufacturer's facility to the jobsite for installation, the completed pump control panel shall be inspected by an Underwriter's Laboratories (UL) representative. Upon successful completion of the inspection, the panel shall be assigned the required 913 serialized UL label, indicating the equipment is built in accordance with the practices and requirements of this UL category. While the use of UL list components is encouraged, their use alone and of the alternate use of a UL 508 enclosed industrial control panel serialized label will not be considered and acceptable or satisfactory alternate to the UL 913 serialized label. Upon request form the Contracting Officer; the panel manufacturer shall supply documentation to the owner proving it is a UL recognized manufacturing facility for the type of equipment required. Only the labeled products of UL 913 recognized panel manufacturer shall be considered acceptable for use on this project.

2.1.2 Panel Wiring

All wiring shall be minimum 600 volt, UL type MTW or AWM and have a current-carrying capacity of not less than 125% of the full load current. The conductors shall be in complete conformity with NFPA 70. For ease of servicing and maintenance, all wiring shall be color-coded. The wire color code shall be clearly shown on the shop drawings, with each wire's color indicated. All control wiring shall be contained within plastic/PVC wiring duct with covers. Where dimensional constraints prevent the use of wiring duct, wires shall be trained to panel components in groupings. The wire groupings shall be bundled and tied not less than every 3 inches with nylon self locking cable ties. Every other cable tie shall be fastened to the enclosure door or inner device panel with a cable tie mounting plate with pressure tape. Where wiring crosses hinged areas, such as when trained from the inner device panel to the enclosure door, spiral wrap shall be used.

2.1.3 Incoming Service and Lightning Arrestor

The incoming service for the control system shall be 120 volt, single phase, 3 wire, 60 Hz. A single phase lightning arrestor shall be supplied in the control system and connected to each line of the incoming side of the power input terminals. The arrestor shall protect the control system against damage as the result of transient voltage surges cause by lighting interference, switching loads and power line interferences. It shall begin shunting to ground at 500 volts maximum and withstand repeated transient voltage pulse currents up to 2,000 amperes. The panel shall be supplied with a properly sized main control power circuit breaker. The breaker shall supply power to all controls and equipment within the enclosure.

2.1.4 Nameplates

All major components and subassemblies shall be identified as to function with laminated, engraved nameplates.

2.1.5 Signal Transient Protection

Transient protection shall be provided with all equipment to protect all instrumentation and telemetry devices either receiving or sending signals. The transient protectors shall be a three stage surge suppression device which shall effectively arrest most transients encountered in an instrumentation environment. Transient protectors utilizing single or dual

stage suppression devices will not be acceptable. The first stage of the transient protector shall consist of a gas tube arrestor connected across the signal wires and to ground. This stage shall be designed to suppress transients greater than 150 to 300 volts. The second stage of the transient protector shall consist of two varistors each connected between a signal line and ground. This stage shall suppress any transients less that 150 to 300 volts and clamp them to 56 volts. The third stage of the transient protector shall consist of two special purpose, high speed zener diodes which suppress any remaining transients to 51 volts. Fifty ohm, 5 watt resistors shall be connected between the stages to dissipate the potential energy of the transients. Transient protectors shall be similar or equal to Series TP as manufactured by US Filter Control Systems.

2.2 SYSTEM SPECIFICATIONS

The controller shall monitor wet well level via submersible level transducer and provide automatic control of storm water pumps and one sump pump as indicated on the drawings.

Pump controls and alarms shall be in accordance with the elevation settings shown on the contract drawings.

The controllers shall indicate wet well level, provide alarm and control set points, annunciate station alarms and indicate station status. All parameters shall be viewable and configurable from the front of the panel. Unit shall include a microprocessor based controller unit for pump control and sequencing as herein described. The controller/telemetry unit shall also provide digital communications with a future master telemetry unit via dedicated leased voice grade phone lines. The unit shall include necessary control equipment including main breaker, transformers, all contained in a Type 12 enclosure in accordance with NEMA 250 to provide a completely integrated control system.

2.2.1 Power Supply

The power supply to the controller will be 120 volts, 1 phase, 2 wire, 60 Hz.

2.2.2 Enclosure

The pump controller shall be housed in the Motor Control Center. The section shall be properly sized to accommodate all control elements. A properly size data pocket provided behind the door to keep all the wiring drawings.

2.2.3 Circuit Breaker

A 1 pole, 15 amp trip, thermal magnetic molded case industrial type circuit breaker shall be supplied.

2.2.4 VDC Power Supply

The autosensory control panel shall include necessary DC power supplies for internally mounted panel components. Unit shall also include battery and battery charger for continued operation during power interruptions for up to 4 hours. A regulated 12VDC power supply shall be provided for the microprocessor based digital controller and other control system components as required. The power supply shall include a terminal block for incoming AC, output DC and ground connections. The power supply shall be powered

from a 120/24 VAC class II transformer and include tapered charge/float type battery charging circuitry to maximize battery life. The power supply/battery charger shall also include a transistor based open collector output signaling when AC voltage is present for interface to control equipment. The power supply shall be rated at a minimum of 1.5 amps at 12VDC. Power supply circuits shall include AC line electrical noise filtering capable of reducing induce transient voltages that may damage sensitive microprocessor circuits. Unit shall be supplied with battery back up. Battery shall be sized to provide 4 hours of back up power to controller, alarm and transducer systems.

2.2.5 Microprocessor Controller/Telemetry Unit

Microprocessor based controller shall be provided for control of the pumps based on the wet well level at the pump station as shown on the drawings. The controller shall be capable of being powered by a Class II UL listed transformer/power supply. Voltage regulation and battery charging circuitry shall be on board. The controller shall be a standard, catalogued product of a water and wastewater pumping automation equipment manufacturer, regularly engaged in the design and manufacture of such equipment. The controller shall be specifically designed for water and wastewater pumping automation utilizing standard hardware and software. The level signal received from the submersible transducers shall be converted to a "feet and tenths of a foot" digital display. Keyboard-configurable digital setpoints shall be provided for differential level-type automatic pump operation as well as automated alternation and manual sequence selection or timing, and alarm performance as herein described. The controller/RTU shall provide on/off operation of the pumps based on the wet well level as sensed by the herein specified submersible level transducer in a pump down mode of operation. In general, additional pumping capacity shall be called into operation with an increase in the wet well level. Decreasing pumping capacity shall be called for upon a lowering wet well level. Automatic first on, first-off alternation shall be provided for the storm water pumps of the station, with integral time clock alternation sequence advancement. All pumps shall operate in accordance with the pump control settings shown on the drawings. The controller/RTU shall monitor analog and digital information. Analog variable setpoints shall be provided for the wet well level analog signal. Each analog shall be presented in engineering units. Setpoints based on the system discharge pressure shall be provided for the following:

Wet Well Level (Display)

1. High Alarm on/off
2. DWP Pump on/off
3. Lead SWP 1 Pump on/off
4. Lag SWP 2 Pump on/off
5. Lag SWP 3 Pump on/off (As applicable)

The controller shall be capable of accepting seven (7) analog (1-5 VDC or 4-20 mADC) and twelve (12) digital inputs in it's base form. The controller shall provide two (2) analog and ten (10) digital outputs in its base form. The controller shall incorporate 12-bit analog to digital and digital to analog conversion. Additional telemeter analog and digital signal monitoring capability shall be built in. Additional local analog inputs shall be provided in increments of four (4). Additional local digital inputs or outputs shall be provided in increments of eight (8). Additional analog outputs shall be provided individually. The operating program shall be resident in EEPROM and include full scale ranging and pump up/down determination. The controller shall be arranged to operate up to five (5)

pumps plus high alarms in its base form. The on and off adjustments of each pump and alarm setpoint shall be full range adjustable through the use of an authorized operator access code and a key pad. The controller display shall show the operation of each control stage. Review of adjustments shall be possible by the operator without the use of the access code. The controller shall alternate the storm water pumps to equalize the system pumps. Input signal conditioning shall provide keypad-selectable averaging of the input signal with one reading taken every second and from one to thirty readings being selectable with the controller displaying and providing control based on a moving average of the selected number of samples. The controller shall include keypad adjustable on delay timing logic to provide staggered pump starting following a power failure condition. Keypad adjustable off delay timing for each pump control stage shall provide smooth transition between control stages. In addition to the pump and alarm control capability, the controller shall provide alarm annunciation. The controller, upon the occurrence of High wet well level alarm, shall flash the alphanumeric display, and energize the weatherproof strobe light mounted outside the building. The display will indicate the alarm description, complete with the time and date of the alarm occurrence. The digital display shall continue to show the alarm function, complete with time and date information, until the condition has cleared. The following alarms shall be provided for the pump station:

a. High wet well level alarm
b. Controller failure
d. Motor Over Temperature (Each pump motor)
e. Pump Leakage (SWP-1,2, & 3)
f. Power failure

The controller shall have built in alarm and event historical log permitting operator review of time stamped historical events. This log will store a minimum of 1000 historical alarms/events for review via front panel mounted operator interface. The historical log shall allow the user to configure data to be stored in up to 4 different groups for review individually or combined. Available capabilities shall include:

a. Multiple analog inputs with alarm and control setpoint capability for each.
b. Multiple pump alternators (for varying sized pumps)
c. Varying alternation and sequencing schemes (rotary, first on, first off, manual, fixed).
d. Delays (on and off delay).
e. Load cycling/shedding with automatic or manual activation.
f. Automatic pump replacement upon a pump failure input (pump failed/replaced).
g. Pump alternator advancement.

The controller display shall operate in a manual scrolling menu mode with the various displays shown in sequence as selected by the keypad's up/down arrow keys. The display shall indicate the specific function entered on the keypad to confirm that selection of a particular output or other function from the keypad during adjustment or review routines. When operating a key of the controller, the audible alarm shall chirp briefly to confirm that the selected key has operated. An analog simulation software module shall be supplied to provide a wet well normal/simulated signal to test the control system. The controller/RTU shall be housed in a flush-mounted, environmentally protected assembly and mounted on the door of the control panel. All connections shall be made via plug-in terminal blocks. The controller shall employ an operator interface having a 32 character

alphanumeric backlit LCD display with character height not less than0.3" and with a 116 position keypad operating in menu mode. The controller/RTU shall be field configurable permitting operator adjustments. The changes may be saved to permanent nonvolatile memory or may function in working memory only; thus allowing the operator to reset the system to previously programmed settings. The controller/RTU shall support up to 4 levels of security in a hierarchical structure allowing different levels of access to the controller/RTU for differentiation of desired access levels to include Operator 1, Operator 2, Maintenance and Supervisory access levels. Each data viewing/configuration parameter shall be assigned a separate level of access. A watchdog function shall be provided which shall observe meaningful microprocessor activity. In the unlikely event of microprocessor stoppage, the watchdog shall reset the processor. In addition, it shall transfer Form C contracts provided to job connection terminals. The controller shall have two (2) RS-232C serial communications ports. One serial port shall be connected to phone line modem for communications to future master telemetry unit. The other serial port shall be available as an interface to laptop computer. It is the intention of this specification that a standard controller/transceiver be provided, with all of the control and communications features described, as a full integrated assembly.

2.2.6 Selector Switch

The control panel shall interface with selector switches mounted on the motor control center for Hand-Off-auto operation of each pump. In the Hand position, the pump shall operate. In the Off mode, the pump shall not be allowed to operate. In the Auto mode, the pump shall operate in response to control signals from the microprocessor based controller.

2.2.7 Indicator/Pilot Lights

The control panel shall include indicator lights mounted on the door for pump run, and pump fail indication. Additionally, a front panel mounted indicator light shall be provided to indicate high wet well level. Indicator lights shall be full size 1-1/8 inch diameter NEMA 4X, heavy duty, full voltage type. Connection shall be made by screw type compression terminals. Lens colors shall be as shown or specified. Pilot lights shall be push to test type.

2.2.8 Time Delay Relay

A time delay relay circuit shall be furnished for each pump to provide pump failure detection. The time delay logic shall be activated when the storm water pump is called for operation. The timer shall remain active until the pump run signal is received and inhibit the timing of the relay. In the event that the pump does not start before the time delay relay has "timed out", the time delay relay shall energize and provide contact closure outputs representing pump fail for input to alarm light and microprocessor controller. Additionally, the pump shall be locked out of service, requiring manual reset. The time delay relay shall be multirange time adjustable from 0.5 seconds to 1000 minutes and include top mounted LED indication for timer and output status. Unit shall have three form C contact outputs or 3PDT rated at 8 amps and 10 million operations. Unit shall have polycarbonate case with high impact strength. Unit shall have inverse polarity protection on DC units. The time delay relay shall be transient protected up to 2,500 volts peak to peak for up to 50 ms. Operating temperature range shall be 0-122 degrees F. Unit shall be UL recognized.

2.2.9 Pump Run Verification

A positive pump running (flow) condition shall be sensed by an auxiliary contact from the pump motor starter.

2.2.10 Analog Input Isolator With Loop Power Supply

The controller shall provide isolated 24 VDC loop power to each level transmitters and the future station flow rate transmitter. The analog signals shall be isolated from the controller via in-line transducer input isolation amplifier module. The unit shall provide a minimum of 750 volts isolation between the voltage input of the controller and the transducer and include three stage surge suppression for reliable operations during possible electrical transients. The isolation amplifier module shall include adjustable signal scaling potentiometers to achieve full scale signal output for better signal differentiation. The isolation amplifier shall be powered by 12 VDC to permit operation from batteries during incoming power interruptions.

2.2.11 Submersible Level Transducer

The liquid level of the wet well shall be sensed by a submersible level transducer similar or equal to US Filter Control Systems Bulletin A1000, Model 157GSCD. The transducer shall be a 4-20 mADC, 2 wire, 15 to 40 VDC loop powered type with its output signal directly proportional to the measured level excursion over a factory calibrated range as indicated by the drawings. The transducer shall be of the sold state head-pressure sensing type, suitable for continuous submerged operation and shall be installed in accordance with the manufacturer's instructions. The bottom diaphragm face of the sensor shall be installed where shown on the drawings. The sensor shall be mounted using a stainless steel cable system at the locations shown. The transducer housing shall be fabricated of type 316 stainless steel with a bottom diaphragm 2-5/8 inches diameter, of heavy duty, limp foul-free molded Teflon bonded to a synthetic rubber back/seat. A hydraulic fill liquid behind the diaphragm shall transmit the sensed pressure to a solid state variable capacitance transducer element to convert the sensed pressure to a corresponding electrical value. The sensed media shall exert its pressure against the diaphragm which flexes minutely so as to vary the proximity between an internal ceramic diaphragm and a ceramic substrate to vary the capacitance of an electrical field created between the two surfaces. A stable, hybrid, operational amplifier assembly shall be incorporated in the transducer to excite and demodulate the sensing mechanism. The transducer shall incorporate laser trimmed, temperature compensated, high quality components and construction to provide a precise, reliable, stable output signal directly proportional to the sensed pressure over a factory calibrated range. The transducer element shall incorporate high over pressure protection and be designed to withstand intermittent over pressures five times the full scale range being sensed. Metallic diaphragms shall not be acceptable in that they are subject to damage or distortion. Sensing principles employing LVDT's, resistive or pneumatic elements shall not be acceptable. The transducer/transmitter shall include easily accessible offset and span adjustments in the upper assembly. Span shall be adjustable from 100% down to 15% of the sensor range. Fine and coarse adjustments for both span and offset shall be provided, using 25 turn potentiometers. Offset and span adjustments shall be non-interactive, for ease of calibration. The internal pressure of the lower transducer assembly shall be relieved to atmospheric pressure through a heavy duty urethane jacketed hose and cable assembly and a slack PVC bellows mounted in the weatherproof fiberglass upper assembly.

The sealed breather system shall compensate for variations in barometric pressure and expansion and contraction of air due to temperature changes and altitude as well as prevent fouling from moisture and other corrosive elements. The transducer assembly shall be installed where directed by the Contracting Officer and connected with other system elements and placed in successful operation. It shall be provided with input power and output signal transient protection, associated control elements as specified herein and in accordance with the manufacturer's instructions.

2.2.12 Cable Suspension Mounting Kit

The sensor shall be suspension mounted using a Consolidated Electric Company Cable Suspension Mounting Kit or equivalent, consisting of a 2 foot long 1 inch NPT type 316 stainless steel pipe with coupling, bolt, cable clamps and hardware along with the required length of 1/8 inch diameter 7x19 stainless steel cable.

2.2.13 Transducer Intrinsically Safe Wiring Barrier

An intrinsically safe barrier shall be provided ahead of each transducer assembly. The barrier shall render the level sensing system suitable for use in Class 1, division 1, Groups A, B, C and D, Class 2, Division 1, Groups E, F, and G, and Class 3, Division 1 hazardous locations.

2.2.14 Alarm Light

The control panel supplier shall provide an alarm light for remote mounting. The alarm light shall be a weatherproof strobe operating on 12VDC, producing a minimum of 300,000 candlepower flash through a high impact red Lexan lens, operating at 60 to 90 flashes per minute. The light shall be surface mounted at a location as shown on the drawings.

2.2.15 Float Switches

Float switches shall be installed in the wet well area to back-up the transducer incase it failed and to initiate the high water level alarm and to perform pump down operation. Float Switch shall be a non-mercury type. The body shall be constructed of "Teflon" covered, 20 gauge, 316 stainless steel housing measuring not less 5.5 inches in diameter. Switch shall be a SPST magnetic reed switch rated for not less than 100VA at up to 250 Volts shall be mounted inside the float and connected to a multi-stranded, 2 conductor plus ground, 16 gauge, CPE jacketed cable. The cord shall have fine strand conductors (not more than 34 gauge) made especially for heavy flexing service. The cable connection point shall be potted in epoxy providing a strong bond to the float and reed switch forming a water/moisture tight connection. A 316 stainless steel flanged cable mounting clamp assembly shall be supplied allowing pipe or cable mount. Float switch shall be US Filter Control series 9G-EF or equal.

2.2.16 Condensation Protection

A 100 watt condensation protective heater with a high temperature cutout thermostat shall be supplied in the control enclosure. The heater shall maintain internal enclosure temperature higher than out side ambient air temperature to prevent condensation of electronic equipments.

PART 3 EXECUTION

3.1 INSTALLATION

Installation shall comply with manufacturer's instructions, drawings, recommendations, and the applicable provisions of Section 16415 ELECTRICAL WORK, INTERIOR. The services of a factory trained, qualified representative shall be provided to inspect the completed installation, make all adjustments necessary to place the system in trouble free operation and instruct the operating personnel in the proper care and operation of the equipment. After the system has been installed, the supplier shall demonstrate the performance of each unit, and document that the system operates properly as specified. Monitoring signals shall register at all required locations and loop checks on all loops shall have been completed and tested. The results of all tests and adjustment made shall be documented for insertion into the operation and maintenance manual.

3.2 TRAINING

A field-training course shall be provided for operating and supervising staff members. Training shall be provided for a total period of eight hours of normal working time and shall start after the system is functionally complete but prior to final acceptance tests. The field instructions shall cover all of the items contained in the operating and maintenance instructions, including: system overview, general theory of operation, system operation, system configuration, alarm formats, failure recovery procedures, troubleshooting and repair, maintenance and calibration, and system programming and configuration.

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SECTION 16415

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SECTION 16415

ELECTRICAL WORK

PART 1 GENERAL

1.1 SCOPE

The work of this section covers electrical work on the interior of the storm water pump stations and pump controls. Installation shall conform to the requirements of NFPA 70 and NFPA 101, unless more stringent requirements are indicated herein or shown.

1.2 REFERENCES

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

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI C119.1	(1986) Electric Connectors - Sealed Underground Connector Systems Rated 600

ASTM INTERNATIONAL (ASTM)

ASTM B 187/B 187M	(2006) Copper, Bus Bar, Rod and Shapes and General Purpose Rod, Bar and Shapes
ASTM B 8	(2004) Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE C37.13	(1990; R 1995) Standard for Low-Voltage AC Power Circuit Breakers Used in Enclosures
IEEE C37.16	(2000) Recommendations for Low-Voltage Power Circuit Breakers and AC Power Circuit Protectors, - Preferred Ratings, Related Requirements, and Application
IEEE C62.41.1	(2002) IEEE Guide on the Surges Environment in Low-Voltage (1000 V and Less) AC Power Circuits

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA AB 1	(2002) Molded-Case Circuit Breakers, Molded Case Switches, and Circuit-Breaker Enclosures
NEMA FB 1	(2007) Standard for Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable

NEMA ICS 1	(2000; R 2005) Standard for Industrial Control and Systems General Requirements
NEMA ICS 2	(2000; Errata 2002; R 2005; Errata 2006) Standard for Industrial Control and Systems: Controllers, Contractors, and Overload Relays Rated Not More than 2000 Volts AC or 750 Volts DC: Part 8 - Disconnect Devices for Use in Industrial Control Equipment
NEMA ICS 6	(1993; R 2006) Standard for Industrial Controls and Systems Enclosures
NEMA PB 1	(2006) Standard for Panelboards
NEMA RN 1	(2005) Standard for Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit
NEMA ST 20	(1992; R 1997) Standard for Dry-Type Transformers for General Applications
NEMA WC 8	(1988; Rev 3 1996) Ethylene-Propylene-Rubber-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy
NEMA WD 1	(1999; R 2005) Standard for General Requirements for Wiring Devices
NEMA WD 6	(2002) Standard for Wiring Devices - Dimensional Requirements

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2007) National Electrical Code - 2008 Edition

UNDERWRITERS LABORATORIES (UL)

UL 1277	(2004) Electrical Power and Control Tray Cables with Optional Optical-Fiber Members
UL 1449	(2006) Surge Protective Devices
UL 198C	(1986; R 1998) High-Interrupting-Capacity Fuses, Current-Limiting Types
UL 198D	(1995) Class K Fuses
UL 198E	(1988; R 1988) Class R Fuses
UL 360	(2003; Rev thru Jul 2007) Liquid-Tight Flexible Steel Conduit
UL 198G	(1988; Rev May 1988) Fuses for Supplementary Overcurrent Protection

UL 198L	(1995; Rev May 1995) D-C Fuses for Industrial Use
UL 467	(2007) Standard for Grounding and Bonding Equipment
UL 486A	(1997; R 2001, Bul. 2002, 2003) Wire Connectors and Soldering Lugs for Use with Copper Conductors
UL 489	(2002; R 2003) Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit-Breaker Enclosures
UL 506	(2000; Rev thru Feb 2004) Specialty Transformers
UL 510	(1994; R 1998) Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape
UL 512	(1993; R 1999) Fuseholders
UL 6	(2004) Standard for Electrical Rigid Metal Conduit-Steel
UL 67	(1993; Rev thru Nov 2003) Panelboards
UL 83	(2003; Rev thru Apr 2006) Standard for Thermoplastic-Insulated Wires and Cables
UL 817	(1994); Rev thru May 1999) Cord Sets and Power Supply Cords
UL 943	(1993; Rev thru Feb 2004) Ground-Fault Circuit-Interrupters

1.3 COORDINATION

The drawings indicate the extent and the general location and arrangement of equipment, conduit, and wiring. The Contractor shall become familiar with all details of the work and verify all dimensions in the field so that the outlets and equipment shall be properly located and readily accessible. Electrical equipment and materials shall be located to avoid interference with mechanical or structural features. If any conflicts occur necessitating departures from the drawings, details of and reasons for departures shall be submitted and approved prior to implementing any change. The Electrical Contractor shall coordinate the electrical work with mechanical and electrical drawings and provide all power related wiring even if they are not shown on electrical drawings.

1.4 SPECIAL ENVIRONMENTS

Wiring, Fixtures and equipment shall conform to NFPA requirements for installation in damp wet locations.

1.5 IDENTIFICATION NAMEPLATES

Major items of electrical equipment and major components shall be

permanently marked with an identification name to identify the equipment by type or function and specific unit number as indicated. Designation of motors shall coincide with their designation in the motor control center or panel. Unless otherwise specified, all identification nameplates shall be made of laminated plastic with black outer layers and a white core. Edges shall be chamfered. Plates shall be fastened with black-finished round-head drive screws, except motors, or approved nonadhesive metal fasteners. When the nameplate is to be installed on an irregular-shaped object, the Contractor shall devise an approved support suitable for the application and ensure the proper installation of the supports and nameplates. In all instances, the nameplate shall be installed in a conspicuous location. At the option of the Contractor, the equipment manufacturer's standard embossed nameplate material with black paint-filled letters may be furnished in lieu of laminated plastic. The front of each panelboard, motor control center, switchgear, and switchboard shall have a nameplate to indicate the phase letter, corresponding color and arrangement of the phase conductors. The following equipment, as a minimum, shall be provided with identification nameplates:

Minimum 1/4 inch High Letters	Minimum 1/8 inch High Letters
Panelboards	Control Power Transformers
Starters	Control Devices
Safety Switches	Instrument Transformers
Motor Control Centers	
Transformers	
Equipment Enclosures	

Each panel, section, or unit in motor control centers, switchgear or similar assemblies shall be provided with a nameplate in addition to nameplates listed above, which shall be provided for individual compartments in the respective assembly, including nameplates which identify "future," "spare," and "dedicated" or "equipped spaces."

1.6 COMMERCIAL POWER SERVICE

It shall be the responsibility of the Contractor to properly coordinate with the local utility, Commonwealth Edison (ComEd), Mr. Garry VonDrasek, New Business Field Representative (Telephone No. 847-870-2057), all requirements for the new service. The Contractor shall furnish all materials and equipment necessary, perform all work required, and pay all cost associated for obtaining and for the installation of the complete power service. All requirements for the commercial power service shall be installed in strict accordance with all requirements ComEd. Service shall be three phase, four wire, 480/277 volts.

1.6.1 Metering Cabinets and Transformers

The metering cabinet shall be utility company approved and shall be furnished and installed by Contractor. The metering transformer will be furnished and installed by ComED. ComED will furnish the meter socket and the Contractor shall install the meter socket and the 1-1/2 inch conduit from the metering transformers to the meter socket. The entire service shall be installed in accordance with the requirements of ComED.

1.6.2 Inspections

Prior to the installation of any portion of the commercial power service, the Contractor shall contact ComEd to coordinate the placement of all

equipment and materials so that they are compatible with the equipment provided by ComEd. Prior to energizing power service by the power company, the Contractor shall provide for the inspection of the installation in accordance with the requirements of the power company. Certificates of approval shall be provided for the power company and for the Contracting Officer.

1.7 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Electrical Work Drawings; G, DT

Detail drawings for all materials and equipment specified. Detail drawings shall consist of a complete list of equipment and materials, equipment drawings, illustrations, schedules, instructions, diagrams, manufacturer's standard installation drawings and other information necessary to define the installation and enable the Government to check conformity with the requirements of the contract drawings. Drawings shall show applicable schematic and wiring diagrams, elevation drawing, and equipment floor plan. If departures from the contract drawings are deemed necessary by the Contractor, complete details of such departures shall be included with the detail drawings. Approved departures shall be made at no additional cost to the Government.

Conduits and Cables Installation Plan; G, DT

The Contractor shall submit conduits and cables installation plans. Installation plan shall include the Site layout drawing showing the size of each conduit and number and schedule of conductor/cable.

SD-03 Product Data

Manufacturer's Catalog; G, DT
Data composed of catalog cuts, brochures, circulars, specifications, product data, and printed information in sufficient detail and scope to verify compliance with the requirements of the contract documents.

Material, Equipment, and Fixture Lists; G, DT
A complete itemized listing of equipment and materials proposed for incorporation into the work. Each entry shall include an item number, the quantity of items proposed, and the name of the manufacturer of each item.

As-Built Drawings; G, DT

As-built drawings shall be a record of the construction as installed. The drawings shall include all information shown on the contract drawings, deviations, modifications, and changes from the contract drawings, however minor. The as-built drawings shall

be kept at the job site and updated daily. The as-built drawings shall be a full-sized set of prints marked to reflect all deviations, changes, and modifications. The as-built drawings shall be complete and show the location, size, dimensions, part identification, and other information. Additional sheets may be added. The as-built drawings shall be jointly inspected for accuracy and completeness by the Contractor's quality control representative and by the Contracting Officer prior to the submission of each monthly pay estimate. Upon completion of the work, the Contractor shall submit three full sized sets of the marked prints to the Contracting Officer for approval. If upon review, the as-built drawings are found to contain errors and/or omissions, they will be returned to the Contractor for correction. The Contractor shall correct and return the as-built drawings to the Contracting Officer for approval within ten calendar days from the time the drawings are returned to the Contractor.

Onsite Tests; G, DT

A detailed description of the Contractor's proposed procedures for on-site tests.

SD-06 Test Reports

Field Test Plan; G, DT

Detailed description of the Contractor's proposed procedures for:

a. Pump control/alarms and operation tests.
b. Equipment test.
b. Cables insulation resistance test.

The test plan shall be submitted 15 days prior to the test including tests to be performed, test equipment required, and tolerance limits.

Field Test Reports; G, DT

Test report shall be submitted for approval. Information shall be included in 8 1/2 x 11 inch binders having a minimum of 3 rings from which material may readily be removed and replaced, including a separate section for each test. Sections shall be separated by heavy plastic dividers with tabs.

a. A list of equipment used, with calibration certifications.
b. A copy of measurements taken.
c. The dates of testing.
d. The equipment and values to be verified.
e. The conditions specified for the test.
f. The test results, signed and dated.
g. A description of adjustments made.
h. Final position of controls and device settings.

SD-07 Certificates

Materials and Equipment Reports; G, DT

The label or listing of the Underwriters Laboratories, Inc., shall

be accepted as evidence that the materials or equipment conform to the applicable standards of that agency. In lieu of this label or listing, a statement from a nationally recognized, adequately equipped testing agency indicating that the items have been tested in accordance with required procedures and that the materials and equipment comply with all contract requirements will be accepted. Materials and equipment Shall be approved based on the manufacturer's published data. For other than equipment and materials specified to conform to UL publications, a manufacturer's statement indicating complete compliance with the applicable Federal Specification, or standard of the American Society for Testing and Materials, National Electrical Manufacturers Association, or other commercial standard, is acceptable.

SD-10 Operation and Maintenance Data

Operation and Maintenance Manuals; G, DT

Six copies of operation and maintenance manuals for the equipment specified herein shall be furnished for each pump station. Two complete sets for each pump station shall be submitted a minimum of 30 days prior to Initial Acceptance Test and remainder upon acceptance. Operating manuals shall detail the step-by-step procedures for system startup, operation, and shut down. Operating manuals shall include the manufacturer's name, model number, parts list, and brief description of all equipment and their basics operating features. Maintenance manuals shall list routine maintenance procedures, possible breakdowns and repairs and trouble shooting guides. Maintenance manuals shall include equipment layout and simplifies wiring and control diagrams of the systems installed. Each set shall be permanently bound and shall have hard cover. Provide index for easy location of information. Include copies of all approved as-built drawings. Record the final field settings of all adjustable components in a typed comprehensive table. See Section 16225, PUMP CONTROLLER, Section 15132, SUBMERSIBLE PUMP, MIXED FLOW TYPE, and Section 11310, SUBMERSIBLE DEWATERING PUMPS, for additional information.

PART 2 PRODUCTS

2.1 CABLES AND WIRES

Conductors in cables shall be annealed copper. Design is based on copper conductors. Cables shall be single-conductor type, unless otherwise indicated. Cables and wires shall conform to UL 44 for rubber-insulated type, UL 83 for the thermoplastic insulated type. Conductor shall be of soft drawn copper conductor material. The following types shall be provided:

2.1.1 Low-Voltage Cables

Low-voltage cables shall utilize either ethylene-propylene-rubber (EPR) insulation conforming to NEMA WC 8, or Cross-Linked-Polyethylene (XLPE), or polyvinyl chloride (PVC) insulation conforming to UL 83; all as indicated on the drawings or as specified herein.

2.1.2 Grounding Cables

Grounding cables shall be bare, except where installed in conduit with

associated phase conductors. Insulated grounding cables shall be rated 600 volts and shall have green colored insulation of the same material as the associated phase conductors. Bare cables shall be ASTM B 8 soft-drawn unless otherwise indicated; aluminum is not acceptable.

2.1.3 Single Conductor Cables

All single conductor low voltage wire and cables shall be rated 600 volts and NEC types XHHW, unless otherwise indicated on the drawings.

2.1.4 Multi-conductor Cables

All multi-conductor control or power cables shall be Type TC tray cable conforming to UL 1277. Insulation shall be NEC type XHHW with a Chlorinated Polyethylene (CPE) jacket, rated 600 volts. Cables shall be have an integral ground conductor as specified or shown.

2.1.5 Underground Cables

Cables shall be rated 600 volts and shall conform to the requirements of NFPA 70. Cables shall utilize cross-linked thermosetting polyethylene XLP insulation and shall conform to the requirements of NEMA WC 7.

2.1.6 Flexible Power Cables

Cables shall be extra flexible and extra thick, with EPR insulation and a reinforced rubber jacket. Cables shall be highly resistant to impact and abrasion, flame resistant, sunlight resistant, weather resistant, resistant to oils, acids and alkalis; shall be color-coded for permanent conductor identification; and shall be able to withstand constant reeling and flexing.

2.1.7 Control Wires

All Control wires shall be type SIS meeting the requirement of UL 44

2.1.8 Cord Sets and Power-Supply Cords

UL 817

2.1.9 Connectors for Low-Voltage Cables

UL 486A for copper conductors; and ANSI C119.1 for sealed insulated connectors.

2.1.10 Cable Splices

Low-voltage cable splices and terminations shall be rated at not less than 600 Volts. Splices in conductors No. 10 AWG and smaller shall be made with an insulated, solderless, pressure type connector, Type I, Class 1, Grade B, Style G, and conforming to the applicable requirements of UL 486A. Splices in conductors No. 8 AWG and larger shall be made with noninsulated, solderless, pressure type connector, conforming to the applicable requirements of UL 486A. Splices shall then be covered with an insulation and jacket material equivalent to the conductor insulation and jacket. Splices below grade or in wet locations shall be sealed type conforming to ANSI C119.1 or shall be waterproofed by a sealant-filled, thick wall, heat shrinkable, thermosetting tubing or by pouring a thermosetting resin into a mold that surrounds the joined conductors.

2.1.11 Cord Sets and Power-Supply Cords

Cord sets and power supply cords shall meet the requirements of UL 817

2.2 CONDUIT AND FITTINGS

Unless otherwise noted all conduits shall be rigid steel, 3/4-inch minimum size. All flexible conduits shall be liquidtight, flexible steel, 1/2-inch minimum size.

2.2.1 Liquidtight Flexible Steel Conduit

UL 360

2.2.2 PVC Coated Rigid Steel Conduit

NEMA RN 1. All components and accessories for this type of raceway system shall be provided by one manufacturer.

2.2.3 Rigid Metal Conduits

UL 6

2.2.4 Conduit Coatings Plastic Resin System

NEMA RN 1, Type A-40.

2.2.5 Duct and Conduit Caulking Compound

Compounds for sealing ducts and conduit shall have a putty-like consistency workable with the hands at temperatures as low as 2 degree C (35 degree F), shall not slump at a temperature of 150 degree C (300 degree F), and shall not harden materially when exposed to the air. Compounds shall readily calk or adhere to clean surfaces of fiber, or plastic ducts; metallic conduits or conduit coatings; concrete, masonry, or lead; any cable sheaths, jackets, covers, or insulation materials; and the common metals. Compounds shall form a seal without dissolving, noticeably changing characteristics, or removing any of the ingredients. Compounds shall have no injurious effect upon the hands of workmen or upon materials. Sealing compounds shall be as manufactured by O.Z. Gedney Co. or approved equal.

2.2.6 Conduit and Device Boxes and Fittings

Cast metal boxes, conduit bodies for conduit and cable assemblies, and fittings for conduit and outlet boxes shall conform to the requirements of NEMA FB 1.

2.3 MOTOR CONTROL

Each motor shall be provided under these specifications with a suitable controller and devices that will perform the functions as specified for the respective motors. Each motor of 93 W (1/8 hp) or larger shall be provided with thermal-overload protection. Polyphase motors shall have overload protection in each ungrounded conductor. The overload-protection device shall be provided either integral with the motor or controller, or shall be mounted in a separate enclosure. Unless otherwise specified, the protective device shall be of the manually reset type. Automatic control devices such as Level Control/Alarm unit shall control the starting and stopping of motors. A magnetic starter shall be used, with the

automatic-control device actuating the pilot-control circuit. Provided a three-position selector switch marked MANUAL-OFF-AUTOMATIC. Connections to the selector switch shall be such that only the normal automatic regulatory control devices will be bypassed when the switch is in the Manual position; all safety control devices, such as high-temperature cutouts, and motor-overload protective devices, shall be connected in the motor-control circuit in both the Manual and the Automatic positions of the selector switch. Control circuit connections to any MANUAL-OFF-AUTOMATIC switch or to more than one automatic regulatory control device shall be made in accordance with wiring diagram approved by the Contracting Officer unless such diagram is included on the drawings. All controls shall be 120 volts or less unless otherwise indicated. Control circuit power shall disconnect when the unit compartment is opened.

2.3.1 Motor Control Centers

Motor Control Centers shall be NEMA 3R Non-Walk-In outdoor type and shall contain combination starters and other equipment as indicated. Motor control centers shall be NEMA ICS 2, Class II, Type B. Motor control center shall be mounted on floor sills or mounting channels. Each circuit shall have a suitable metal or laminated plastic nameplate with white cut letters. Combination starters shall be provided with circuit breakers. Motor control centers shall be provided with a full-length ground bus bar. Motor control center shall be provided with a solid state power monitor capable of monitoring and displaying the functions listed below:

a. Current, per phase and neutral
b. Volts, phase to phase and phase to neutral
c. Real power (kW), per phase and three phase total
d. Reactive Power (kVAR). per phase and three phase total
e. Apparent power (kVA), per phase and three phase total

2.3.2 Enclosures

Motor control center shall consist of the required number of vertical sections of 90 inches nominal height, bolted together, with steel channel sills and suitable for floor mounting. Vertical section shall be 20 inches deep. Buses, control wiring, control transformers, small power transformers, terminal blocks, line terminals, cable supports, and clamps shall be accessible from the front. Enclosure shall be NEMA Type 3R gasketed. The control centers shall be fabricated from smooth select steel sheets shaped and reinforced to form rigid free-standing structures. Metal thickness for enclosures shall be not less than specified in NEMA ICS 6 without exception. Vertical edges of sections exposed to view shall be so fabricated and bolted that the joints will not pass a 1.6 millimeter (1/16 inch) gage. Each structure shall be designed for addition of future sections required. Individual compartments shall be isolated from adjacent compartments.

2.3.2.1 Unit Compartments

Each operating unit shall contain equipment as shown on the drawings mounted in an individual cell. The unit assembly, except main circuit breaker shall be drawout type removed from the front without disturbing other units in the control center assembly. The drawout type unit assemblies shall have positive guide rail system to ensure alignment of connection to vertical bus. Unit shall interlocked with the door to prevent removal while in energized position. Each removal unit shall have a provision for padlocking in a position in which it is disconnected from the

vertical bus although not removed from stationary structure. All ventilating openings shall be provided with corrosion-resistance insect-proof screens on the inside. Bus closing plugs shall be provided for all inused opening in vertical bus barriers.

2.3.2.2 Motor Control Center Doors and Covers

Each unit compartment, including blank compartments for future use, shall be provided with either a flange-formed or a rolled-edge door. Each door shall be mounted on fully-concealed or continuous full-length piano-type hinges and shall be provided with positive fasteners. Door sag shall be prevented by proper alignment of hinges made of sufficiently strong material. The door fastenings shall be so interlocked to prevent opening when the equipment is energized. The external operating handle shall clearly indicate whether the equipment is in an "ON", "OFF" or "TRIPPED" position.

2.3.2.3 Horizontal Wireways

Structure shall have a minimum 12 inches high wireway at the top and a 6 inches minimum wireway at the bottom. Both horizontal wireways shall run the length of the structure. Cover plates shall be provided on the side of the assembly to permit extension of the horizontal bus and wireway when vertical sections are added.

2.3.2.4 Vertical Wireways

Vertical wireways shall be provided in all vertical sections accepting multiple plug-in components. Vertical wireways shall connect with horizontal wireways at the top and bottom and be a minimum 4 inches wide. Barriers shall be provided in sections containing both AC and DC vertical buses. Doors shall be provided on each vertical wireway. The exposed surface of any door shall not deviate more than 1/16-inch from a true plane.

2.3.2.5 Sills

Channel iron foundations, complete with bolts and drilled holes for grouting and anchoring to the floor, shall be furnished for the complete length (front and rear) of each motor control center assembly. The channels shall be designed for flat mounting and maximum channel depth shall be 60 millimeters (2-1/2 inches). Additional channel or substantial metal trim shall be provided flush with the end panels to completely enclose the bases across the ends of the equipment assemblies.

2.3.2.6 Shutters

Drawout units shall have shutters which close when the unit is withdrawn to isolate the vertical bus.

2.3.2.7 Thermostatically Controlled Strip Heaters

Thermostatically controlled strip heaters shall be provided in all sections of motor control center.

2.3.3 Buses

All buses shall be of tin-plated copper and all bolted splices and connections between buses and for extensions or taps for equipment shall be tin or silver-plated. Copper bars and shapes for bus conductors shall

conform to the applicable requirements of ASTM B 187/B 187M. All splices for field assembly shall be bolted with at least two bolts and shall employ the use of "Belleville" washers in the connection. The bus ratings shall be based on a 65 degree Celsius maximum temperature rise in accordance with UL 845 requirements. Bus shall have a short-circuit current rating of not less than 65,000 RMS symmetrical amperes, as indicated on the drawings. All bus work shall be supported on wet process porcelain insulators, glass polyester, or suitable molded material.

2.3.3.1 Horizontal Bus

Each control center assembly shall be provided with a three-phase main horizontal bus, with a continuous current rating not less than 800 amperes, located across the top of each vertical section. The ends of horizontal buses shall be drilled for future extensions. The main horizontal bus shall be fully insulated.

2.3.3.2 Vertical Bus

Each vertical section shall be provided with a three-phase vertical bus with a continuous current rating of 300 amperes connected to the horizontal bus by brazing, welding, or bolting. Where the incoming feeder breakers are located at the bottom of a control center, the vertical bus in that section shall be rated the same as the main horizontal bus. Vertical buses shall extend from the horizontal bus to the bottom of the lowest available unit mounting space. The vertical bus shall be isolated from wireways and equipment in compartments.

2.3.3.3 Ground Bus

A copper ground bus shall be provided full width at the bottom of the motor control center line-up. A full clamp-type solderless copper or copper alloy lug for No. 2/0 AWG stranded copper cable (3/0 AWG for S.E.Hessville) shall be provided at each end of the bus for connection to the station grounding system.

2.3.4 Circuit Breakers

Circuit breakers shall have voltage, current and interrupting ratings as indicated. Fully rated circuit breakers shall in combinations approved for series applications by UL, be provided to obtain the specified interrupting rating. Fully rated circuit breakers or series rated circuit breakers in combinations approved for series applications by UL shall be provided as indicated, for specific pieces of distribution equipment, to obtain the specified interrupting rating. Panelboards or individual enclosures shall be appropriately marked for use with the specified breakers at the designated short circuit level.

2.3.4.1 Molded Case Circuit Breakers

Molded-case circuit breakers shall meet the requirements of NEMA AB 1 and UL 489 for circuit breakers. Single-pole breakers shall be full module size; two poles shall not be installed in a single module. Multiple breakers shall be of the common-trip type having a single operating handle, but for sizes of 100 amperes or less may consist of single-pole breakers permanently factory assembled into a multiple unit having an internal, mechanical, nontamperable common-trip mechanism and external handle ties. Breakers coordinated with current-limiting fuses shall have a combined interrupting capacity of 100,000 symmetrical amperes. All poles of

associated breakers shall open if any fuse blows.

2.3.4.2 Ground Fault Circuit Interrupters

Ground fault circuit interrupters shall meet the requirements of UL 943. Breaker equipped with ground fault interrupters shall have ground fault class, interrupting capacity, and voltage and current rating as indicated.

2.3.4.3 Low-Voltage-Power

Low-Voltage-Power shall meet the requirements of IEEE C37.13 and IEEE C37.16. Breakers shall have continuous, short time withstand, and interrupting current ratings and frame sizes as indicated. Breakers shall have adjustable instantaneous trip elements as indicated. Breakers shall be manually operated.

2.3.5 Combination Starters

Combination motor controller units shall contain molded-case circuit breakers, auxiliary and pilot devices and a magnetic contactor with solid state overload relays. The ratings of air circuit breakers, contactors, motor controllers and other devices shall be as shown on the drawings. All NEMA size 1 combination motor controller units shall have short circuit ratings equal to 25,000 amps or greater. All NEMA size 4 combination controller units shall have short circuit ratings equal to 35,000 amps or greater. All NEMA size 5 combination controller units shall have short circuit ratings equal to 65,000 amps or greater. Where control push-buttons, indicating lamps, "Hand-Off-Automatic" switches, and similar control devices are associated with a unit, they shall be mounted on the unit compartment door. Door-mounted components shall not interfere with access within the compartments. Molded case circuit breakers for use in combination starters shall meet the requirements of paragraph MOLDED CASE CIRCUIT BREAKERS.

2.3.5.1 Magnetic Contactors

Magnetic contactors shall be of the NEMA sizes indicated on the drawings. The rating, performance and service characteristics shall conform to the requirements of NEMA ICS 2 for contactors with continuous current ratings for the duty indicated. Contactors for motor control shall be rated for full-voltage starting (Class A controllers). Contactors shall be suitable for at least 200,000 complete operations under rated load without more than routine maintenance. The interruption arc and flame shall be minimized by suitable arc chutes or other means so that no damage will be done to other portions of the device. The arc chutes, if provided, shall be easily removable without removing or dismantling other parts. The contacts shall be easily removable. All current-carrying contact surfaces shall be silver-surfaced or of other approved material to prevent the formation of high resistance oxides. The contactor shall operate without chatter or perceptible hum while energized. Coils shall be suitable for continuous operation 120-volt AC circuits. Alternating-current contactors shall be three-pole, except where otherwise noted, and shall be insulated for 600 volts AC and of the electrically- operated, magnetically-held type.

2.3.5.2 Auxiliary Contacts

Each controller shall be provided with a minimum of three auxiliary contacts which can be easily changed from normally open to normally closed. Where indicated on the drawings, a fourth auxiliary contact and

indicating lights shall be provided.

2.3.5.3 Overload Relays/Phase Loss/Phase Unbalance

Except as otherwise indicated, each controller shall be provided with NEMA Class 20 solid state overload relays with external manual reset. In addition to overload protection, the solid state circuitry shall provide phase loss and phase unbalance and repeat trip accuracy of +2%. The threshold shall be 25% between phases before a phase unbalance trip is initiated. Phase loss/phase unbalance circuitry shall initiate a trip within 3 seconds.

2.3.5.4 Individual Control Transformers

Where 120 volt AC control of contactors is indicated or required, individual control transformer shall be provided. The control transformers shall be rated 480-120 volts and shall conform to the requirements for control transformers in NEMA ST 1. Control transformers shall have adequate volt-ampere capacity for the control functions indicated. Transformers shall be installed with primary fuses. Primary fuses shall be Class J. Except as otherwise indicated on the drawings, each control transformer shall be provided with a fuse in one secondary lead and shall have the other secondary lead grounded.

2.3.5.5 Fuses and Fuseholders

Equipment provided under this contract shall be provided with properly rated fuses when the equipment manufacturer utilize fuses in the manufacture of the equipment. Fuses shall have a voltage rating not less than the phase to phase circuit voltage, and shall have the time current characteristics required for effective power system coordination. The Contractor shall ensure they meet the standards as listed.

FUSES	REFERENCED STANDARDS
Low-Voltage Cartridge type	NEMA FU1
High-Interrupting-Capacity, Current-Limiting Type	UL 198C
Class K, High-Interrupting-Capacity Type	UL 198D
Class R	UL 198E
D-C for Industrial Use	UL 198L
Fuses for Supplementary Overcurrent Protection	UL 198G
Low-Voltage Cartridge type	UL 198E
FUSEHOLDERS	UL 512

2.3.5.6 CONTROL ACCESSORIES

Control accessories shall be provided and mounted on the front of or inside the motor control center as shown on the drawings. Pump supplier shall be responsible for providing the motor control circuit, including pump control and level transducer in accordance with the pump operating schedule and pump/motor protections. Control accessories shall meet the applicable requirements of NEMA ICS 2. All control equipment shall be factory wired to the starter unit terminal blocks.

2.3.5.6.1 Push Buttons and Selector Switches

Push buttons, and selector switches shall conform to NEMA ICS 2 of NEMA ICS 1 for rating designation of B300 or A600, shall be heavy duty type, oil tight, watertight NEMA 4 control unit. Switch shall be provided

with escutcheon plates clearly marked to show operating position. Pushbuttons which require boots to make complete station watertight are NOT PERMITTED. Provide contact blocks suitable for side-by-side and tandem mounting to the operator base. Contact blocks shall have captive mounting screws, with drilled and tapped heads to permit easy tandem mounting of contact blocks.

2.3.5.6.2 Indicating Lamp Assemblies

Red, green, and amber indicating lamp assemblies shall be provided as indicated on the drawings. The lamp assemblies shall be of heavy duty transformer type, oil tight, watertight NEMA 4 type with appropriate push to test color caps and shall conform to NEMA ICS 2 of NEMA ICS 1. Color caps shall be made of material which will not be softened by the heat from the lamps. Lamps shall be replaceable from the front of the panels and any special tools required for lamp replacement shall be furnished. Insofar as practicable, all color caps shall be similar and interchangeable, and all lamps shall be of the same type and rating.

2.3.5.6.3 Relays

General purpose plug-in relays of NEMA B300. Operating temperature shall be -45 degree C to +45 degree C. Three Form C (3PDT) Silver Cadmium Oxide contacts rated 120/240 VAC, 10 amps continuous, 30/15 amps make, 3/1.5 amps break. Continuous rated coil pickup voltages of 85% of nominal voltage at 60 Hertz, 25 degree C. Coil voltage as required. Transparent polycarbonate dust cover, 11 blade plug-in base. Rail mounted relay base with retainer clips to secure relay.

2.3.5.6.4 Elapse Time Meters

Provide non-resetable hour indicating time meters with 6 digit registers. Numbers shall be at least 1/4 inch high. Registers shall have white numbers on black background. Last digit shall have contrasting colors to indicate tenths of an hour. Enclosure shall be at least 3-1/2 inches square or round. Unit shall be designed for 120 VAC operation.

2.3.5.6.5 Terminal Blocks

Provide channel mounted sectional type terminal blocks rated 600 VAC, 20 Amp minimum. Provide terminal blocks with flat terminal connectors for power and control conductors No. 12 AWG and smaller. Provide terminal blocks with solder less box lug for power and control conductors larger than No. 12 AWG.

2.3.6 Condensation Protection

A 200 watts condensation protective heater with thermostatically controlled fan driven heater unit shall be supplied in each section of MCC. Thermostat is adjustable from -18 degree C to 38 degree C (0 degree F to 100 degree F) and easily access from the front of MCC. Construction of the heater unit shall made of anodized aluminum, and fan draws cool air from the bottom and passes this air across the thermostat and heating element before being released into enclosure cavity and heated air discharged through the top.

2.4 ELECTRICAL GROUNDING AND BONDING EQUIPMENT

Electrical grounding and bonding equipment shall meet the requirements of UL 467.

2.4.1 Ground Rods

Ground rods shall be of copper-clad steel conforming to UL 467 not less than 19.1 mm (3/4 inch) in diameter by 3.1 meter (10 feet) in length driven full length into the earth.

2.4.2 Ground Bus

The ground bus shall be bare conductor or flat copper in one piece, if practicable.

2.5 PUMP MOTORS

See section 11310 and 15132 for details

2.6 LIGHTING PANEL

Lighting panel shall be 240VAC, 1-phase, 3 wires, minimum 60A main, rainproof, with cover and suitable for mounting inside the MCC. Circuit breakers and switches used as a motor disconnecting means, and not in sight of the motor and the driven machinery location, shall be capable of being locked in the open position. Door locks shall be keyed alike. Nameplates shall be as approved. Directories shall be typed to indicate loads served by each circuit and mounted in a holder behind a clear protective covering. Busses shall be copper.

Dead-front construction, NEMA PB 1 and UL 67.

2.7 RECEPTACLES

Receptacles shall conform to the requirements of NEMA WD 1. Ground Fault Interrupters must conform to the requirements of UL 943, Class A or B.

2.7.1 Single and Duplex

Single and duplex receptacles shall be rated 15 or 20 amperes, 125 volts, two-pole, three-wire, grounding type with polarized parallel slots. Bodies shall be supported by mounting strap having plaster ears. Contact arrangement shall be such that contact is made on two sides of an inserted blade. Receptacle shall be side- or back-wired with two screws per terminal. The third grounding pole shall be connected to the metal mounting yoke. Switched receptacles shall be the same as other receptacles specified except that the ungrounded pole of each suitable receptacle shall be provided with a separate terminal. Only the top receptacle of a duplex receptacle shall be wired for switching application. Receptacles with ground fault circuit interrupters shall have the current as indicated, and shall be the UL Class A type unless otherwise shown. Ground fault circuit protection shall be provided everywhere as required by National Electrical Code and as shown on the drawing.

2.7.2 Power Receptacle and plug

Generator receptacle shall be 600 volt, A.C., 3 pole, 4 wire, rated ampere as shown on the drawing. It shall be weatherproof and raintight, with spring-hinged cap, angle adapter, junction box and complete with matching plug and polarized. It shall be a type designed to supply/receive power to fixed electrical equipment. It shall be a type approved for current interruption, having a separate arc quenching chamber for each pole so

designed that arc is broken before the plug is completely withdrawn from the receptacle. Generator receptacle shall be furnished compatible plug. Plug shall have cast body, cable grip assembly, clamping ring with neoprene gasket to provide raintight assembly, and shall be designed for outlet specified.

2.8 TAPES

Both plastic and rubber tape. UL 510.

2.9 TRANSFORMERS

Single- and three-phase transformers shall have two windings per phase. Full-capacity standard NEMA taps shall be provided in the primary windings of transformers unless otherwise indicated. Three-phase transformers shall be configured with delta-wye windings, except as indicated.

2.9.1 Transformers, Dry-Type

Transformers shall have 220 degrees C insulation system for transformers 15 kVA and greater, and shall have 180 degrees C insulation system for transformers rated 10 kVA and less, with temperature rise not exceeding 115 degrees C under full-rated load in maximum ambient temperature of 40 degrees C. Transformer of 115 degrees C temperature rise shall be capable of carrying continuously 115 percent of nameplate kVA without exceeding insulation rating.

2.9.1.1 600 Volt or Less Primary

NEMA ST 20, UL 506, general purpose, dry-type, self-cooled, ventilated. Transformers shall be provided in NEMA 1 enclosure. Transformers shall be quiet type with maximum sound level at least 3 decibels less than NEMA standard level for transformer ratings indicated.

2.9.2 Average Sound Level

The average sound level in decibels (dB) of transformers shall not exceed the following dB level at 12 inches for the applicable kVA rating range listed unless otherwise indicated:

kVA Range	dB Sound Level
1-50	50

2.10 WIRING DEVICES

NEMA WD 1 for general-purpose wiring devices, and NEMA WD 6 for dimensional requirements of wiring devices

2.11 HIGH PRESSURE SODIUM LAMPS

High pressure sodium lamps shall be rated 400 watts and as shown on the drawing.

2.12 Transient Voltage Surge Protection (TVSS)

Transient voltage surge suppressors shall be provided as indicated. Surge suppressors shall meet the requirements of IEEE C62.41.1 and be UL listed and labeled as having tested in accordance with UL 1449. Surge suppressor rating shall be 480 volts rms, 60 HZ; 3-phase; 3 wire with ground; surge capacity of 240 KA per phase. Each suppression metal oxide varistor shall

be thermally protected for low current faults. Diagnostic shall include audible alarm with silence, reset, test function, and indicator lights per phase. The TVSS unit shall be mounted internal to each MCC and switchboard. Fuse shall not be used for suppression.

2.13 PUMP CONTROLLER

See section 16225 PUMP CONTROLLER for details.

2.14 ACCESSORIES AND SPARE PARTS

Complete set of accessories and special tools required for erecting, handling, dismantling, testing and maintaining the apparatus shall be furnished by the Contractor as specified below. All spare parts shall be interchangeable with, and meet the same requirements as, the corresponding original parts furnished. Each pump station shall be provided with the following spare parts:

a. 2 - Indicating lamp assembly of each color and type complete with lens.
b. 2 - Selector switch assembly of each type complete with contacts.
c. 2 - Relays or contactors of each type.
d. 6 - Fuses of each type and size.
e. 1 - 20 bulbs for indicating lights.
f. 6 - 100W, 120VAC HPS lamp.
g. 3 - 400W HPS lamps.
h. 3 - Level transducer with cables.
i. 1 - Float switch with minimum 40' cable.
j. 2 - Contactor overload relays of each type and rating.
k. 2 - Control transformer of each type and rating.

PART 3 EXECUTION

3.1 GROUNDING

Grounding shall be in conformance with NFPA 70, the contract drawings, and the following specifications.

3.1.1 Ground Rods

The resistance to ground shall be measured using the fall-of-potential method described in IEEE Std 81. The maximum resistance of a driven ground shall not exceed 25 ohms under normally dry conditions. If this resistance cannot be obtained with a single rod, install additional rods not less than 1.8 meters (6 feet) on centers. In high-ground-resistance, UL listed chemically charged ground rods may be used. If the resultant resistance exceeds 25 ohms measured not less than 48 hours after rainfall, the Contracting Officer shall be notified immediately. Connections below grade shall be fusion welded. Connections above grade shall be fusion welded or shall use UL 467 approved connectors.

3.1.2 Grounding Conductors

A green ground wire shall be furnished regardless of the type of conduit. All equipment grounding conductors, including metallic raceway systems used as such, shall be bonded or joined together in each wiring box or equipment enclosure. Metallic raceways and grounding conductors shall be checked to assure that they are wired or bonded into a common junction. Metallic boxes and enclosures, if used, shall also be bonded to these grounding

conductors by an approved means per NFPA 70. When boxes for receptacles, switches, or other utilization devices are installed, any designated grounding terminal on these devices shall also be bonded to the equipment grounding conductor junction with a short jumper.

3.1.3 Grounding System

A permanent and effective equipment grounding systems shall be provided at the station for grounding steel structures, service entrance equipment, conduit systems, and other equipment in conformity with the rules of the National Electrical Code, and as listed below. Unless otherwise specified, all grounding wire and cable No. 4 and larger shall be soft drawn copper.

3.1.3.1 Ground Loops and Taps

No. 2/0 bare, stranded, copper ground bus loops shall be installed in the sump area, and gatewell areas. The No. 2/0 loops shall be connected to the service entrance equipment using No. 2/0 bare stranded copper wire. No. 4 bare stranded copper ground taps shall be installed from the loops to the submersible pump motors. No. 6 bare stranded copper ground taps shall be installed from the loops to the remaining motors, pumps, float switches, manhole hatches, float wells, sluice gate guides, gate floor strands, handrailings, ladders, flap gates, discharge piping and hatch cover frames. Ground loops and taps shall be securely fastened at approximately 3-feet intervals to the walls and ceilings by means of expansion anchors, galvanized screws, and clamps. All cable to cable, or cable to equipment connectors shall be of the solderless type, and shall be of non ferrous metal, including fastening bolts, screw and nuts. Connectors shall be of a type suitable for the purpose in which used, and shall be similar and equal to compression or mechanical grounding connectors, as manufactured by Burndy.

3.1.3.2 Conduit Sleeves

Cables through floors and walls shall be protected by galvanized rigid steel conduit sleeves extending approximately 2 inches from the surfaces. Conduit sleeves shall be size 1/2 inch, and provided with grounding bushings on both ends. Sleeves shall be sealed by caulking around the cable with an approved compound such as John-Manville "Duxseal", or equal. Sleeves shall be bonded to the ground cables passing through them. Location of conduit sleeves shall be established in the field to suit the actual equipment furnished.

3.1.3.3 Connections

Connections To Reinforcing Steel Shall Be As Required By Article 250-81(c) of the National Electrical Code. The general locations of No. 2/0 station ground bus loops shall be as specified above. The exact locations shall be subject to the approval of the Contracting Officer. Four No. 2/0 bare copper conductors shall be run from the loops through 1/2 inch sleeves in the station floor down to the station reinforcing steel below the floor. Sleeves shall be caulked watertight. Before the floor is the reinforcing bars, and tested for resistance in the presence of the COR.

3.2 WIRING METHODS

Unless otherwise indicated, wiring shall consist of insulated conductors installed in rigid zinc-coated steel conduit.

3.2.1 Conduit and Tubing Systems

Conduit systems shall be installed as indicated. Conduit sizes shown are based on use of copper conductors with insulation types as described in paragraph WIRING METHODS. Minimum size of raceways shall be 15 mm (1/2 inch). Only metal conduits will be permitted when conduits are required for shielding or other special purposes indicated, or when required by conformance to NFPA 70. Nonmetallic conduit may be used in damp, wet or corrosive locations when permitted by NFPA 70 and the conduit system is provided with appropriate boxes, covers, clamps, screws or other appropriate type of fittings. Bushings, manufactured fittings or boxes providing equivalent means of protection shall be installed on the ends of all conduits and shall be of the insulating type, where required by NFPA 70. Raceways crossing structural expansion joints shall be provided with suitable expansion fittings or other suitable means to compensate for the expansion and contraction and to provide for continuity of grounding. Wiring installed in underfloor raceway system shall be suitable for installation in wet locations.

3.2.1.1 Below Slab-on-Grade or in the Ground

All electrical wiring below slab-on-grade shall be protected by a conduit system. Conduit passing vertically through slabs-on-grade shall be rigid steel. Rigid steel conduits installed below slab-on-grade or in the earth shall be field wrapped with 0.254 mm (0.010 inch) thick pipe-wrapping plastic tape applied with a 50 percent overlay, or shall have a factory-applied polyvinyl chloride, plastic resin, or epoxy coating system.

3.2.1.2 Installing in Slabs Including Slabs on Grade

Conduits shall be installed as close to the middle of concrete slabs as practicable without disturbing the reinforcement. Outside diameter shall not exceed 1/3 of the slab thickness and conduits shall be spaced not closer than 3 diameters on centers except at cabinet locations where the slab thickness shall be increased as approved by the Contracting Officer.

3.2.1.3 Changes in Direction of Runs

Changes in direction of runs shall be made with symmetrical bends or cast-metal fittings. Field-made bends and offsets shall be made with an approved hickey or conduit-bending machine. Crushed or deformed raceways shall not be installed. Trapped raceways in damp and wet locations shall be avoided where possible. Care shall be taken to prevent the lodgment of plaster, dirt, or trash in raceways, boxes, fittings and equipment during the course of construction. Clogged raceways shall be entirely freed of obstructions or shall be replaced.

3.2.1.4 Supports

Metallic conduits shall be securely and rigidly fastened in place at intervals of not more than 3 meters (10 feet) and within 900 mm (3 feet) of boxes, cabinets, and fittings, with approved pipe straps, wall brackets, or conduit clamps. C-clamps or beam clamps shall have strap or rod-type retainers. Loads and supports shall be coordinated with supporting structure to prevent damage or deformation to the structures, but no load shall be applied to joist bridging. Fastenings shall be by toggle bolts on hollow masonry units; by expansion bolts on concrete or brick; by machine screws, welded threaded studs, heat-treated or spring-steel-tension clamps on steel work. Nail-type nylon anchors or threaded studs driven in by a

powder charge and provided with lock washers and nuts may be used in lieu of expansion bolts or machine screws. Raceways or pipe straps shall not be welded to steel structures. Holes cut to a depth of more than 40 mm (1-1/2 inches) in reinforced concrete beams or to a depth of more than 20 mm (3/4 inch) in concrete joists shall avoid cutting the main reinforcing bars. Holes not used shall be filled. In partitions of light steel construction, sheet-metal screws may be used. Conduit shall not be supported using wire or nylon ties. Raceways shall be installed as a complete system and be independently supported from the structure. Upper raceways shall not be the support of lower raceways. Supporting means will not be shared between electrical raceways and mechanical piping or ducts and shall not be fastened to hung ceiling supports. Conduits shall be fastened to all metal enclosures, boxes and cabinets with two locknuts where required by the NFPA 70, where insulating bushings are used, and where bushings cannot be brought into firm contact with the box; otherwise, a single locknut and bushing may be used.

3.2.1.5 Conduit Sealing Bushings

Every conduit that enters an enclosure (i.e., cabinet, panelboard, control center, junction box, etc.) from the wet well area, sump area and outdoor area shall be sealed at point of entry against moisture migration through the conduit into the enclosure by using a conduit sealing bushing.

3.2.1.6 Underground Conduits

Conduits for underground electric-service cable shall be installed minimum 24 inches below grade and as required by the utility company. Conduits stub up from the ground for connection between the aerial and underground system shall extended up pole minimum of 18 feet and as required by the utility company. Conduits shall be equipped with weatherhead bushings to protect cables and prevent water entry.

3.2.1.7 Duct Line Markers

Duct Line Markers shall be provided at the end of long duct line stub outs or for other ducts whose locations are indeterminated because of duct curvature or terminations completely below grade structure. In addition to marker, a 5 mil brightly colored plastic tape, not less than 3 inches in width and suitably inscribed at not more than 110 feet on center with continuous metallic backing and corrosion-resistance 1 mil metallic foil core to permit easy location of duct line, shall be placed approximately 12 inches below finished grade level of such lines.

3.2.2 Cables and Conductors

3.2.2.1 Sizes

All sizes are based on copper conductors. Sizes shall be not less than indicated. Branch-circuit conductors shall be not smaller than No. 12 AWG. Conductors for branch circuits of 120 volts more than 30 meters (100 feet) long and of 277 volts more than 70 meters (230 feet) long, from panel to load center, shall be no smaller than No. 10 AWG. Class 1 remote control and signal circuit conductors shall be not less than No. 14 AWG. Class 2 remote control and signal circuit conductors shall be not less than No. 16 AWG. The conductor sizes are based on the use of TW insulation for conductors smaller than No. 1/0 AWG and THW insulation for conductors No. 1/0 and larger, except where otherwise indicated. Higher temperature rated conductors will be permitted to be used, if the UL tested temperature

ratings for which the equipment in the circuit is marked are not exceeded. Conductor sizes for nonlinear loads shall be based on the use of minimum 75 degrees C insulated conductors for branch circuits and feeders.

3.2.2.2 Power Conductor Identification

Phase conductors shall be identified by color coding. The color of the insulation on phases A, B, and C respectively (for three phase) or phases A and B respectively (for single phase) of different voltage systems shall be as follows:

277/480 volt, 3-phase: Brown, orange, and yellow.
120/208 volts, 3-phase; Black, red and blue.
120/240 volt, single/phase: Black and red.

Conductor phase and voltage identification shall be made by color-coded insulation for all conductors smaller than No. 6 AWG. For conductors No. 6 AWG and larger, identification shall be made by color-coded insulation, or conductors with black insulation may be furnished and identified by the use of half-lapped bands of colored electrical tape wrapped around the insulation for a minimum of 75 mm (3 inches) of length near the end, or other method as submitted by the Contractor and approved by the Contracting Officer. Conductor identification shall be provided within each enclosure where a tap, splice, or termination is made. Phase identification by a particular color shall be maintained continuously for the length of a circuit, including junctions.

3.2.2.3 Control Conductor Identification

Control circuit conductor identification shall be made by color-coded insulated conductors, plastic-coated self-sticking printed markers, permanently attached stamped metal foil markers, or equivalent means as approved. Control circuit terminals of equipment shall be properly identified. Terminal and conductor identification shall match that shown on approved detail drawings. Hand lettering or marking is not acceptable.

3.3 BOXES AND SUPPORTS

Boxes shall be provided in the wiring or raceway systems wherever required for pulling of wires, making connections, and mounting of devices or fixtures. NEMA type 6 Boxes shall be installed in the sump area or manhole. Each box shall be rigidly mounted using approved supports. Boxes and supports shall be fastened with bolts and metal expansion shields on concrete or brick, and with machine screws or welded studs on steel work. Threaded studs driven in by powder charge and provided with lockwashers and nuts, or nail-type nylon anchors may be used in lieu of expansion shields, or machine screws. Penetration of more than 38.1 mm (1-1/2 in.) into reinforced-concrete beams or more than 19.1 mm (3/4 in.) into reinforced-concrete joists shall avoid cutting any main reinforcing steel.

3.3.1 Boxes for Use with Raceway Systems

Boxes for use with raceway systems shall be not less than 38.1 mm (1-1/2 in.) deep except where shallower boxes required by structural conditions are approved. Cast metal boxes shall be not less than 101.6 mm 4 in. square except that 101.6 by 50.8 mm (4 by 2 inch) boxes may be used where only one raceway enters the outlet.

3.3.2 Pull Boxes

Pull boxes of not less than the minimum size required by NFPA 70 shall be constructed of 16 gauge galvanized steel, Drip Shield top and seamfree sides, front and back. Galvanized steel hinge has stainless steel pin. Provisions for padlocking on zinc-plated draw pull catch.

3.3.3 Painting

Steel plates, support, channel and etc. shall be cleaned to white metal grade and given two coat of epoxy zinc-rich paint, two coat of epoxy polyamide paint and a top coat of an aliphatic urethane coating. Color of top coat shall be gray. Application shall be in accordance with written instructions and recommendation of paint manufacturer.

3.4 DEVICE PLATES

One-piece type device plates shall be provided for all outlets and fittings. Plates on unfinished walls and on fittings shall be of zinc-coated cast-metal. Plates shall be installed with all four edges in continuous contact with finished wall surfaces without the use of mats or similar devices. Plaster fillings will not be permitted. Plates shall be installed with an alignment tolerance of 16 mm (1/16 inch). The use of sectional-type device plates will not be permitted. Plates installed in wet locations shall be gasketed and provided with a hinged, gasketed cover, unless otherwise specified.

3.5 SERVICE EQUIPMENT

Service-disconnecting means shall be of the enclosed molded-case circuit breaker type as indicated with external handle for manual operation. When service disconnecting means is a part of an assembly, the assembly shall be listed as suitable for service entrance equipment. Enclosures shall be sheet metal with hinged cover for surface mounting unless otherwise indicated.

3.6 MOTOR-DISCONNECT MEANS

Each motor shall be provided with a disconnecting means when required by NFPA 70 even though not indicated. For single-phase motors, a single or double pole toggle switch, rated only for alternating current, will be acceptable for capacities less than 30 amperes, provided the ampere rating of the switch is at least 125 percent of the motor rating. Switches shall disconnects all ungrounded conductors.

3.7 EQUIPMENT CONNECTIONS

All wiring not furnished and installed under other sections of the specifications for the connection of electrical equipment as indicated on the drawings shall be furnished and installed under this section of the specifications. Connections shall comply with the applicable requirements of paragraph WIRING METHODS. Flexible conduits 6 feet or less in length shall be provided to all electrical equipment subject to periodic removal, vibration, or movement and for all motors. All motors shall be provided with separate grounding conductors. Liquid-tight conduits shall be used in damp or wet locations.

3.7.1 Motors and Motor Control

Control equipment furnished under this section of the specifications, and shown on the drawings, shall be connected under this section of the specifications unless shown or specified otherwise.

3.7.2 Circuit Protective Devices

The Contractor shall calibrate, adjust, set and test each adjustable circuit protective device to ensure that they will function properly prior to the initial energization of the new power system under actual operating conditions.

3.8 TESTS

After the wiring-system installation is completed, and at such time as the Contracting Officer may direct, the Contractor shall conduct an operating test for approval. The equipment shall be demonstrated to operate in accordance with the requirements of this specification. Two weeks prior to the test the contractor shall submit to the Contracting Officer a certified report from the controller manufacturer that the pumps control have been wired in accordance to the approved wiring diagrams. A test procedure shall also be submitted for approval four weeks prior to the test. The test shall be performed in the presence of the Contracting Officer. The Contractor shall furnish all instruments and personnel required for the tests, including the necessary electric power. No part of the electrical distribution system shall be energized prior to the resistance testing of that system's ground rods and submission of test results to the Contracting Officer. Test reports shall indicate the location of the rod and the resistance and the soil conditions at the time the test was performed.

3.9 DIAGRAMS

Wiring diagrams for each pump station shall be provided. Diagrams shall be put in a plastic envelop and kept in the data pocket behind the controller door in the motor control center. The breakers, switches, relays, terminals and control equipment identification on the diagram shall match the installed equipment.

3.10 QUALITY CONTROL

The Contractor shall establish and maintain a quality control system for the contract requirements and maintain records of his quality control for all construction operations. A copy of these records and tests, as well as the records of corrective action taken shall be furnished to Government as directed by the COR.

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-- End of Section --