SOLICITATION NO: W912P6-07-B-0006

US Army Corps of Engineers®

CHICAGO DISTRICT
LEADERS IN CUSTOMER CARE

LOCAL FLOOD PROTECTION
LITTLE CALUMET RIVER, INDIANA
STAGE 5 PHASE 2

CONSTRUCTION SOLICITATION SPECIFICATIONS

Solicitation
August 07, 2007

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SOLICITATION, OFFER, AND AWARD (Construction, Alteration, or Repair)	1. SOLICITATION NO. W912P6-07-B-0006	2. TYPE OF SOLICITATION [X] SEALED BID (IFB) [ ] NEGOTIATED (RFP)	3. DATE ISSUED 07-Aug-2007	PAGE OF PAGES 1 OF 94

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

4. CONTRACT NO.	5. REQUISITION/PURCHASE REQUEST NO. W81G6670749559	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	B. TELEPHONE NO. (Include area code) (NO COLLECT CALLS)
	LINDA L ZAMAROCY	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):

LITTLE CALUMET RIVER, INDIANA, LOCAL FLOOD PROTECTION, STAGE 5 PHASE 2, MUNSTER, HAMMOND, AND HIGHLAND, INDIANA

The Contractor will be responsible for providing all necessary facilities, plants, labor, transportation, materials, and equipment to construct a levee protection systems consisting of approx. 11,755 lineal ft (LF) of earthen levee; 360 LF of sheetpile wall, 3,520 LF of floodwall, 810 LF of utility corridor floodwall (option items), two railroad closure structures, 1,600 LF access ramps, 1-270 FT span, 1-140 LF span and 1-232 FT span pedestrian bridges (option items), 2,100 LF of ditches, 360 LF of French Drains, 1-Flood Control Structure constructed in the channel, gatewell structures, outlet improvements, riprap for erosion control, recreation trail, and other work items identified in the Bid Schedule.

The estimated magnitude of cost for construction is between $10,000,000.00 and $25,000,000.00.

The NAICS Code is 237990 with a business size in dollars of $31 Million.

Applicable Wage Rates: General Decision Number: IN070001 08/03/2007

COMPETITION FOR THIS PROCUREMENT IS UNRESTRICTED TO BUSINESS SIZE

11. The Contractor shall begin performance within 10 calendar days and complete it within 750 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 06 Sep 2007 (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 AND DEMOBILIZATION FFP PURCHASE REQUEST NUMBER: W81G6670749559				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0002		1	Lump Sum		
	TEMPORARY CONSTRUCTION FACILITIES FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0003		1	Lump Sum		
	MAINTENANCE OF TRAFFIC FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0004		1	Lump Sum		
	CLEARING AND GRUBBING FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0005		1	Lump Sum		
	DEMOLITION AND REMOVAL FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES
0006	
	RIPRAP CLASS 2 GRADATION **(NORTH BANK AT HART DITCH)** 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 0006AC.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0006AA	**RIPRAP** FFP	4,300	Net Ton (2,000 LB)		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0006AB	**BEDDING STONE** FFP	2,130	Net Ton (2,000 LB)		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0006AC	**SAND** FFP	710	Net Ton (2,000 LB)		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0007		360	Linear Foot		
	FRENCH DRAINS FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES
0008	**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 0008AA THROUGH 0008AE.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0008AA		32,605	Cubic Yard		
	STRIPPING TOPSOIL FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0008AB		116,000	Cubic Yard		
	IMPERVIOUS FILL FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0008AC		2,800	Cubic Yard		
	SATISFACTORY FILL FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0008AD		2,450	Cubic Yard		
	DITCH EXCAVATION (6N-D3 AND 5S-D2 ONLY. OTHER DITCHES ARE INCIDENTAL) FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0008AE		23,500	Cubic Yard		
	SPOIL BANK EXCAVATION FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES
0009	
	LANDSCAPING 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 0009AB.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0009AA		57	Acre		
	SEEDING FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0009AB		12,200	Cubic Yard		
	TOPSOIL FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES
0010	
	RECREATION TRAIL AND RAMPS 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 0010AF.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0010AA		380	Net Ton (2,000 LB)		
	BITUMINOUS SURFACE AND BINDER COURSE FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0010AB		1,050	Cubic Yard		
	LIMESTONE SCREENINGS FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0010AC		1,800	Cubic Yard		
	CRUSH AGGREGATE, CA-53 FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0010AD		5	Each		
	VEHICLE BARRIER, TYPE 1 **(SET - TWO FIXED AND ONE REMOVABLE BOLLARDS)** FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0010AE		8	Each		
	VEHICLE BARRIER, TYPE II (FIXED BOLLARDS) FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0010AF		5	Each		
	A-FRAME GATES FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES
0011	
	RELOCATE PARKWAY DRIVE 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 0011AB.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0011AA		5,025	Square Foot		
	6" PCC BASE COURSE FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0011AB		475	Net Ton (2,000 LB)		
	BITUMINOUS SURFACE FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0012		350	Cubic Yard		
	REMOVAL OF UNSUITABLE MATERIAL FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES
0013	**PEDESTRIAN BRIDGE WEST OF INDIANAPOLIS BOULEVARD** 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 0013AE.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0013AA	**CONCRETE ABUTMENTS** FFP	2	Each		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0013AB	**PRE-FABRICATED PEDESTRIAN BRIDGE** FFP	1	Lump Sum		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0013AC		2	Each		
	BOLLARDS WITH SLEEVES AND HARDWARE FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0013AD		2,217	Square Foot		
	PZC18 SHEET PILING FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0013AE		480	Linear Foot		
	HP 12X63 PILE FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES
0014	**HART DITCH CONTROL STRUCTURE** 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 0014AD.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0014AA	**RIPRAP CLASS 2 GRADATION** FFP	869	Net Ton (2,000 LB)		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0014AB	**RIPRAP REVETMENT GRADATION** FFP	1,142	Net Ton (2,000 LB)		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0014AC		144	Cubic Yard		
	GABION MATTRESS FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0014AD		1	Lump Sum		
	CONTROL STRUCTURE FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES
0015	
	HART DITCH 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 0015AA THROUGH 0015AB.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0015AA		1	Lump Sum		
	CONCRETE FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0015AB		20,700	Square Foot		
	STEEL SHEET PILING, PZ-22 FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES
0016	
	FENCING 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 0016AD.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0016AA		3,385	Linear Foot		
	FENCE REMOVAL FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0016AB		647	Linear Foot		
	PERMANENT CHAIN LINK FENCE WITH BARBWIRE AND GATE, 5' FFP				

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0016AC		3,352	Linear Foot		
	PERMANENT CHAIN LINK FENCE AND GATES 8' FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0016AD		1	Lump Sum		
	TEMPORARY SECURITY FENCE & GATES FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES
0017	
	CULVERT STRUCTURES 5-7C 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 0017AD.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0017AA		1	Lump Sum		
	1-24" RCP CULVERT PIPE, END SECTION, TRASHRACK, AND PRECAST MANHOLE FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0017AB		1	Lump Sum		
	HEADWALL FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0017AC		1	Lump Sum		
	1- 24" x 24" FLAP GATE FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0017AD		1	Lump Sum		
	RIPRAP REVETMENT GRADATION FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES
0018	**INDIANAPOLIS PUMP STATION GATEWELL** 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 0018AB.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0018AA	**GATEWELL STRUCTURE** FFP	1	Lump Sum		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0018AB	**STEEL SHEET PILING, PZ-27** FFP	7,400	Square Foot		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES
0019	**INDIANAPOLIS BOULEVARD CULVERT STRUCTURES** 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	**2-18" RCP CULVERT PIPES, 2 MANHOLES AND CONCRETE COLLARS** FFP	1	Lump Sum		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0019AB	**REMOVE EXISTING STORM SEWER (WEST OF INDIANAPOLIS BOULEVARD)** FFP	1	Lump Sum		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0019AC		1	Lump Sum		
	REMOVE SEDIMENT, GRADING AND PLACEMENT OF RIPRAP (EAST OF INDIANAPOLIS BOULEVARD) FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES
0020	
	KENNEDY AVENUE GATEWELL 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 0020AC.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0020AA		1	Lump Sum		
	GATEWELL STRUCTURE FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0020AB		1	Lump Sum		
	2 - 54"X54" SLUICE GATES AND EQUIPMENT FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0020AC		1	Lump Sum		
	2- 54" RCP CULVERT PIPES, END SECTIONS, TRASHRACKS FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES
0021	**KENNEDY AVENUE PUMP STATION OUTFALL MODIFICATIONS** 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 0021AC.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0021AA		1	Lump Sum		
	CONCRETE FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0021AB		1	Lump Sum		
	REMOVE 48" AND 24" CULVERT PIPE FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0021AC		1,100	Square Foot		
	STEEL SHEET PILING, PZ-27 FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES
0022	**NORTH DRIVE FLOODWALL** 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	**STEEL SHEET PILING, PZ-27** FFP	17,800	Square Foot		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0022AB	**CONCRETE** FFP	1	Lump Sum		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES
0023	**BARING AVENUE I-WALL AND PUMP STATION OUTFALL** 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 0023AF.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0023AA	**OUTFALL STRUCTURE** FFP	1	Lump Sum		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0023AB	**STEEL SHEET PILING, PZ-22** FFP	9,000	Square Foot		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0023AC		7,300	Square Foot		
	STEEL SHEET PILING, PZ-27 FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0023AD		1	Lump Sum		
	1 - 42" X 42" SLUICE GATE AND EQUIPMENT FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0023AE		1	Lump Sum		
	REMOVE SECTION 42" PIPING AND HEADWALL FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0023AF		1	Lump Sum		
	RIP RAP REVETMENT GRADATION FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES
0024	
	24" GATEWELL 6-5C 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 0024AA THROUGH 0024AH.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0024AA		1	Lump Sum		
	PRELOAD EMBANKMENT FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0024AB		4,680	Linear Foot		
	PRE-FABRICATED VERTICAL DRAINAGE WICKS FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0024AC		1	Lump Sum		
	GATEWELL STRUCTURE FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0024AD		1	Lump Sum		
	1 - 24" RCP CULVERT PIPE, END SECTION, AND TRASHRACK FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0024AE		1	Lump Sum		
	HEADWALL FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0024AF		1	Lump Sum		
	1 - 24" X 24" SLUICE GATE AND EQUIPMENT FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0024AG		1	Lump Sum		
	1 - 24" X 24" FLAPGATE AND EQUIPMENT FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0024AH		1	Lump Sum		
	RIP RAP REVETMENT GRADATION FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES
0025	
	MISCELLANEOUS SHEET PILING 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 0025AB.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0025AA		2,050	Square Foot		
	6N TURNAROUND TOE - STEEL SHEET PILING, PZ-27 FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0025AB		1,800	Square Foot		
	6W RAMP TOE - STEEL SHEET PILING PZ-27 FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES
0026	
	48" TRI-STATE GATEWELL 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 0026AA THROUGH 0026AG.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0026AA		1	Lump Sum		
	PRELOAD EMBANKMENT FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0026AB		4,320	Linear Foot		
	PRE-FABRICATED VERTICAL DRAINAGE WICKS FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0026AC		1	Lump Sum		
	GATEWELL STRUCTURE WITH HEADWALLS FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0026AD		1	Lump Sum		
	1 - 48"RCP CULVERT PIPE FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0026AE		1	Lump Sum		
	1 - 48" X 48" SLUICE GATE & EQUIPMENT FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0026AF		1	Lump Sum		
	1 - 48" X 48" FLAPGATE & EQUIPMENT FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0026AG		1	Lump Sum		
	RIP RAP REVETMENT GRADATION FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES
0027	**CULVERT STRUCTURE 5-8C** 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 0027AA THROUGH 0027AE.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0027AA	**1 - 12" AND 1 - 24" RCP CULVERT PIPES, 2 - TRASHRACKS, 2 END SECTIONS, 1 CATCH BASIN, AND 1 PRECAST MANHOLE** FFP	1	Lump Sum		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0027AB	**1 - HEADWALL** FFP	1	Lump Sum		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0027AC		1	Lump Sum		
	1 - 24" X 24" FLAPGATE FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0027AD		1	Lump Sum		
	REMOVAL OF EXISTING CMP CULVERT INCLUDING INLET AND OUTLET STRUCTURES FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0027AE		1	Lump Sum		
	RIP RAP REVETMENT GRADATION FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES
0028	**CULVERT STRUCTURE 6-3C** 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 0028AA THROUGH 0028AF.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0028AA	**PRELOAD EMBANKMENT** FFP	1	Lump Sum		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0028AB	**PRE-FABRICATED VERTICAL DRAINAGE WICKS** FFP	4,320	Linear Foot		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0028AC		1	Lump Sum		
	1-24" RCP CULVERT PIPE, END SECTION, TRASHRACK, AND PRECAST MANHOLE FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0028AD		1	Lump Sum		
	HEADWALL FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0028AE		1	Lump Sum		
	1 - 24" X 24" FLAPGATE FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0028AF		1	Lump Sum		
	RIP RAP REVETMENT GRADATION FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES
0029	
	CULVERT STRUCTURE 6-7C 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 0029AA THROUGH 0029AG.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0029AA		1	Lump Sum		
	PRELOAD EMBANKMENT FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0029AB		5,760	Linear Foot		
	PRE-FABRICATED VERTICAL DRAINAGE WICKS FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0029AC		1	Lump Sum		
	1 - 24" RCP CULVERT PIPE, END SECTION, TRASHRACK, AND PRECAST MANHOLE FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0029AD		1	Lump Sum		
	HEADWALL FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0029AE		1	Lump Sum		
	1 -24" X 24" FLAPGATE FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0029AF		1	Lump Sum		
	REMOVAL OF EXISTING METAL CULVERT FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0029AG		1	Lump Sum		
	RIP RAP REVETMENT GRADATION FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES
0030	**WICKER PARK 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 0030AA THROUGH 0030AB.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0030AA	**CONCRETE** FFP	1	Lump Sum		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0030AB	**STEEL SHEET PILING, PZ-27** FFP	7,950	Square Foot		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0031		1	Lump Sum		
	NORTHCOTE SANDBAG CLOSURE FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0032		74	Linear Foot		
	CONCRETE CURB FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0033		1	Lump Sum		
	PERFORMANCE & PAYMENT BONDS FFP				
				NET AMT	

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 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.

OPTION BID ITEMS 0034AA THROUGH 0043AC

ITEM NO	SUPPLIES/SERVICES
0034 OPTION	**PEDESTRIAN BRIDGE WEST OF KENNEDY** 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 0034AA THROUGH 0034AH.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0034AA OPTION	**CONCRETE ABUTMENTS** FFP	2	Each		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0034AB OPTION	**CONCRETE PIER** FFP	1	Each		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0034AC OPTION	**SEGMENTAL BLOCK WALL** FFP	1	Lump Sum		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0034AD OPTION	**PRE-FABRICATED PEDESTRIAN BRIDGE** FFP	1	Lump Sum		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0034AE OPTION	**BOLLARDS WITH SLEEVES AND HARDWARE** FFP	2	Each		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0034AF		651	Square Foot		
OPTION	**PZC13 SHEET PILING** FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0034AG		1,056	Linear Foot		
OPTION	**HP 12X63 PILE** FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0034AH OPTION	**PERFORMANCE AND PAYMENT BONDS** FFP 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 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.	1	Lump Sum		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES
0035 OPTION	**PEDESTRIAN BRIDGE EAST OF KENNEDY** 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 0035AA THROUGH 0035AG.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0035AA OPTION	**CONCRETE ABUTMENTS** FFP	2	Each		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0035AB OPTION	**CONCRETE PIER** FFP	2	Each		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0035AC OPTION	**PRE-FABRICATED PEDESTRIAN BRIDGE** FFP	1	Lump Sum		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0035AD OPTION	**BOLLARDS WITH SLEEVES AND HARDWARE** FFP	2	Each		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0035AE OPTION	**PZC18 SHEET PILING** FFP	1,443	Square Foot		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0035AF OPTION	**HP 12X63 PILE** FFP	1,040	Linear Foot		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0035AG		1	Lump Sum		
OPTION	**PERFORMANCE AND PAYMENT BONDS** FFP				

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 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.

NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0036		1	Lump Sum		
OPTION	**UPGRADE HAND RAILING TO WROUGHT IRON ON PEDESTRIAN BRIDGE EAST OF KENNEDY AVENUE** FFP				

NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0037		1	Lump Sum		
OPTION	**UPGRADE TO A CAST IN PLACE CONCRETE DECK ON PEDESTRIAN BRIDGE EAST OF KENNEDY AVENUE** FFP				

NET AMT

ITEM NO	SUPPLIES/SERVICES
0038	
OPTION	**NORTH RAIL ROAD CLOSURE** 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 0038AA THROUGH 0038AC.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0038AA		375	Square Foot		
OPTION	**STEEL SHEET PILING, PZ-27** FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0038AB		1	Lump Sum		
OPTION	**STRUCTURE AND APPURTENANCES** FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0038AC OPTION	**PERFORMANCE AND PAYMENT BONDS** FFP	1	Lump Sum		

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 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.

NET AMT

ITEM NO	SUPPLIES/SERVICES
0039 OPTION	**SOUTH RAIL ROAD CLOSURE** 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 0039AA THROUGH 0039AC.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0039AA		375	Square Foot		
OPTION	**STEEL SHEET PILING, PZ-27** FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0039AB		1	Lump Sum		
OPTION	**STRUCTURE AND APPURTENANCES** FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0039AC		1	Lump Sum		
OPTION	**PERFORMANCE AND PAYMENT BONDS** FFP				
	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 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.				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES
0040 OPTION	**UTILITY CORRIDOR I-WALL, 6N EAST** 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 0040AA THROUGH 0040AF.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0040AA OPTION	**STEEL SHEET PILING, PZ-35** FFP	10,800	Square Foot		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0040AB OPTION	**CONCRETE** FFP	1	Lump Sum		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0040AC OPTION	**24" CULVERT OUTLET 6-6C STRUCTURE** FFP	1	Lump Sum		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0040AD OPTION	**1 - 24" X 24" FLAPGATE MOUNTED TO I-WALL** FFP	1	Lump Sum		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0040AE OPTION	**1- 24"X24" SLUICE GATE MOUNTED TO I-WALL** FFP	1	Lump Sum		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0040AF OPTION	**PERFORMANCE AND PAYMENT BONDS** FFP 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 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.	1	Lump Sum		

NET AMT

ITEM NO	SUPPLIES/SERVICES
0041 OPTION	**UTILITY CORRIDOR I-WALL, 6N WEST** 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 0041AA THROUGH 0041AC.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0041AA OPTION	**STEEL SHEET PILING, PZ-27** FFP	1,250	Square Foot		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0041AB OPTION	**CONCRETE** FFP	1	Lump Sum		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0041AC OPTION	**PERFORMANCE AND PAYMENT BONDS** FFP 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 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.	1	Lump Sum		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES
0042 OPTION	**UTILITY CORRIDOR I-WALL, 6S EAST** 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 0041AA THROUGH 0041AD.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0042AA OPTION	**CONCRETE** FFP	1	Lump Sum		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0042AB OPTION	**STEEL SHEET PILING, PZ-27** FFP	2,800	Square Foot		
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0042AC		240	Linear Foot		
OPTION	**STEEL H-PILES** FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0042AD		1	Lump Sum		
OPTION	**PERFORMANCE AND PAYMENT BONDS** FFP 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 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.				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES
0043	
OPTION	**UTILITY CORRIDOR I-WALL, 6S WEST** 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 0043AA THROUGH 0043AC.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0043AA		1,510	Square Foot		
OPTION	**STEEL SHEET PILING, PZ-27** FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0043AB		1	Lump Sum		
OPTION	**CONCRETE** FFP				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0043AC OPTION	**PERFORMANCE AND PAYMENT BONDS** FFP 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 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.	1	Lump Sum		_____
				NET AMT	

TOTAL BID PRICE (ITEMS 0001 THROUGH 0043AC): $_____

IMPORTANT NOTES:

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

   A Pre-Bid Meeting will be held on August 17, 2007 at 10:30 a.m. at the Little Calumet River Basin Development Commission office located at: 6100 Southport Road, Portage, Indiana 46368.

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 will be considered non-responsive to the Solicitation and ineligible for award.

3. **SMALL BUSINESS SUBCONTRACTING PLAN:**

   a. Prior to the Contracting Officer awarding the contract, the successful bidder will be required to submit a Small Business Subcontracting Plan in accordance with the provision of FAR Clause 52.219-9, "Small Business Subcontracting Plan." **This requirement applies to all business concerns other than small businesses.** The Contracting Officer must approve the Plan before an award can be made; the Plan will be made apart of the resultant contract.

   b. The successful bidder shall make a good faith effort to apply the following percentages to its intended amount of subcontracts in order to satisfy the Small Business Subcontracting goals of the Chicago District. The District Goals are identified below:

      (1) at least 51.2% with small businesses (SB)
      (2) at least 8.8% with small disadvantaged businesses (SDB)
      (3) at least 7.3% with women-owned SB (WOSB)
      (4) at least 1.5% with service-disabled veteran-owned SB
      (5) at least 3.1% with HUBZone SB

- BIDDERS SHALL NOT INCLUDE A SMALL BUSINESS SUBCONTRACTING PLAN WITH ITS BID -

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.

5. OPTIONS: BID ITEM'S 0034AA THROUGH 0043AC:

The government reserves the right to exercise any or all of the Option Bid Items under the above Bid Schedule.

At the discretion of the government, Option Bid Items 0034AA through 0043AC may be awarded within **365** days of contract award. Should Option Bid Items 0034AA through 0043AC be awarded with the stated time period, NO additional calendar days will be added to the Contract Performance Period. If any or all of the Optional Bid Items are exercised, they will be awarded by way of a formal modification, which will issued by the Contracting Officer.

Section 00100 - Bidding Schedule/Instructions to Bidders

CLAUSES INCORPORATED BY REFERENCE

52.204-6	Data Universal Numbering System (DUNS) Number	OCT 2003
52.211-6	Brand Name or Equal	AUG 1999
52.214-3	Amendments To Invitations For Bids	DEC 1989
52.214-4	False Statements In Bids	APR 1984
52.214-5	Submission Of Bids	MAR 1997
52.214-7	Late Submissions, Modifications, and Withdrawals of Bids	NOV 1999
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
52.232-38	Submission of Electronic Funds Transfer Information with Offer	MAY 1999

CLAUSES INCORPORATED BY FULL TEXT

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)

52.214-18 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 Indiana, Munster.

(End of provision)

52.225-11 BUY AMERICAN ACT--CONSTRUCTION MATERIALS UNDER TRADE AGREEMENTS (NOV 2006)

(a) Definitions. As used in this clause--

Caribbean Basin country construction material means a construction material that--

(1) Is wholly the growth, product, or manufacture of a Caribbean Basin country; or

(2) In the case of a construction material that consists in whole or in part of materials from another country, has been substantially transformed in a Caribbean Basin country into a new and different construction material distinct from the materials from which it was transformed.

Component means an article, material, or supply incorporated directly into a construction material.

Construction material means an article, material, or supply brought to the construction site by the Contractor or subcontractor for incorporation into the building or work. The term also includes an item brought to the site preassembled from articles, materials, or supplies. However, emergency life safety systems, such as emergency lighting, fire alarm, and audio evacuation systems, that are discrete systems incorporated into a public building or work and that are produced as complete systems, are evaluated as a single and distinct construction material regardless of when or how the individual parts or components of those systems are delivered to the construction site. Materials purchased directly by the Government are supplies, not construction material.

Cost of components means--

(1) For components purchased by the Contractor, the acquisition cost, including transportation costs to the place of incorporation into the construction material (whether or not such costs are paid to a domestic firm), and any applicable duty (whether or not a duty-free entry certificate is issued); or

(2) For components manufactured by the Contractor, all costs associated with the manufacture of the component, including transportation costs as described in paragraph (1) of this definition, plus allocable overhead costs, but

excluding profit. Cost of components does not include any costs associated with the manufacture of the construction material.

Designated country means any of the following countries:

(1) A World Trade Organization Government Procurement Agreement country (Aruba, Austria, Belgium, Canada, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hong Kong, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea (Republic of), Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Singapore, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, or United Kingdom);

(2) Free Trade Agreement country (Australia, Bahrain, Canada, Chile, El Salvador, Guatemala, Honduras, Mexico, Morocco, Nicaragua, or Singapore);

(3) A least developed country (Afghanistan, Angola, Bangladesh, Benin, Bhutan, Burkina Faso, Burundi, Cambodia, Cape Verde, Central African Republic, Chad, Comoros, Democratic Republic of Congo, Djibouti, East Timor, Equatorial Guinea, Eritrea, Ethiopia, Gambia, Guinea, Guinea-Bissau, Haiti, Kiribati, Laos, Lesotho, Madagascar, Malawi, Maldives, Mali, Mauritania, Mozambique, Nepal, Niger, Rwanda, Samoa, Sao Tome and Principe, Senegal, Sierra Leone, Solomon Islands, Somalia, Tanzania, Togo, Tuvalu, Uganda, Vanuatu, Yemen, or Zambia); or

(4) A Caribbean Basin country (Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, British Virgin Islands, Costa Rica, Dominica, Dominican Republic, Grenada, Guyana, Haiti, Jamaica, Montserrat, Netherlands Antilles, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, or Trinidad and Tobago).

Designated country construction material means a construction material that is a WTO GPA country construction material, an FTA country construction material, a least developed country construction material, or a Caribbean Basin country construction material.

Domestic construction material means--

(1) An unmanufactured construction material mined or produced in the United States; or

(2) A construction material manufactured in the United States, if the cost of its components mined, produced, or manufactured in the United States exceeds 50 percent of the cost of all its components. Components of foreign origin of the same class or kind for which nonavailability determinations have been made are treated as domestic.

Foreign construction material means a construction material other than a domestic construction material.

Least developed country construction material means a construction material that--

(1) Is wholly the growth, product, or manufacture of a least developed country; or

(2) In the case of a construction material that consists in whole or in part of materials from another country, has been substantially transformed in a least developed country into a new and different construction material distinct from the materials from which it was transformed.

United States means the 50 States, the District of Columbia, and outlying areas.

WTO GPA country construction material means a construction material that--

(1) Is wholly the growth, product, or manufacture of a WTO GPA country; or

(2) In the case of a construction material that consists in whole or in part of materials from another country, has been substantially transformed in a WTO GPA country into a new and different construction material distinct from the materials from which it was transformed.

(b) Construction materials. (1) This clause implements the Buy American Act (41 U.S.C. 10a-10d) by providing a preference for domestic construction material. In addition, the Contracting Officer has determined that the WTO GPA and Free Trade Agreements (FTAs) apply to this acquisition. Therefore, the Buy American Act restrictions are waived for designated country construction materials.

(2) The Contractor shall use only domestic or designated country construction material in performing this contract, except as provided in paragraphs (b)(3) and (b)(4) of this clause.

(3) The requirement in paragraph (b)(2) of this clause does not apply to the construction materials or components listed by the Government as follows: **NONE.**

(4) The Contracting Officer may add other foreign construction material to the list in paragraph (b)(3) of this clause if the Government determines that--

(i) The cost of domestic construction material would be unreasonable. The cost of a particular domestic construction material subject to the restrictions of the Buy American Act is unreasonable when the cost of such material exceeds the cost of foreign material by more than 6 percent;

(ii) The application of the restriction of the Buy American Act to a particular construction material would be impracticable or inconsistent with the public interest; or

(iii) The construction material is not mined, produced, or manufactured in the United States in sufficient and reasonably available commercial quantities of a satisfactory quality.

(c) Request for determination of inapplicability of the Buy American Act.

(1)(i) Any Contractor request to use foreign construction material in accordance with paragraph (b)(4) of this clause shall include adequate information for Government evaluation of the request, including--

(A) A description of the foreign and domestic construction materials;

(B) Unit of measure;

(C) Quantity;

(D) Price;

(E) Time of delivery or availability;

(F) Location of the construction project;

(G) Name and address of the proposed supplier; and

(H) A detailed justification of the reason for use of foreign construction materials cited in accordance with paragraph (b)(3) of this clause.

(ii) A request based on unreasonable cost shall include a reasonable survey of the market and a completed price comparison table in the format in paragraph (d) of this clause.

(iii) The price of construction material shall include all delivery costs to the construction site and any applicable duty (whether or not a duty-free certificate may be issued).

(iv) Any Contractor request for a determination submitted after contract award shall explain why the Contractor could not reasonably foresee the need for such determination and could not have requested the determination before contract award. If the Contractor does not submit a satisfactory explanation, the Contracting Officer need not make a determination.

(2) If the Government determines after contract award that an exception to the Buy American Act applies and the Contracting Officer and the Contractor negotiate adequate consideration, the Contracting Officer will modify the contract to allow use of the foreign construction material. However, when the basis for the exception is the unreasonable price of a domestic construction material, adequate consideration is not less than the differential established in paragraph (b)(4)(i) of this clause.

(3) Unless the Government determines that an exception to the Buy American Act applies, use of foreign construction material is noncompliant with the Buy American Act.

(d) Data. To permit evaluation of requests under paragraph (c) of this clause based on unreasonable cost, the Contractor shall include the following information and any applicable supporting data based on the survey of suppliers:

Foreign and Domestic Construction Materials Price Comparison

Construction material description	Unit of measure	Quantity	Price (dollars) \1\
Item 1:			
Foreign construction material....	.....	.....	.....
Domestic construction material...	.....	.....	.....
Item 2:			
Foreign construction material....	.....	.....	.....
Domestic construction material...	.....	.....	.....

\1\ Include all delivery costs to the construction site and any applicable duty (whether or not a duty-free entry certificate is issued).

List name, address, telephone number, and contact for suppliers surveyed. Attach copy of response; if oral, attach summary.

Include other applicable supporting information.

(End of clause)

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% of the bid price or $3M, 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 Cnal 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: **Doug Anderson**
Address: **906 Griffith Boulevard**
Griffith, Indiana 46319
Telephone: (219) 923-1763

(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
252.209-7001	Disclosure of Ownership or Control by the Government of a Terrorist Country	OCT 2006
252.225-7031	Secondary Arab Boycott Of Israel	JUN 2005
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 2005)

(a) The definitions and prohibitions contained in the clause, at FAR 52.203-12, Limitation on Payments to Influence Certain Federal Transactions, included in this solicitation, are hereby incorporated by reference in paragraph (b) of this Certification.

(b) The offeror, by signing its offer, hereby certifies to the best of his or her knowledge and belief that on or after December 23, 1989,--

(1) 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 his or her behalf in connection with the awarding of this contract.

(2) If any funds other than Federal appropriated funds (including profit or fee received under a covered Federal transaction) 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 his or her behalf in connection with this solicitation, the offeror shall complete and submit, with its offer, OMB standard form LLL, Disclosure of Lobbying Activities, to the Contracting Officer; and

(3) He or she will include the language of this certification in all subcontract awards at any tier and require that all recipients of subcontract awards in excess of $100,000 shall certify and disclose accordingly.

(c) Submission of this certification and disclosure is a prerequisite for making or entering into this contract imposed by section 1352, title 31, United States Code. Any person who makes an expenditure prohibited under 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 DEBARMENT, SUSPENSION, PROPOSED DEBARMENT, AND OTHER RESPONSIBILITY MATTERS (DEC 2001)

(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, 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.

(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) - ALTERNATE I (APR 2002)

(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.

(7) (Complete if offeror represented itself as disadvantaged in paragraph (b)(2) of this provision.) The offeror shall check the category in which its ownership falls:

____ Black American.

____ Hispanic American.

____ Native American (American Indians, Eskimos, Aleuts, or Native Hawaiians).

____ Asian-Pacific American (persons with origins from Burma, Thailand, Malaysia, Indonesia, Singapore, Brunei, Japan, China, Taiwan, Laos, Cambodia (Kampuchea), Vietnam, Korea, The Philippines, U.S. Trust Territory of the Pacific Islands (Republic of Palau), Republic of the Marshall Islands, Federated States of Micronesia, the Commonwealth of the Northern Mariana Islands, Guam, Samoa, Macao, Hong Kong, Fiji, Tonga, Kiribati, Tuvalu, or Nauru).

____ Subcontinent Asian (Asian-Indian) American (persons with origins from India, Pakistan, Bangladesh, Sri Lanka, Bhutan, the Maldives Islands, or Nepal).

____ Individual/concern, other than one of the preceding.

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

(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)

52.219-4 NOTICE OF PRICE EVALUATION PREFERENCE FOR HUBZONE SMALL BUSINESS CONCERNS (JUL 2005)

(a) Definition. HUBZone small business concern, as used in this clause, means a small business concern that appears on the List of Qualified HUBZone Small Business Concerns maintained by the Small Business Administration.

(b) Evaluation preference. (1) Offers will be evaluated by adding a factor of 10 percent to the price of all offers, except--

(i) Offers from HUBZone small business concerns that have not waived the evaluation preference; and

(ii) Otherwise successful offers from small business concerns.

(2) The factor of 10 percent shall be applied on a line item basis or to any group of items on which award may be made. Other evaluation factors described in the solicitation shall be applied before application of the factor.

(3) A concern that is both a HUBZone small business concern and a small disadvantaged business concern will receive the benefit of both the HUBZone small business price evaluation preference and the small disadvantaged business price evaluation adjustment (see FAR clause 52.219-23). Each applicable price evaluation preference or adjustment shall be calculated independently against an offeror's base offer.

These individual preference amounts shall be added together to arrive at the total evaluated price for that offer.

(c) Waiver of evaluation preference. A HUBZone small business concern may elect to waive the evaluation preference, in which case the factor will be added to its offer for evaluation purposes. The agreements in paragraph (d) of this clause do not apply if the offeror has waived the evaluation preference.

___ Offeror elects to waive the evaluation preference.

(d) Agreement. A HUBZone small business concern agrees that in the performance of the contract, in the case of a contract for

(1) Services (except construction), at least 50 percent of the cost of personnel for contract performance will be spent for employees of the concern or employees of other HUBZone small business concerns;

(2) Supplies (other than procurement from a nonmanufacturer of such supplies), at least 50 percent of the cost of manufacturing, excluding the cost of materials, will be performed by the concern or other HUBZone small business concerns;

(3) General construction, at least 15 percent of the cost of the contract performance incurred for personnel will be spent on the concern's employees or the employees of other HUBZone small business concerns; or

(4) Construction by special trade contractors, at least 25 percent of the cost of the contract performance incurred for personnel will be spent on the concern's employees or the employees of other HUBZone small business concerns.

(e) A HUBZone joint venture agrees that in the performance of the contract, the applicable percentage specified in paragraph (d) of this clause will be performed by the HUBZone small business participant or participants.

(f) A HUBZone small business concern nonmanufacturer agrees to furnish in performing this contract only end items manufactured or produced by HUBZone small business manufacturer concerns. This paragraph does not apply in connection with construction or service contracts.

(End of clause)

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)

Section 00700 - Contract Clauses

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 2005
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
52.211-18	Variation in Estimated Quantity	APR 1984
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
52.219-7	Notice of Partial Small Business Set-Aside	JUN 2003
52.219-8	Utilization of Small Business Concerns	MAY 2004
52.219-9 Alt I	Small Business Subcontracting Plan (Sep 2006) Alternate I	OCT 2001
52.219-14	Limitations On Subcontracting	DEC 1996
52.219-16	Liquidated Damages-Subcontracting Plan	JAN 1999
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	APR 2002
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
52.225-12	Notice of Buy American Act Requirement - Construction Materials Under Trade Agreements	JAN 2005
52.225-13	Restrictions on Certain Foreign Purchases	FEB 2006
52.227-1	Authorization and Consent	JUL 1995
52.227-2	Notice And Assistance Regarding Patent And Copyright Infringement	AUG 1996
52.228-2	Additional Bond Security	OCT 1997
52.228-11	Pledges Of Assets	FEB 1992
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
52.236-13 Alt I	Accident Prevention (Nov 1991) - Alternate I	NOV 1991
52.236-15	Schedules for Construction Contracts	APR 1984
52.236-16	Quantity Surveys	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	AUG 1987
52.244-2	Subcontracts	JUN 2007
52.244-5	Competition In Subcontracting	DEC 1996
52.244-6	Subcontracts for Commercial Items	SEP 2006
52.246-1	Contractor Inspection Requirements	APR 1984
52.246-11	Higher-Level Contract Quality Requirement	FEB 1999
52.246-12	Inspection of Construction	AUG 1996
52.246-21	Warranty of Construction	MAR 1994
52.248-3 Alt I	Value Engineering-Construction (Sep 2006) - Alternate I	APR 1984
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
52.249-5000	Basis for Settlement of Proposals	MAY 1999
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	NOV 2003
252.204-7006	Billing Instructions	OCT 2005
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
252.219-7003	Small, Small Disadvantaged and Women-Owned Small Business Subcontracting Plan (DOD Contracts)	APR 1996
252.225-7012	Preference For Certain Domestic Commodities	JAN 2007
252.227-7033	Rights in Shop Drawings	APR 1966
252.232-7003	Electronic Submission of Payment Requests	MAY 2006
252.232-7010	Levies on Contract Payments	DEC 2006
252.236-7000	Modification Proposals-Price Breakdown	DEC 1991
252.236-7001	Contract Drawings, and Specifications	AUG 2000
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

CLAUSES INCORPORATED BY FULL TEXT

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

The Contractor shall be required to (a) **commence work under the contract within 10 calendar days following its acknowledgment of the Notice to Proceed,** (b) prosecute the work diligently, and (c) complete the entire work ready for use not later than **750 CALENDAR DAYS following the Contractor's acknowledgement of the Notice to Proceed.** * 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 **$1,719.00** 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)

52.222-4 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)

52.236-1 PERFORMANCE OF WORK BY THE CONTRACTOR (APR 1984)

The Contractor shall perform on the site, and with its own organization, work equivalent to at least **12%** of the total amount of work to be performed under the contract. This percentage may be reduced by a supplemental agreement to this contract if, during performing the work, the Contractor requests a reduction and the Contracting Officer determines that the reduction would be to the advantage of the Government.

(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)

252.236-7001 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-1	LOCALITY MAP AND VICINITY MAP
2	G-2	INDEX OF DRAWINGS
3	G-3	STANDARD SYMBOLS AND ABBREVIATIONS
4	G-4	GENERAL NOTES AND BORING LOG LEGEND & SYMBOLS
5	C-1	WORK LIMITS AND CONTROL DATA 5S STA. 0+00 TO STA. 19+00
6	C-2	WORK LIMITS AND CONTROL DATA 5S STA. 19+00 TO STA. 34+24
7	C-3	WORK LIMITS AND CONTROL DATA 5S STA. 34+69 TO STA. 60+00
8	C-4	WORK LIMITS AND CONTROL DATA 5S STA. 60+00 TO STA. 75+32
9	C-5	WORK LIMITS AND CONTROL DATA 6S
10	C-6	WORK LIMITS AND CONTROL DATA STA. 5N 00+00 to 5N 11+00
11	C-7	WORK LIMITS AND CONTROL DATA STA 5N 11+00 to 22+00
12	C-8	WORK LIMITS AND CONTROL DATA STA. 5N 22+00 TO 5N 31+71
13	C-9	WORK LIMITS AND CONTROL DATA 6N STA. 6N 0+00 TO STA. 6N 20+00
14	C-10	WORK LIMITS AND CONTROL DATA 6N STA. 6N 20+00 TO STA. 6N 41+54
15	C-11	PLAN AND PROFILE STA. 5S 00+00 TO STA. 5S 11+00
16	C-12	PLAN AND PROFILE STA. 5S 11+00 TO STA. 5S 23+00
17	C-13	PLAN AND PROFILE STA. 5S 23+00 TO STA. 5S 33+62
18	C-14	PLAN AND PROFILE STA. 5S 34+69 TO STA. 5S 48+00
19	C-15	PLAN AND PROFILE STA. 5S 48+00 TO STA. 5S 60+00
20	C-16	PLAN AND PROFILE STA. 5S 60+00 TO STA. 5S 71+00
21	C-17	PLAN AND PROFILE STA. 5S 71+00 TO STA. 5S 75+32
22	C-18	PLAN AND PROFILE STA. 6S 00+00 TO STA. 6S 15+45
23	C-19	PLAN AND PROFILE STA. 5N 00+00 TO STA. 5N 11+00
24	C-20	PLAN AND PROFILE STA. 5N 11+00 TO STA. 5N 21+00
25	C-21	PLAN AND PROFILE STA. 5N 21+00 TO STA. 5N 31+71
26	C-22	PLAN AND PROFILE STA. 6N 00+00 TO STA. 6N 13+00
27	C-23	PLAN AND PROFILE STA. 6N 13+00 TO STA. 6N 24+00
28	C-24	PLAN AND PROFILE STA. 6N 24+00 TO STA. 6N 34+00
29	C-25	PLAN AND PROFILE STA. 6N 34+00 TO STA. 6N 41+54
30	C-26	CROSS SECTION STA. 5S 00+00 TO 5S 11+00
31	C-27	CROSS SECTION STA. 5S 12+00 TO 5S 23+00
32	C-28	CROSS SECTION STA. 5S 24+00 TO 5S 33+66
33	C-29	CROSS SECTION STA. 5S 34+69 TO 5S 45+00
34	C-30	CROSS SECTION STA. 5S 46+69 TO 5S 56+69
35	C-31	CROSS SECTION STA. 5S 58+69 TO 5S 69+69
36	C-32	CROSS SECTION STA. 5S 70+69 TO 5S 74+37
37	C-33	CROSS SECTION STA. 6S 00+00 TO 6S 11+00
38	C-34	CROSS SECTION STA. 6S 12+00 TO 6S 15+06
39	C-35	CROSS SECTION STA. 5N 00+00 TO 5N 11+00
40	C-36	CROSS SECTION STA. 5N 12+00 TO 5N 23+00
41	C-37	CROSS SECTION STA. 5N 24+00 TO 5N 31+79
42	C-38	CROSS SECTION STA. 6N 00+00 TO 6N 11+00
43	C-39	CROSS SECTION STA. 6N 12+00 TO 6N 23+00
44	C-40	CROSS SECTION STA. 6N 24+00 TO 6N 35+00
45	C-41	CROSS SECTION STA. 6N 36+00 TO 6N 41+56
46	C-42	LEVEE, TRENCH, AND DITCH TYPICAL SECTIONS
47	C-43	PRELOAD EMBANKMENTS AND DRAINAGE WICKS
48	C-44	CULVERT 5-8C DETAIL - 24" RCP - 5S
49	C-45	CULVERT 6-3C DETAIL - 24" RCP - 6N
50	C-46	CULVERT 6-5C DETAIL - 24" RCP - 6N
51	C-47	CULVERT 6-7C DETAIL - 24" RCP - 6N
52	C-48	CULVERT 6-8C AND SOUTH KENNEDY AVE. PUMPING STATION OUTFALL DETAILS - 6N
53	C-49	5N TRISTATE GATEWELL PROFILE
54	C-50	CULVERT 5-7C DETAIL - 24" AND 18" RCP -5N
55	C-51	INDIANAPOLIS BLVD DETAIL - 96" RCP - 6N
56	C-52	BARING AVE PUMPING STATION OUTFALL DETAIL - 5S
57	C-53	HAUL ROUTE AND CONSTRUCTION ACCESS
58	C-54	HART DITCH CONTROL STRUCTURE CROSS SECTIONS
59	C-55	HART DITCH CONTROL STRUCTURE TEMPORARY WATER CONTROL STRUCTURE
60	C-56	HART DITCH CONTROL STRUCTURE - SITE PLAN
61	C-57	ACCESS RAMP PROFILE - 5N AND 5S
62	C-58	ACCESS RAMP PROFILE - 6N
63	C-59	ACCESS RAMP PROFILE - 6S AND 5S
64	C-60	PLAN UTILITY CORRIDOR
65	R-00	RECREATIONAL TRAIL ALIGNMENT KENNEDY TO NORTHCOTE
66	R-01	RECREATIONAL AND MAINTENANCE ACCESS PLAN STA. 5N 0+00 TO 5N 11+00
67	R-01A	RECREATION AND MAINTENANCE ACCESS PLAN STA 5S 51+00 TO 5S 34+69
68	R-02	RECREATION AND MAINTENANCE ACCESS PLAN STA 5N 11+00 TO 5N 22+00
69	R-03	RECREATION AND MAINTENANCE ACCESS PLAN STA 5N 22+00 TO 5N 31+79
70	R-04	RECREATION AND MAINTENANCE ACCESS PLAN STA 5N 31+79 TO 6N 13+00

71	R-05	RECREATION AND MAINTENANCE ACCESS PLAN STA 6N 13+00 TO 6N 31+00
72	R-06	RECREATION AND MAINTENANCE ACCESS PLAN STA 6N 31+00 TO KENNEDY
73	R-07	RECREATION TRAIL AND ACCESS RAMP TYPICAL SECTIONS
74	R-08	RECREATION TRAIL SIGNS
75	R-09	VEHICLE BARRIER DETAILS
76	R-10	A-FRAME GATE ELEVATION AND DETAILS
77	S-01	BARING PUMP STATION I-WALL ELEVATIONS
78	S-02	BARING PUMP STATION I-WALL ELEVATIONS SHEET 2
79	S-03	BARING PUMP STATION ELEVATION AND SECTIONS
80	S-04	HART DITCH I-WALL ELEVATIONS
81	S-05	HART DITCH I-WALL ELEVATIONS SHEET 2
82	S-06	HART DITCH I-WALL ELEVATIONS AND SECTIONS
83	S-07	BARING PUMP STATION AND HART DITCH I-WALL PILASTER ELEVATIONS
84	S-08	HART DITCH I-WALL PILASTER ELEVATIONS
85	S-09	BARING PUMP STATION AND HART DITCH I-WALL PILASTER SECTIONS
86	S-10	HART DITCH I-WALL PILASTER SECTIONS
87	S-11	BARING PUMP STATION AND HART DITCH I-WALL PILASTER SECTIONS AND DETAILS
88	S-12	I-WALL SECTIONS AND DETAILS
89	S-13	WICKER PARK PUMP STATION I-WALL ELEVATION AND SECTION
90	S-14	TYPICAL SHEET PILE CORNER AND WALL DETAILS
91	S-15	TYPICAL 24" CULVERT HEADWALL
92	S-16	TRI-STATE 48" GATEWELL PLAN, ELEVATION AND SECTIONS
93	S-17	48" GATEWELL HEADWALLS AND MISCELLENOUS GATEWELL DETAILS
94	S-18	UTILITY COORIDOR SOUTHWEST SIDE ELEVATION AND SECTION
95	S-19	UTILITY COORIDOR SOUTHEAST SIDE ELEVATION AND SECTION
96	S-20	UTILITY COORIDOR SOUTHEAST SIDE ELEVATION AND SECTION SHEET 2
97	S-21	UTILITY COORIDOR SOUTHEAST SIDE SECTIONS AND DETAILS
98	S-22	PIPELINE COVER AND BACKFILL DETAILS
99	S-23	NORTH DRIVE I-WALL ELEVATIONS
100	S-24	NORTH DRIVE I-WALL ELEVATIONS SHEET #2
101	S-25	NORTH DRIVE I-WALL SECTIONS AND DETAILS
102	S-26	NORTH DRIVE I-WALL PILASTER ELEVATIONS
103	S-27	NORTH DRIVE I-WALL PILASTER SECTIONS
104	S-28	NORTH DRIVE I-WALL PILASTER SECTIONS AND DETAILS
105	S-29	KENNEDY AVE OUTLET STRUCTURES ELEVATIONS
106	S-30	KENNEDY AVE DOUBLE 54 INCH GATEWELL PLAN AND SECTIONS
107	S-31	KENNEDY AVE PUMP STATION OUTFALL PLAN AND SECTIONS
108	S-32	NORTHCOTE SANDBAG CLOSURE PLANE, ELEVATION AND SECTIONS
109	S-33	HART DITCH CONTROL STRUCTURE PLAN AND ELEVATION
110	S-34	HART DITCH CONTROL STRUCTURE DETAILS
111	S-35	HART DITCH CONTROL STRUCTURE SECTIONS
112	S-36	UTILITY CORRIDOR NORTHEAST SIDE PLAN AND ELEVATIONS
113	S-37	UTILITY CORRIDOR NORTHEAST SIDE PLAN AND ELEVATIONS SHEET 2
114	S-38	UTILITY CORRIDOR NORTHEAST SIDE EAST ELEVATION AND SECTIONS
115	S-39	UTILITY CORRIDOR NORTHEAST SIDE 24" CLOSURE STRUCTURE
116	S-40	UTILITY CORRIDOR NORTHEAST SECTIONS AND DETAILS
117	S-41	UTILITY CORRIDOR NORTHWEST SIDE PLAN, ELEVATION AND SECTION
118	S-42	INDIANAPOLIS PUMP STATION 96" GATEWELL I-WALL ELEVATION
119	S-43	INDIANAPOLIS PUMP STATION 96" GATEWELL PLAN, ELEVATION, AND SECTION
120	S-44	INDIANAPOLIS PUMP STATION 96" GATEWELL SECTIONS AND DETAILS
121	S-45	24" GATEWELL 6-5C PLAN, ELEVATION, AND SECTIONS
122	S-46	STANDARD CONCRETE AND CONSTRUCTION DETAILS
122A	S-47	STANDARD MISC. METAL DETAILS
123	S-101	RAILROAD SLIDE GATE CLOSURE SITE PLAN
124	S-102	RAILROAD SLIDE GATE CLOSURE NORTH CLOSURE PLAN AND SECTION
125	S-103	RAILROAD SLIDE GATE CLOSURE SOUTH CLOSURE PLAN AND SECTION
126	S-104	RAILROAD SLIDE GATE CLOSURE ABUTMENT PLANS AND SECTIONS
127	S-105	RAILROAD SLIDE GATE CLOSURE SECTIONS AND DETAILS
128	S-106	RAILROAD SLIDE GATE CLOSURE SLIDE GATE PLAN AND ELEVATION
129	S-107	RAILROAD SLIDE GATE CLOSURE SECTIONS AND DETAILS
130	S-108	RAILROAD SLIDE GATE CLOSURE CLOSURE DETAILS
131	S-109	RAILROAD SLIDE GATE CLOSURE ASPHALT RAIL CROSSING
132	S-108A	PEDESTRIAN BRIDGES BRIDGE AND ABUTMENT PLANS
133	S-109A	PEDESTRIAN BRIDGE ELEVATIONS
134	S-110	PEDESTRIAN BRIDGE TYPICAL ABUTMENT DETAILS
135	S-111	PEDESTRIAN BRIDGE PIER ELEVATION AND PLAN
136	S-112	PEDESTRIAN BRIDGE EAST OF KENNEDY AVENUE PIER ELEVATION AND PLAN
137	S-113	PEDESTRIAN BRIDGE WEST OF KENNEDY AVENUE PIER ELEVATION AND PLAN
138	M-01	SLUICE & FLAP GATE DETAILS

(End of clause)

CLAUSES INCORPORATED BY FULL TEXT

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 **$2,000,000.00** 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)

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: IN070001 08/03/2007 IN1

Superseded General Decision Number: IN20030001

State: Indiana

Construction Types: Building, Heavy and Highway

Counties: La Porte, Lake, Porter and St Joseph Counties in Indiana.

LAKE AND PORTER COUNTIES

BUILDING CONSTRUCTION PROJECTS (does not include single family homes and apartments up to and including 4 stories, HEAVY AND HIGHWAY CONSTRUCTION PROJECTS

Modification Number	Publication Date
0	02/09/2007
1	02/16/2007
2	04/06/2007
3	04/27/2007
4	05/11/2007
5	06/01/2007
6	06/15/2007
7	06/22/2007
8	07/06/2007
9	08/03/2007

* ASBE0017-002 06/01/2007

LAKE AND PORTER COUNTIES

	Rates	Fringes
ASBESTOS WORKER/HEAT & FROST INSULATOR	$ 37.15	19.18
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)	$ 24.60	13.98

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* ASBE0075-001 06/01/2007

REMAINING COUNTIES:

	Rates	Fringes
ASBESTOS WORKER/HEAT & FROST INSULATOR	$ 28.65	10.54
HAZARDOUS MATERIAL HANDLER (includes preparation,		

wetting, stripping, removal,
scrapping, vaccuming,
bagging, and disposal of all
insulation materials, whether
they contain asbestos or not,
from mechanical systems).....$ 18.75 9.70

BOIL0001-005 07/01/2004

LAKE COUNTY, City of Hammond; North of 114th Street

	Rates	Fringes
BOILERMAKER.....	$ 35.16	4.36+19.5%

BOIL0374-003 01/01/2006

	Rates	Fringes
BOILERMAKER.....	$ 30.00	16.07

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* BRIN0004-011 06/01/2007

MERRILLVILLE
LAKE, LAPORTE AND PORTER COUNTIES

	Rates	Fringes
Bricklayer, Stone Mason, Marble Mason, Terrazzo Worker, Tile Layer, Pointer, Cle.....	$ 32.80	15.22
Marble and terrazzo finisher.....	$ 22.32	7.35
Marble Setter, Terrazzo Worker & Tile Setter.....	$ 29.10	12.72
TILE FINISHER.....	$ 21.32	7.35

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* BRIN0004-018 06/01/2007

SOUTH BEND
ST. JOSEPH COUNTY

	Rates	Fringes
BRICKLAYER		
BRICKLAYER; STONE MASON; POINTER, CAULKER, CLEANER...	$ 26.75	10.18
MARBLE AND TILE FINISHER....	$ 23.86	8.39
MARBLE AND TILE LAYER.....	$ 25.73	9.38
TERRAZZO FINISHER.....	$ 24.86	8.39
TERRAZZO WORKER.....	$ 26.73	9.38

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* CARP0765-001 06/01/2007

HEAVY, HIGHWAY AND BUILDING CONSTRUCTION

LAKE, LAPORTE AND PORTER COUNTIES

	Rates	Fringes
CARPENTER	$ 32.22	17.95
MILLWRIGHT	$ 32.32	17.95

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* CARP0888-001 06/01/2007

ST. JOSEPH COUNTY (Zone 1)

	Rates	Fringes
Carpenters		
BUILDING CONSTRUCTION	$ 24.74	10.62
HEAVY & HIGHWAY CONSTRUCTION	$ 24.14	10.37
MILLWRIGHT		
BUILDING CONSTRUCTION	$ 22.96	13.45

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* ELEC0153-001 06/04/2007

ST JOSEPH COUNTY

	Rates	Fringes
Communication Technician	$ 22.30	8.17
ELECTRICIAN	$ 27.75	13.82

Includes the installation, operation, inspection, modification, maintenance and repair of systems used for the transmission and reception of signals of any nature, for any purpose, including but not limited to, sound and voice transmission/transference systems, communication systems that transmit or receive information and/or control systems, television and video systems, micro-processor controlled fire alarm systems, and security systems and the performance of any task directly related to such installation or service. The scope of work shall exclude the installation of electrical power wiring and the installation of conduit raceways exceeding fifteen (15) feet in length.

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* ELEC0531-001 09/05/2005

LAPORTE AND PORTER COUNTIES

	Rates	Fringes
ELECTRICIAN	$ 30.63	14.02

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* ELEC0697-001 05/30/2005

LAKE COUNTY

	Rates	Fringes
ELECTRICIAN	$ 32.50	14.97

ELEC0697-004 08/29/2005

LAKE COUNTY

	Rates	Fringes
Telecommunication Technician.....	$ 25.34	11.71

Work covers low voltage installation, maintenance and removal of telecommunication facilities (voice, sound, data and video) including, telephone and data inside wire, interconnect, terminal equipment, central offices, PABX, fiber optic cable and equipment, micro waves, V/SAT, bypass, CATV, WAN (WIDE AREA NETWORKS), LAN (local area networks), and ISDN (integrated system digital network). Does not cover any work which properly comes under the work description of Inside JW (Journeyman Wireman), but shall cover the pulling of wire in raceways, but not the installation of raceways.

ELEC1393-003 08/28/2006

LAKE & PORTER COUNTIES
(Calumet Area, North of U.S. Hwy 30)

	Rates	Fringes
Line Construction:		
EQUIPMENT OPERATOR (Backhoe over 1/2 yard bucket capacity, cranes rated at 15 ton or more capacity) 95% of J.L. Rate..	$ 32.35	4.75+25.75%
GROUNDMAN, EQUIPMENT OPERATOR: (Diggers 5th wheel type trucks, crawler type, D-4 and smaller, bucket trucks and live boom type line trucks).....	$ 25.47	4.75+25.75%
GROUNDMAN.....	$ 18.91	4.75+25.75%
GROUNDMAN-TRUCK DRIVER.....	$ 22.70	4.75+25.75%
LINEMAN.....	$ 32.35	4.75+25.75%

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* ELEV0002-005 07/03/2002

ELEVATOR CONSTRUCTION

LAKE AND PORTER COUNTIES

	Rates	Fringes
ELEVATOR MECHANIC.....	$ 34.475	7.455+a&b

FOOTNOTES:
a. Eight Paid Holidays: New Year's Day; Veterans Day, Memorial Day; Independence Day; Labor Day; Thanksgiving

Day; Friday after Thanksgiving and Christmas Day.

b. Employer contributes 8% of regular hourly rate to vacation pay credit for employee who has worked in business more than 5 years. Employer contributes 6% of regular hourly rate to vacation pay credit for employee who has worked in business less than 5 years.

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* ELEV0057-001 01/01/2005

LAPORTE AND ST. JOSEPH COUNTIES

	Rates	Fringes
ELEVATOR MECHANIC	$ 31.77	12.015+a

FOOTNOTES:

a. Employer contributes 8% basic hourly rate for 5 years or more of service or 6% basic hourly rate for 6 months to 5 years of service as vacation pay credit.

b. Eight Paid Holidays: New Year's Day; Memorial Day; Independence Day; Labor Day; Veteran's Day; Thanksgiving Day, the Friday after Thanksgiving Day and Christmas Day.

ENGI0150-001 06/01/2006

BUILDING CONSTRUCTION POWER EQUIPMENT OPERATORS:

LAKE, LAPORTE, PORTER COUNTIES

	Rates	Fringes
Power equipment operators:		
GROUP 1	$ 36.35	14.88
GROUP 2	$ 35.75	14.88
GROUP 3	$ 33.05	14.88
GROUP 4	$ 31.55	14.88
GROUP 5	$ 26.10	14.88

POWER EQUIPMENT OPERATOR CLASSIFICATIONS

GROUP 1: Asphalt Plant; Autograde; Batch Plant); Benoto (requires 2 engineers; Boiler & throttle valve; Boring machine (mining machine); Caisson Rigs; Central redi-mix plant; Combination Backhoe Endloader with backhoe bucket over 1/2 cu. yd. or with attachments; Combination tugger hoist & air compressor; Compressor & throttle; Concrete Breaker (truck mounted); Concrete conveyor; Concrete conveyor (truck mounted); Concrete paver over 27E cu.ft.; Concrete paver 27E cu. ft. & under; Concrete placing boom; Concrete pump/grout pump with boom (truck mounted); Concrete pump with boom (truck mounted); concrete tower; Cranes and Backhoes (All Attachments); Cranes, Hammerhead Tower; Creter Crane; Derricks (all); Derricks (traveling); Forklift lull type; Forklift, 10 ton & over; Gradall, Hoist

1, 2, and 3 drums; Hoist (2 tugger l floor), Hydraulic Boom truck, Laser Screed, Locomotive (all), Motor patrol, Mucking Machine; Pile Driving and Skid rig, Pit machine, Prestress Machines, Pump cretes (and similar types), Rock Drill (self-propelled), Rock Drill Truck mounted; Slip form paver, Straddle buggies, Tractor with boom and side boom, Trenching Mechine; Winch Tractors, Welding machines (6-9),

GROUP 2: Air Comporessor (3) (feeding a common receiver); Asphalt Spreader; boilers; bulldozers; Combination Backhoe end loader with Backhoe bucket 1/2 cu. yd. and under or with attachments; Corboy drilling machine; Grader, Elevating; Grouting machines; Guard rail post driver; Highlift Shovel or frontend loader; Hoist (automatic), Hoist (all elevators); Hoist (tugger and single drum); Post hole digger; rollers (all); Scoop (tractor drawn); Stone crushers; Tournapull; Winch trucks

GROUP 3: Air compressor - small 210 and under (1 to 5 not to exceed a total of 300 feet); Air compressor - large over 210; Air compressor (2) feeding a common receiver; Combination - small equipment operator; Concrete mixer (two bag & over); Conveyor, portable; Forklift-under 10 ton; Generator; Pumps (1 to 3 not to exceed a total of 300 feet); Pumps, well points; Steam generators; Tractors, farm & similar type; Welding machines (2 thru 5); Winches, 4 electric drillo winches

GROUP 4: Bull gang (crane erection crew); Heaters, mechanical (1 to 5); Oilers; Switchmen

GROUP 5: Fork lifts (Housing and commercial only)

ENGI0150-012 06/01/2005

BUILDING CONSTRUCTION

ST. JOSEPH COUNTY

	Rates	Fringes
Power equipment operators:		
GROUP 1	$ 23.60	13.75+a
GROUP 2	$ 22.25	13.75+a
GROUP 3	$ 21.45	13.75+a
GROUP 4	$ 20.65	13.75+a
GROUP 5	$ 18.05	13.75+a

FOOTNOTE:
a. PAID HOLIDAYS: New Years Day, Fourth of July, Thanksgivng Day, Decoration Day, Labor Day and Christmas Day

POWER EQUIPMENT OPERATOR CLASSIFICATIONS

GROUP 1: Mechanic, Asphalt Plant, Asphalt Spreader, Auto Grader; Batch Plant, Benoto (requires 2 Engineers), Boiler and Throttle Valve, Boring Machine (road), Bulldozers (with

engines of 140 net horse power or more) Caisson Rigs, Central Redi-mix Plant, Concrete Conveyor Systems, Concrete Power (over 27E cu. ft.), Concrete Paver (27E cu. ft. and under), Concrete Pumps/Grout cncrete placer (Truck Mounted), Concrete Tower, Cranes and backhoes (all), Cranes, Hammerhead Tower, Creter Crane, Derricks (all), Forklift (capble of hoisting and mechanically moving forks horizontally), Grader, Elevating, Highlift Shovels or Front End Loaders (over 3 yd bucket), Hoists (2 or more drums), Locomotives (all), Laser screed, Motor Patrol, Pile Drivers and Skid Rig, Pre-Stress Machines, Pump Cretes & Similar Types, Rock Drill (Self-Propelled), Rock Drill (self propelled Truck Mounted), Scoops (tractor drawn), Slip-Form Paver, Tournapull, Tractor with Boom & Side Boom, Trenching Machine (12 or more inches in width), Combination Backhoe Front End Loader Machine with backhoe 1/2 yd bucket or attachments.

GROUP 2: Air Compressor (600 cu. ft. and over), Bob Cat (over 3/4 cu. yd.), Boilers, Broom (all powered propelled), Bull Dozers with engines of less than 140 net horsepower, combination backhoe front end loader 1/2 yf bskhhoe or under, Compressor and Throttle Valve, Concrete Breaker (truck mounted), Concrete Mixer (of moore than 21 cu. ft. capacity), Forklift (with fixed or tilt mast), Greaser Engineer, Highlift shovel or front endloader 3 yd bucket and under, Hoists (1 drum), Hydrulic Boom Truck, Post Hole Digger (vehicle mounted), Pump Cretes (squeze crete type pumps, Gypsum, bulker , Rollers(all), Steam Generators, Stone Crushers, Stradddle Buggies, Tractors, Winch Trucks (with "a" frame.

GROUP 3: Buck Hoist, Combination (small equipment operator), .Conveyor (portable), Grouting Machine, Hoist Elevators (material and personnel), Hydraulic Power Units, Grouting and Pile Driving, Stud Welder, Trenching Machines less than 12 inches in width, Welding Machines (8 through 15).

GROUP 4: Bobcat (up to and including 3/4 cu. yd.). Compressor (over 210 cu. ft. and less than 600 cu. ft.), Generator (over 50 kw.), Heaters, Mechanical, Hoists (all elevator, permanent installation), Hoist (automatic), Hoist (tugger single drum), Oilers, Pumps, Well Points and electric submersible, Small Rubber Tired End Loaders (1/4 cu. yd. and under), Tractors (farm type) Welding Machines (2 through 8)

GROUP 5: Bobcats and forklifts (commercial or residential)

ENGI0150-014 05/01/2006

POWER EQUIPMENT OPERATOR HEAVY/HIGHWAY

LAKE, LAPORTE, PORTER AND ST. JOSEPH COUNTIES

	Rates	Fringes

Power equipment operators:

GROUP 1	$ 33.95	14.95
GROUP 2	$ 33.50	14.95
GROUP 3	$ 33.05	14.95
GROUP 4	$ 31.85	14.95
GROUP 5	$ 30.80	14.95

POWER EQUITMENT OPERATOR CLASSIFICATIONS

GROUP 1: Asphalt plants (construction), Asphalt plant (permanent), Auto Patrol (Maintainer), Automatic Dry Batch Plant, Automated Concrete Placer, Automated Sub-Grader, Automated Slip Form Paver, Automated Finish Machine, Combination Backhoe Front, End Loader Machine (1/2 cu. yd.), Backhoe bucket or over or with attachments), Combination backhoe 1 cu yd, Backhoe bucket or over or with attachments, Ballast Regulator (RR), Belt Loader (stationary), Boring Machine (road), Bulldozer, Concrete Mixer(27 cu. ft. or over), Concrete Pump (truck mounted), Concrete Breaker (truck mounted and self-propelled), Core Drilling Machine, Cranes and Backhoes (all attachments), Cranes, Hammerhead, Creter Crane, Crushers (concrete, rock, recycling, etc.), Derricks , Derricks (traveling), Dredge Operator, Formless Curb and Gutter Machine (36 inches and over), Formless Curb and Gutter Machine under 36 inches, Gradall and Machines (of a like nature), Guardrail Post Driver (truck mounted), Lead Greaser, Helicopter, Highlift Shovel (3 yd. and over), Hoist (1 drum), Hoist (2, and 3 drums), Hydraulic Power Units (grouting, piledriving and extracting) Hydro or water blaster (self-propelled), Locomotive Operators, Mechanic, Welder, Mucking Machine, Panelboard Concrete Plant (central mix type), Paver (Hetherington), Pile Driver (Skid or Crawler), Road Paving Mixer, Rock Drill Crawler or Skid Rig, Rock Drill (truck Mounted), Ross Carrier, Roto Mill Grinder (36" and over), Roto mill grinder (less than 36"), Throttle Valve and Compressor or Clever Brooks Type Combination, Throttle Valve and Fireman Combination or Horizontal or Upright Boiler, Tournapull or similar type equipment, Tractor (boom), Tractor Drawn Belt Loader with attached Pusher (requires two engineers), Trench Machine, Tug Boat Operator, Wheel Excavator, Winch Tractor with "a" frame, Scoops, Turnapull or similar types machine used in Tandem (add $1.00 to class l hourly rate for each machine attached there to).

GROUP 2: Combination Backhoe Front End Loader Machine with less than 1/2 cu. yd., Backhoe Bucket or with attachments, Bituminous Mixer, Bituminous Paver, Bridge Deck Finisher, Concrete Mixer (less than 27 cu. ft.), Compressor and throttle valve, Compressor (common receiver 3), Greaser, Highlift Shovels (under 3 cu. yds.), Jersey Spreader or Base Paver, Pavement Bump Grinder (self-propelled), Roller (Asphalt, waterbound, Macadam, Bituminous Macadam, Brick Surface, Sheepfoot Roller (self- propelled with blade), Surface Heater and Planer, Tamper (mutiple vibrating, asphalt waterbound macadam, bituminouus macadam, brick

surface), Tractor (push), Tractor with scoop, Widener, Apsco or similar type.

GROUP 3: Back Filler, Bituminous Distributor, Broom and Belt Machine, Bull Float, Compressor (common receiver 2), Concrete cutter wheel type (rockwell), Concrete Finishing Machine, Concrete Spreader (power driven), Digger, Post Hole (power driven), Finishing Machine and Bull Float, Forklift, Form Grader, Form Tamper (motor driven), Hydraulic (boom truck) when used for hauling materials, Laser screed, Mutiple Tamping Machine, Paving Breaker, Roller (earth and subbase material), Roller sheepfoot (self-propelled), Sub-grader, Tamper, Mutipile Vibrating (earth and subbase material), Tractaire with Drill, Tractor (with all drawn attachements except backhoe and including Highlift, Endloader of 1 cu. yd. capacity and less.

GROUP 4: Air Compressors, Conveyor (all), Fireman on Boiler, Generator, Grout Machine, Power curing Spraying Machine (self-propelled), Broom (self-propelled), Seaman Tiller, Skid steer loaders, Spike Machine (RR), Stripping Machine (paint, self-propelled), Throttle Valve, Welding Machine, Well Points System.

GROUP 5: Deck Hand, Hetherington Driver, Mechanical Heater (1 to 5), Outboard or Inboard Motor Boat, Oiler, Power Saw (Concrete Power Driven), Water Pump, Grasscutter.

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* IRON0292-001 01/01/2006

ST. JOSEPH and LAPORTE (REMAINDER OF COUNTY)

	Rates	Fringes
IRONWORKER	$ 21.55	14.18

IRON0395-001 06/01/2005

LAKE, PORTER AND LAPORTE (FROM LAKE MICHIGAN ON NORTH TO 50 MILES S. OF LAKE MICHIGAN ON THE S. AND FROM IN/IL STATE LINE ON W. TO 3 MILES E. OF IN. COUNTIES

	Rates	Fringes
Ironworkers:		
SHEETER	$ 29.50	15.77
STRUCTURAL & ORNAMENTAL	$ 29.25	15.77

LABO0041-001 06/01/2007

BUILDING CONSTRUCTION:

LAKE (Western Half)

	Rates	Fringes

Laborers:

BUILDING CONSTRUCTION

GROUP 1	$ 28.28	10.30
GROUP 2	$ 29.03	10.30
GROUP 3	$ 29.28	10.30

CAISSON AND TUNNEL WORK
(Compressed & Free Air)

GROUP 1	$ 29.78	10.30

LABORER CLASSIFICATIONS

GROUP 1: Building and Construction Laborers; Scaffold Builders (other than for Mason or Plasterers); Railroad Workers, Masonry Wall Workers, (interior & exterior); Portable Water, Pumps with discharge up to 3 indches; Handling of Creosote Lumber or Like Treated Material (excluding railroad material); Asphalt Rakers and Lutemen; Earth compactors; Jackmen and Sheetmen Working Ditches Deeper than Six (6) Feet in Depth; Laborers Working Ditches Six (6) Feet in Depth or Deeper; Assembly of Unicrete Pump; Tile Layers (sewer or field) and Sewer Pipe Layers (metallic or non-metallic); Motor Driven Wheelbarrows and Concrete Buggies; Hyster Operators; Pump Crete Assemblers; Core Drill Operators; Cement, Lime or Silica Clay Handler (bulk or bag); Handling of Toxic Materail Damaging to Clothing; Pneumatic Spikers; Deck Engine and Winch Operators; Water main and Cable Ducking (metallic and non-metallic); Screed Man or Screw Operator on Asphalt Paver; Chain Saw and Demolition Saw Operators; Concrete Saw; Concrete Conveyor Assemblers; Applying of Curing Compound; Sinking of Wellpoints; Dewatering Header Systems

GROUP 2: Plaster Tenders, Masons Tenders; Mortar Mixers; Welders (acetylene or electric); Cutting Torch or Burner; Cement Nozzle Laborers; Cement Gun Operators; Scaffold Builders for Plasterers; Scaffold Builders for Masons; Water Blast Machine Operators; Air Tool Operators and all Pneumatic Tool Operators, Air and Electric Vibrators and Chpping Hammer Operators; Asbestos Removal; Hazardous Waste Removal; All Boiler Setters Laborers, including expediters, bottom men, bell men, and Mason Tenders

GROUP 3: Dynamite Men; Drillers, Air Track or Wagon Drilling for explosives.

CAISSON AND TUNNEL WORK (Compressed & Free Air)

GROUP 1: Cage Tenders, Dump Men, Flagman, Signalman, Top Laborers, Rod Men, Concrete Repairmen, Motor Men, Muckers, Grout Machine, Track Layers, Air Hoist, Key Board, Agitator Car, Car Pushers, Concrete Laborers, Grout Laborers, Sttl Setters, Tuggers, Switchmen, Mucking Machine, Laser Beam, Liner Plate & Ring Setter, Shield Drivers, Power Knife, Burners, Pipe Jacking Machine, Skinners, Maintenance Technician, Miner, Bricklayer Tenders, Concrete Blowers, Drillers, Erectors, Form Men, Jackhammermen, Mining Machine, Dynamite Men, Drillers-air track or wagon drilling

for explosives.

Premium for all employees working in compressed air shall be as follows:

0 - 15 lbs.	$1.00 per hour
16 - 20 lbs.	1.50 per hour
21 - 26 lbs.	2.00 per hour
27 - 33 lbs.	3.00 per hour
34 & over	4.00 per hour

LABO0041-004 04/01/2007

LAKE (WESTERN HALF)

	Rates	Fringes
Laborers		
HEAVY AND HIGHWAY CONSTRUCTION		
GROUP 1	$ 21.99	9.45
GROUP 2	$ 22.29	9.45
GROUP 3	$ 22.99	9.45

LABORERS (HEAVY AND HIGHWAY) CONSTRUCTION

GROUP 1: Constructino Laborer, Carpenter Tender, Fence Erector, Grade Checker, Guard Rail Erector, Continuous Steel Rod or Mat Installer, Wire Mesh Layer, Joint Man (Mortar, Mastic, and all other types), Lighting Installer (Permanent or Temporary), Lineman for Automatic Grade Maker on Paving Machines, Mortar Man, Multi-Plant Erector, Rip-rap Installer (all Products and Materials), Road Marking and Delineation Laborer, Setting and Placing of all Precast Concrete Products, Sing Installation including supporting structure, Spraying of all Epoxy, Curing Compound, or Like Material, Flagperson, Air Tool, Power Tool, and Power Equipment Operator, Asphalt Raker Man, Batch Truck Dumper, Bridge Hand Rail ERector, Handler (bulk or bag cement), Chain Saw Man, Concrete Puddler, Concrete Rubber, Concrete Saw Operator, Core Drill Operator, Eye Level, Hand Blade Operator Hydro Seeder Man, Motor Driven Georgia Buggy Operator, Power Driven Compactor or Taper Operator, Power Saw Operator, Pump Crete Assembly Man, Sreed Man or Screw Man on Asphalt Paver, Regar Installer, Sandblaster Man, Sealer Applicator for Asphalt (toxic), Setting and Placing pre-stressed on Pre-cast Concrete Structural Members, Side Rail Setters (for Sidewalk, Side Ditches, Radii, and Pavement), Spreader Box Tender (manua or power driven), Straw Blower Man, Subsureface Drain and Culvert Pipe Layer, Transverse and longitudinal Hand Bull Float Man, Concrete Conveyor, Horizonal Boring and Jackman and Sheetman, Pipe Greade Man, Winch and Windless Operator Conduit Installer, Sod Layer

GROUP 2: Cutting Torch Burner, Laser Beam Aligner, Manhole Erector, Sewer Pipe Layer, Water Line Installer, Temporary

or Permanent Welders (electric or Oxy Acetylene)

GROUP 3: Air Track and Wagon Drillman, Dynamite and Powder Man, Concrete Barrier Rail Form Setter, General Laborer, Concrete Finisher Transverse and longitudinal hand, bull float man, concrete saw, join control cutting

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LABO0081-001 04/01/2007

HEAVY and HIGHWAY CONSTRUCTION:

LAKE (Eastern Half), LA PORTE AND PORTER COUNTIES

	Rates	Fringes
Laborers:		
GROUP 1	$ 21.99	9.45
GROUP 2	$ 22.29	9.45
GROUP 3	$ 22.99	9.45

LABORERS (HEAVY AND HIGHWAY) GROUP DESCRIPTIONS

GROUP 1: Construction Laborer; Carpenter Tender; Fence Erector; Grade Checker; Guard Rail Erector; Continuous Steel Rod or Mat Installer; Wire Mesh Layer; Joint Man (Mortar, Mastic, and all other types); Lighting Installer (Permanent or Temporary); Lineman for Automatic Grade Maker on Paving Machines; Mortar Man; Multi-Plant Erector; Rip-rap Installer (all Products and Materials); Road Marking and Delineation Laborer; Setting and Placeing of all Precast Concrete Products; Sing Installation including Supporting Structure; Spraying of all Epoxy, Curing Compound, or Like Material; Flagperson; Air Tool, Power Tool, and Power Equipment Operator; Asphalt Raker Man; Batch Truck Dumper; Bridge Hand Rail Erector; Handler (bulk or bag cement); Chain Saw Man; Concrete Puddler; Concrete Rubber; Concrete Saw Operator; Core Drill Operator, Eye Level; Hand Blade Operator Hydro Seeder Man; Motor Driven Georgia Buggy Operator; Power Driven Compactor or Tamper Operator; Power Saw Operator; Pump Crete Assembly Man; Screed Man or Screw Man on Asphalt Paver; Rebar Installer; Sandblaster Man; Sealer Applicator for Asphalt (toxic); Setting and Placeing Prestressed on Precast Concrete Structural Members; Side Rail Setters (for Sidewalk, Side Ditches, Radii, and Pavement); Spreader Box Tender (manual or power driven); Straw Blower Man; Subsurface Drain and Culvert Pipe Layer; Transverse and and longitudinal Hand Bull Float Man; Concrete Conveyor; Horizonial Boring and Jackman and Sheetman; Pipe Grade Man; Winch and Windlass Operator Conduit Installer, Sod Layer.

GROUP 2: Cutting Torch Burner: Laser Beam Aligner; Manhole Erector; Sewer Pipe Layer; Water Line Installer, Temporary or Permanent; Welders (electric or Oxy-Acetylene).

GROUP 3: Air Track and Wagon Drillman; Dynamite and Powder Man; Concrete Barrier Rail Form Setter; General Laborer;

Concrete finisher; transverse and longitudinal hand; bull float man, concrete saw, joint control cutting

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LABO0081-004 06/01/2007

LAKE (Eastern Half), LA PORTE AND PORTER COUNTIES

	Rates	Fringes
Laborers		
BUILDING CONSTRUCTION		
GROUP 1	$ 28.28	10.30
GROUP 2	$ 29.03	10.30
GROUP 3	$ 29.28	10.30

LABORER CLASSIFICATIONS (BUILDING CONSTRUCTION)

GROUP 1: Building and Construction Laborers; Scaffold Builders (other than for Mason or Plasterers); Ironworker Tenders; Mechanic Tenders; Rodmen and Chainmen, Railroad Workers, Masonry Wall Workers, (interior & exterior); Roofer Tenders, Cement Finisher Tenders, Carpenter Tenders, Portable Water, Pumps with discharge up to 3 inches; Waterproofing; Hauling of Creosote Lumber or Lutemen; Asphalt Rakers; Kettlem, Earth Compactors; Jackman and Sheetmen in Ditches more than 6 ft. deep; Laborers in ditches 6' deep or deeper; Assembly of Uncrete Pump; Tile Layers (sewer or field); Sewer Pipe Layers; Motor driven Wheelbarrows and Concrete Buggies; Hyster Operator; Pump Crete Assemblers; Core Drill Operator; Cement, Line or Silica Clay Handers; Handling of Toxic Materials damaging to clothing; Pneumatic Spikers; Deck Engine and Winch Operator; Water Main and Cable Ducking; Screed Man or Screw Operator on Asphalt Paver; Chain Saw and Demolition Saw Operator; Concrete Conveyor Assembler.

GROUP 2: Plaster Tenders, Masons Tenders; Mortar Mixers; Welders (acetylene or electric); Cutting Torch or Burner; Cement Nozzle; Cement Gun; Scaffold Builders when working for Plasterers, and Mason; Water Blast Machine Operator; Air Tool Operators and all Pheumatic Tool Operators; Air and Electric Vibrators and Chipping Hammer Operators; Asbestos Removal; Hazardous Waste Removal

GROUP 3: Dynamite Men; Drillers, Air Track or Wagon Drilling for explosives; Laborer Specialist

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LABO0645-001 06/01/2007

BUILDING CONSTRUCTION:

ST JOSEPH COUNTY:

	Rates	Fringes
Laborers:		
GROUP 1	$ 19.58	8.80

GROUP 2	$ 19.78	8.80
GROUP 3	$ 20.08	8.80
GROUP 4	$ 20.58	8.80

BUILDING CONSTRUCTION

GROUP 1: Building and Construction Laborers; Scaffold Builders (other than for Plasterers); Ironworker Tenders; Mechanic Tenders; Window Washers and cleaners; Waterboys and Toolhousemen; Roofers Tenders; Railroad Workers; Masonry Wall Washers (interior and exterior); Cement Finisher Tenders; Carpenter Tenders; All Portable Water pumps with discharge up to (3) inches; Plaster Tenders; Mason Tenders; Flag & Signal Person.

GROUP 2: Waterproofing; Handling of Creosot Lumber or like treated material (excluding railroad material);Asphalt Rakers and Lutemen; Kettlemen; Air Tool Operators and all Pneumatic Tool Operators; Air and Electric Vibrators and Chipping Hammer Operators; Earth Compactors Jackmen and Sheetmen working Ditches deeper than (6) ft.in depth; Laborers working in ditches (6) ft.in depth or deeper; Assembly of Unicrete Pump; Tile Layers (sewer or field) and Sewer Pipe Layer (metallic or non-metallic); Motor driven Wheelbarrows and Concrete Buggies; Hyster Operators; Pump Crete Assemblers; Core Drill Operators; Cement, Lime or Silica Clay Handlers (bulk or bag); Handling of Toxic Materials damaging to clothing; Pneumatic Spikers; Deck Engine and Winch Operators; Water Main and Cable Ducking (metallic and non-metallic); Screed Man or Screw Operator on Asphalt Paver; Chain and Demolition Saw Operators; Concrete Conveyor Assemblers.

GROUP 3: Water Blast Machine Operator; Mortar Mixers; Welders (Acetylene or electric); Cutting Torch or Burner; Cement Nozzle. Laborers; Cement Gun Operator; Scaffold Builders when Working for Plasterers.

GROUP 4: Dynamite Men; Drillers - Air Track or Wagon Drilling for explosives Hazardous and Toxic material handler, asbestos removal or handler.

LABO0645-002 04/01/2007

(UTILITY CONSTRUCTION)

ST JOSEPH COUNTY

	Rates	Fringes
Laborers:		
GROUP 1:	$ 20.22	8.90
GROUP 2:	$ 20.52	8.90
GROUP 3:	$ 21.22	8.90

LABORER CLASSIFICATIONS (UTILITY CONSTRUCTION)

GROUP 1: Construction laborer; Fence erector; Flagger; Grade checker; Guard rail erector; Wire mesh layer; Joint man (mortar, mastic and all other types); Lighting installer (permanent or temporary); Lineman for automatic grade maker on paving machines; Mortar man; Multi-plateerector; Rip-rap installer (all products and materials); Road markin and delineation laborer; Setting and placing of all precast concrete products; Sign installation including supporting structure; Spraying of all epoxy, curing compound, or like material; sod layer; Air tool, power tool, and power equipment operator; Asphalt lute man; Asphalt raker man; Batch truck dumper; Bridge handrail erector; Handler (bulk or bag cement); Chain saw man; concrete puddler; concrete rubber; Concrete saw operator; Core drill operator, eye level; Hand blade operator; Hydro seeder man; Motor-driven Georgia buggy operator; Power-driven cmpactor or tamper operator; Power saw operator; Pumpcrete assembly man; Screed man or screw man or asphalt paver; Rebar installer; Sandblaster man; Sealer applicator for asphalt (toxic); Setting and placing prestressed or precast concrete structural members; Side rail setter (for sidewalks, side ditches, radii, and pavements); Spreader box tender (manual or power-driven); Straw blower man; Subsurface drain and culvert pipe layer; Transverse and longitudinal hand bull float man; Concrete conveyor assembly man; Horizontal boring and jacking man; Jackman and sheetman; Pipe grade man; winch and windlass operator

GROUP 2: Cutting torch burner; Laser beam aligner; Manhole erector; Sewer pipe layer; Water line installer, temporary or permanent; Welder (electric or exy-acetylene) in connection with waterline and sewer work, Hod Carrier (tending bricklayers); TVing and associated grouting of utility lines.

GROUP 3: Air track and wage drillman; Concrete barrier rail form setter; Dynamite and powder man; General leadman; Concrete Finisher; Transverse and Longitudinal hand Bullfloat man; Concrete Saw Joint Cutting

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LABO0645-004 04/01/2007

ST. JOSEPH COUNTY

	Rates	Fringes
Laborers		
HEAVY AND HIGHWAY CONSTRUCTION		
GROUP 1	$ 20.02	8.90
GROUP 2	$ 20.32	8.90
GROUP 3	$ 21.22	8.90

LABORER CLASSIFICATIONS (HEAVY AND HIGHWAY CONSTRUCTION)

GROUP 1: Construction laborer; Fence erector; Flagger; Grade checker; Guard rail erector; Wire mesh layer; Joint man

(mortar, mastic and all other types); Lighting installer (permanent or temporary); Lineman for automatic grade maker on paving machines; Mortar man; Multi-plateerector; Rip-rap installer (all products and materials); Road markin and delineation laborer; Setting and placing of all precast concrete products; Sign installation including supporting structure; Spraying of all epoxy, curing compound, or like material; sod layer; Air tool, power tool, and power equipment operator; Asphalt lute man; Asphalt raker man; Batch truck dumper; Bridge handrail erector; Handler (bulk or bag cement); Chain saw man; concrete puddler; concrete rubber; Concrete saw operator; Core drill operator, eye level; Hand blade operator; Hydro seeder man; Motor-driven Georgia buggy operator; Power-driven cmpactor or tamper operator; Power saw operator; Pumpcrete assembly man; Screed man or screw man or asphalt paver; Rebar installer; Sandblaster man; Sealer applicator for asphalt (toxic); Setting and placing prestressed or precast concrete structural members; Side rail setter (for sidewalks, side ditches, radii, and pavements); Spreader box tender (manual or power-driven); Straw blower man; Subsurface drain and culvert pipe layer; Transverse and longitudinal hand bull float man; Concrete conveyor assembly man; Horizontal boring and jacking man; Jackman and sheetman; Pipe grade man; winch and windlass operator

GROUP 2: Cutting torch burner; Laser beam aligner; Manhole erector; Sewer pipe layer; Water line installer, temporary or permanent; Welder (electric or exy-acetylene) in connection with waterline and sewer work, Hod Carrier (tending bricklayers); TVing and associated grouting of utility lines.

GROUP 3: Air track and wage drillman; Concrete barrier rail form setter; Dynamite and powder man; General leadman; Concrete Finisher; Transverse and Longitudinal hand Bullfloat man; Concrete Saw Joint Cutting

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* PAIN0027-004 06/01/2006

LAKE COUNTY, West of Highway #41, including HAMMOND area

	Rates	Fringes
GLAZIER	$ 33.00	17.49

PAIN0091-004 06/01/2007

LA PORTE (Everything East of Hwy 39 and North of Hwy 20, including the Cities of LaPorte and Michigan City); ST. JOSEPH COUNTIES

	Rates	Fringes
Painters:		
Brush & Roller, Drywall		

Taping & Finishing,
Vinyl/Paper Hanging.....$ 23.03 9.30
Spray.....$ 23.53 9.30

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* PAIN0460-003 06/01/2007

PORTER, LAKE and the remainder of LA PORTE COUNTY)

	Rates	Fringes
Painters:		
DRYWALL FINISHING	$ 29.24	13.58
PAINTER	$ 28.44	14.58

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* PAIN1165-005 06/01/2005

LAKE (EAST OF HIGHWAY #41 EXCLUDING HAMMOND AREA), LAPORTE and PORTER COUNTIES

	Rates	Fringes
GLAZIER	$ 27.02	10.80

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* PAIN1165-009 07/01/2005

ST. JOSEPH

	Rates	Fringes
GLAZIER	$ 23.14	9.10

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* PLAS0101-006 01/01/2006

HEAVY/HIGHWAY

ST. JOSEPH COUNTY

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER	$ 25.41	8.95

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* PLAS0101-007 06/01/2006

BUILDING CONSTRUCTION

ST. JOSEPH COUNTY

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER	$ 23.19	9.75
PLASTERER	$ 23.46	10.55

10.55

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* PLAS0165-001 07/01/2006

LAKE COUNTY (EXCEPT BY THE NORTHEAST SECTION LYING NORTH OF CROWN POINT AND EAST OF GRIFFITH)

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER		
BUILDING CONSTRUCTION	$ 32.53	13.82
HEAVY & HIGHWAY CONSTRUCTION	$ 28.23	11.07
PLASTERER		
BUILDING CONSTRUCTION	$ 28.78	12.35

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* PLAS0406-001 07/01/2007

LAKE COUNTY (NORTHWARD ON LAKE COUNTY LINE TO AND INCLUDING THE CITY OF MERRILLVILLE, BUT NOT THE CITY LIMITS OF CROWN POINT), PORTER COUNTY

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER		
BUILDING CONSTRUCTION	$ 31.25	15.09
HEAVY & HIGHWAY CONSTRUCTION	$ 27.69	11.61
PLASTERER		
BUILDING CONSTRUCTION	$ 30.23	12.40

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* PLAS0438-001 06/01/2007

LAPORTE COUNTY, EASTERN PORTION OF PORTER COUNTY WEST TO BUT NOT INCLUDING CHESTERTON IN THE NORTH AND WEST TO AND INCLUDING KOUTS IN THE SOUTH

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER		
BUILDING CONSTRUCTION		
Cement Mason	$ 31.93	16.60
HEAVY & HIGHWAY CONSTRUCTION		
Cement Mason	$ 27.52	11.47

PLUM0172-006 06/04/2007

LA PORTE COUNTY (CITY OF LAPORTE) AND ST. JOSEPH COUNTY

	Rates	Fringes
Plumber, Pipefitter, Steamfitter	$ 28.35	12.16

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* PLUM0210-001 06/01/2007

LAKE, LAPORTE (Excluding the City of LaPorte) and PORTER

COUNTIES

	Rates	Fringes
PLUMBER	$ 33.26	14.75

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* PLUM0597-003 06/01/2007

LAKE (Entire County), LA PORTE (Excluding the city of La Porte), PORTER (Entire County)

	Rates	Fringes
PIPEFITTER	$ 40.00	17.33

ROOF0023-006 01/01/2007

LA PORTE AND ST. JOSEPH COUNTIES

	Rates	Fringes
Roofers:		
COMPOSITION	$ 24.95	8.90
SLATE & TILE	$ 25.45	8.90

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* ROOF0026-003 06/01/2007

LAKE AND PORTER COUNTIES

	Rates	Fringes
ROOFER, Including Built Up, Composition and Single Ply	$ 30.66	13.62

SFIN0281-001 06/01/2007

PORTER COUNTY (North of U.S. Route 30)

	Rates	Fringes
Sprinkler Fitters	$ 40.50	15.80

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* SFIN0669-001 04/01/2006

LAKE AND PORTER COUNTIES

	Rates	Fringes
SPRINKLER FITTER	$ 31.29	11.40

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* SFIN0669-002 04/01/2006

	Rates	Fringes
SPRINKLER FITTER	$ 31.29	11.40

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* SHEE0020-013 07/01/2007

ST. JOSEPH COUNTY

	Rates	Fringes
Sheet metal worker	$ 27.50	14.99

SHEE0020-015 01/01/2007

LAKE, LAPORTE AND PORTER COUNTY

	Rates	Fringes
Sheet metal worker	$ 32.00	15.08

TEAM0142-002 06/01/2006

	Rates	Fringes
Truck drivers: (BUILDING CONSTRUCTION ONLY)		
LAPORTE COUNTY		
GROUP 1	$ 14.00	A
GROUP 2	$ 14.10	A
GROUP 3	$ 14.25	A
GROUP 4	$ 14.45	A
Truck drivers: (BUILDING, HEAVY AND HIGHWAY CONSTRUCTION (INCLUDING ASPHALT PAVING WORK))		
LAKE AND PORTER COUNTIES		
GROUP 1	$ 28.85	10.57
GROUP 2	$ 29.05	10.57
GROUP 3	$ 29.25	10.57
GROUP 4	$ 29.45	10.57
GROUP 5	$ 29.80	10.57
GROUP 6	$ 31.10	10.57

FOOTNOTE: A. $123.50 PER WEEK. PER EMPLOYEE

(BUILDING CONSTRUCTION ONLY)
LAPORTE COUNTY

GROUP 1: 4 Wheel and sheet metal trucks
GROUP 2: 6 Wheel and semi trucks
GROUP 3: Winch Trucks
GROUP 4: Mechanics

BUILDING, HEAVY & HIGHWAY AND ASPHALT PAVING
LAKE AND PORTER COUNTIES

GROUP 1: 2 and 3 Axle
GROUP 2: 4 Axle
GROUP 3: 5 Axle
GROUP 4: 6 Axle

GROUP 5: Over 6 Axles
GROUP 6: Articulated Dumps

TEAM0364-004 06/01/2005

	Rates	Fringes
Truck drivers:		
BUILDING CONSTRUCTION (St. Joesph County)		
GROUP 1	$ 19.33	a+b
GROUP 2	$ 19.54	a+b
GROUP 3	$ 19.62	a+b
GROUP 4	$ 19.67	a+b
HEAVY AND HIGHWAY CONSTRUCTION (LaPorte & St. Joesph Counties)		
GROUP 1	$ 15.12	a
GROUP 2	$ 15.17	a
GROUP 3	$ 15.22	a
GROUP 4	$ 15.27	a
GROUP 5	$ 15.32	a
GROUP 6	$ 15.37	a
GROUP 7	$ 15.42	a
GROUP 8	$ 15.47	a
GROUP 9	$ 15.52	a
GROUP 10	$ 14.97	a
GROUP 11	$ 15.07	a
REMAINING COUNTIES		

FOOTNOTE:

a. HEALTH & WELFARE: $237.40 per week for each employee.
PENSION: $37.00 per week for each employee.

b. HOLIDAYS: New Year's Day, Memorial Day, Fourth of July, Labor Day, Thanksgiving Day and Christmas Day.

TRUCK DRIVERS BUILDING CLASSIFICATIONS

GROUP 1: Pickup Trucks
GROUP 2: Single Axle Trucks
GROUP 3: Tandem, Triaxle and Fuel Trucks
GROUP 4: Semi Trailer Trucks

For the REMAINING COUNTIES:

FOOTNOTE: a. $162.30+.07 per week, per employee

TRUCK DRIVER HEAVY & HIGHWAY CLASSIFICATIONS

GROUP 1: Single axle straight trucks

GROUP 2: Single axle fuel and water trucks

GROUP 3: Single axle "dog-legs", and tandem truck or dog-legs; Drivers on batch trucks, wet or dry over 3 (34E) batches and tandem axle truck.

GROUP 4: Tandem axle fuel and Tandem axle water trucks; Drivers on Bituminous Distributors, Two-Man.

GROUP 5: Tandem trucks over 15 tons payload; Single axle semi trucks; Farm tractors hauling material; Mixer trucks (all types); trucks pulling tilt-top trailer single axle; single axle lowboys; truck mounted pavement breakers.

GROUP 6: Tandem trucks or "dog-legs"; Semi-water; Sprinkler; Heavy equipment-type water wagons, 5,000 gallons and under; Drivers on Bituminous Distributors, One-Man.

GROUP 7: Tri-axle trucks; tandem axle semi trucks; Equipment when not self-loaded or pusher loaded, such as Koehring or similar dumpsters, track trucks, Euclid bottom dump and hug bottom dump, tournatrailer, tournarockers, atley wagons, or similar equipment over 12cu. yds.; Mobile mixer trucks; trucks pulling tilt-top trailer tandem axle; Low-boys tandem axle; Tri- axle batch trucks and Tri-axle truck grease and maintenance truck for servicing equipment.

GROUP 8: Tandem-tandem semi trucks; truck mechanics and welders; Heavy equipment type water wagon over 5,000 gallons. Trucks pulling tilt-top trailer tri-axle; Low-boys tandem-tandem axle.

GROUP 9: Low-boys, tandem tri-axle; Acey wagons up to and including three (3) buckets.

GROUP 10: Pick-up trucks.

GROUP 11: Tenders; Greasers; Tire Men; Batch Board Tenders.

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

==========

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.

==========

END OF GENERAL DECISION

SECTION TABLE OF CONTENTS

DIVISION 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS

SECTION 00 31 19.02 03

EXISTING RIVER STAGE DATA

PART 1 GENERAL

1.1 HYDRAULIC CONDITIONS

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

-- End of Section Table of Contents --

SECTION 00 31 19.02 03

EXISTING RIVER STAGE DATA

PART 1 GENERAL

1.1 HYDRAULIC CONDITIONS

The project site and the Hart Ditch/Little Calumet River is subject to local moderate variations in hydraulic conditions due to storm water runoff. Project areas will be subject to water levels of the Little Calumet River and Hart Ditch. The area in the vicinity of the Hart Ditch/Little Calumet River confluence is unique in its flow characteristics due to the manmade features of these streams. Hart Ditch is the primary flow source during flooding events. During flooding events water flows down Hart Ditch and then splits at the confluence, with some flow going to the east along the Little Calumet River and some flowing west along the Little Calumet River. Hydraulic information for the Little Calumet River/Hart Ditch including computed stage-duration, period of record stage hydrographs, and maximum annual stage frequencies are included in this section, along with a link to real time gage data. Data from both the Hart Ditch Gage (located on Hart Ditch near the southern limits of the Stage V-2 levee project,) and the Burr Street Gage (located approx. 3 miles east of the Stage V-2 levee project on the Little Calumet River at Burr Street) will be provided. Data for the Hart Ditch Gage in general will have higher stages than the Burr Street Gage, because it is farther upstream.

Table 00 31 19.02 03-1 below presents stage-duration data developed for the Burr Street Gage located approximately 3 miles east of the project location. The data is based on 42217 hours of available data collected since 01 October 1999. Stage hydrographs for the period of record are shown on plates 00 31 19.02 03-1 through 00 31 19.02 03-8. Plate 00 31 19.02 03-1 presents the full period of record and plates 00 31 19.02 03-2 through 00 31 19.02 03-8 present the same data, one year at a time. Values touching the x axis at the bottom of the graph represent data that is missing. (Plates are attached at the end of this Section)

Table 00 31 19.02 03-1 - Little Calumet River Stage Data Computed for the East End of the Stage V-2 Levee from the Burr Street Gage

Stage (feet NGVD)	**Percent of Time**
>=587 ft NGVD	100.000%
>=588 ft NGVD	99.995%
>=589 ft NGVD	95.777%
>=590 ft NGVD	70.180%
>=591 ft NGVD	26.575%
>=592 ft NGVD	6.159%
>=593 ft NGVD	1.945%
>=594 ft NGVD	0.609%
>=595 ft NGVD	0.204%
>=596 ft NGVD	0.000%
Average 590.49 ft NGVD	

From the Little Calumet River HEC-RAS unsteady flow model, the following maximum river stages were developed for Hart Ditch and the Little Calumet River for the two gage locations for eight flood event frequencies. This

data is presented in table 00 31 19.02 03-2 below. The percent chance exceedence is the probability in percent that the maximum stage will be reached in any one year

Table 00 31 19.02 03-2 Maximum Little Calumet River Stages at the Stage V-Phase 2 Levee

Recurrence Interval	**Percent Chance Exceedence Frequency**	**Maximum Stage(ft. NGVD) Hart Ditch Gage**	**Burr St.Gage**
2 year	50	596.5	595.3
5 year	20	597.9	596.4
10 year	10	598.6	597.0
25 year	4	599.4	597.7
50 year	2	599.9	598.1
100 year	1	600.4	598.4
200 year	0.5	600.9	598.9
500 year	0.2	601.6	599.4

Real-time stage and flow data is available at the following websites for the Hart Ditch at Munster, Indiana and Little Calumet River at Burr St. at Gary, Indiana USGS gages.

http://waterdata.usgs.gov/in/nwis/uv/?site_no=05536190&PARAmeter_cd=00065,00060,00010

http://waterdata.usgs.gov/in/nwis/uv?cb_00065=on&format=gif&period=7&site_no=41333908722

Table 00 31 19.02 03-3 - Hart Ditch Flow Duration Frequency Data for the Hart Ditch Gage in Munster, Indiana

Exceedences	**Flow (CFS)**
1%	828
5%	284
10%	151
20%	76
50%	24
80%	8.8
90%	6.2
95%	4.8
99%	3.5

Table 00 31 19.02 03-4 Peak Streamflow for the Hart Ditch Gage in Munster, Indiana (Table is attached at the end of this Section)

Stage hydrographs for the period of record are shown on plates 00800B-9 through 00800B-16. Plate 00800B-9 presents the full period of record and plates 00800B-10 through 00800B-16 presents the same data in intervals of 10 years or less (Plates are attached at the end of this Section).

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

-- End of Section --

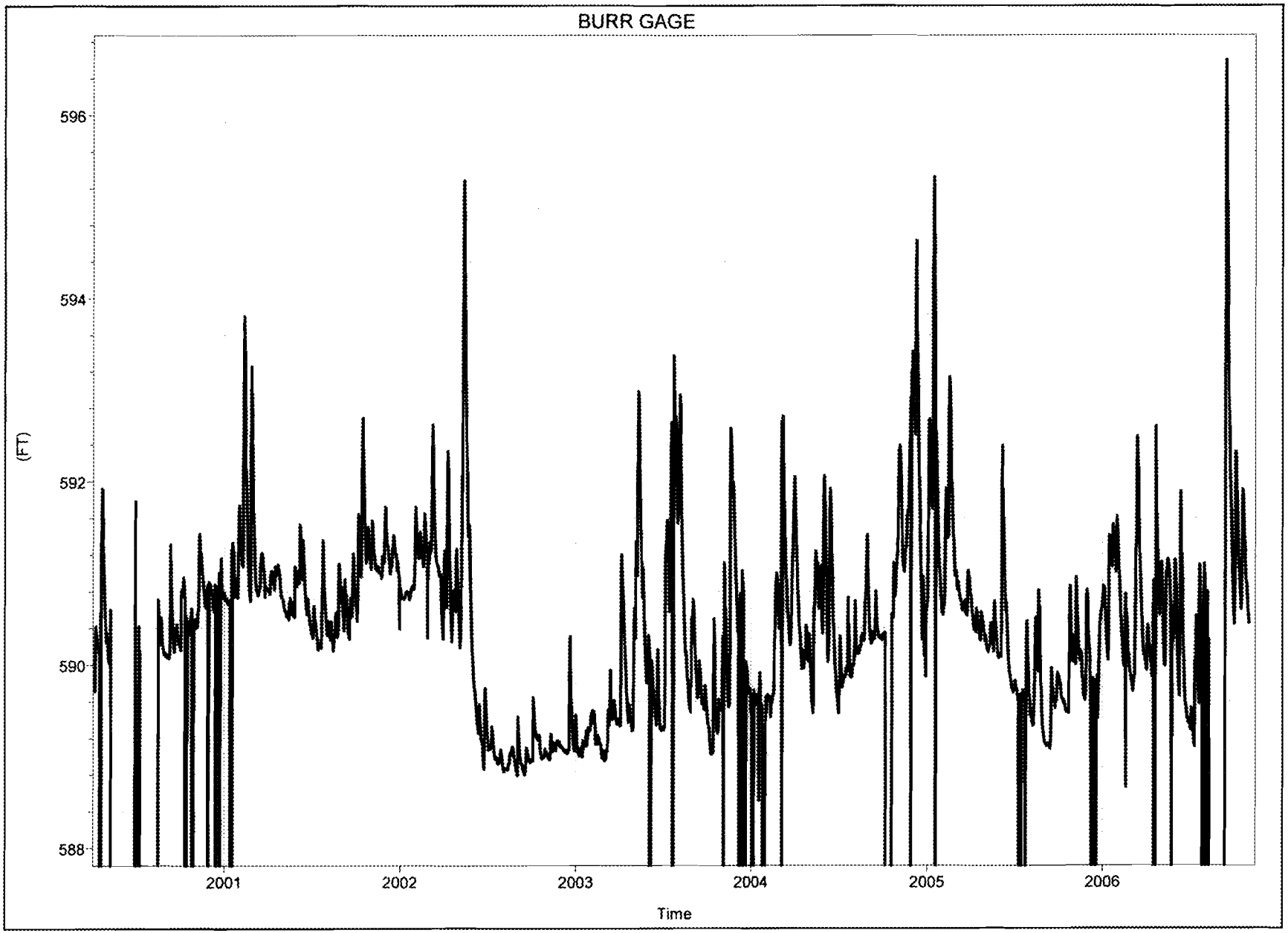


Plate 00800-B-1

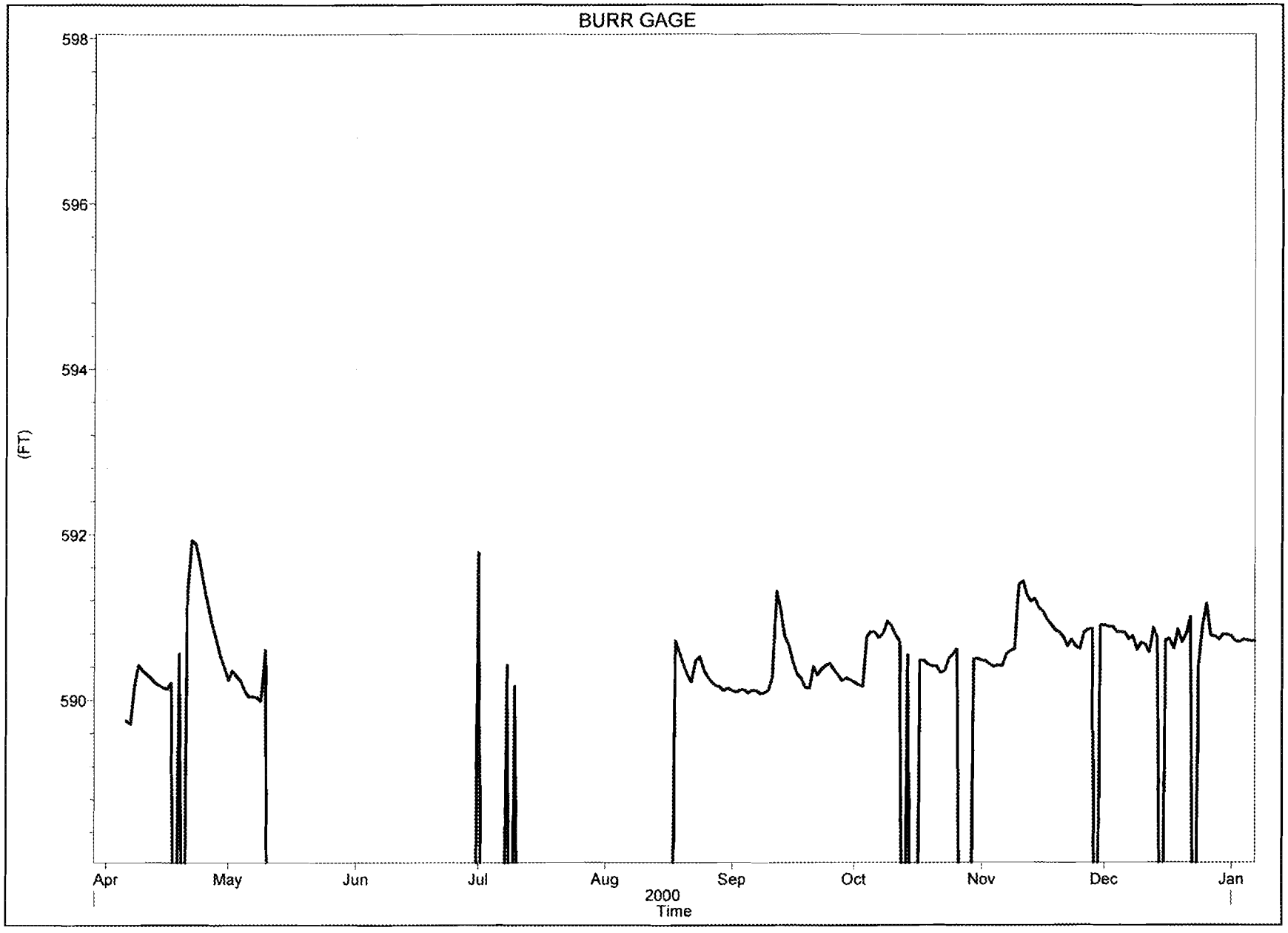


Plate 00800-B-2

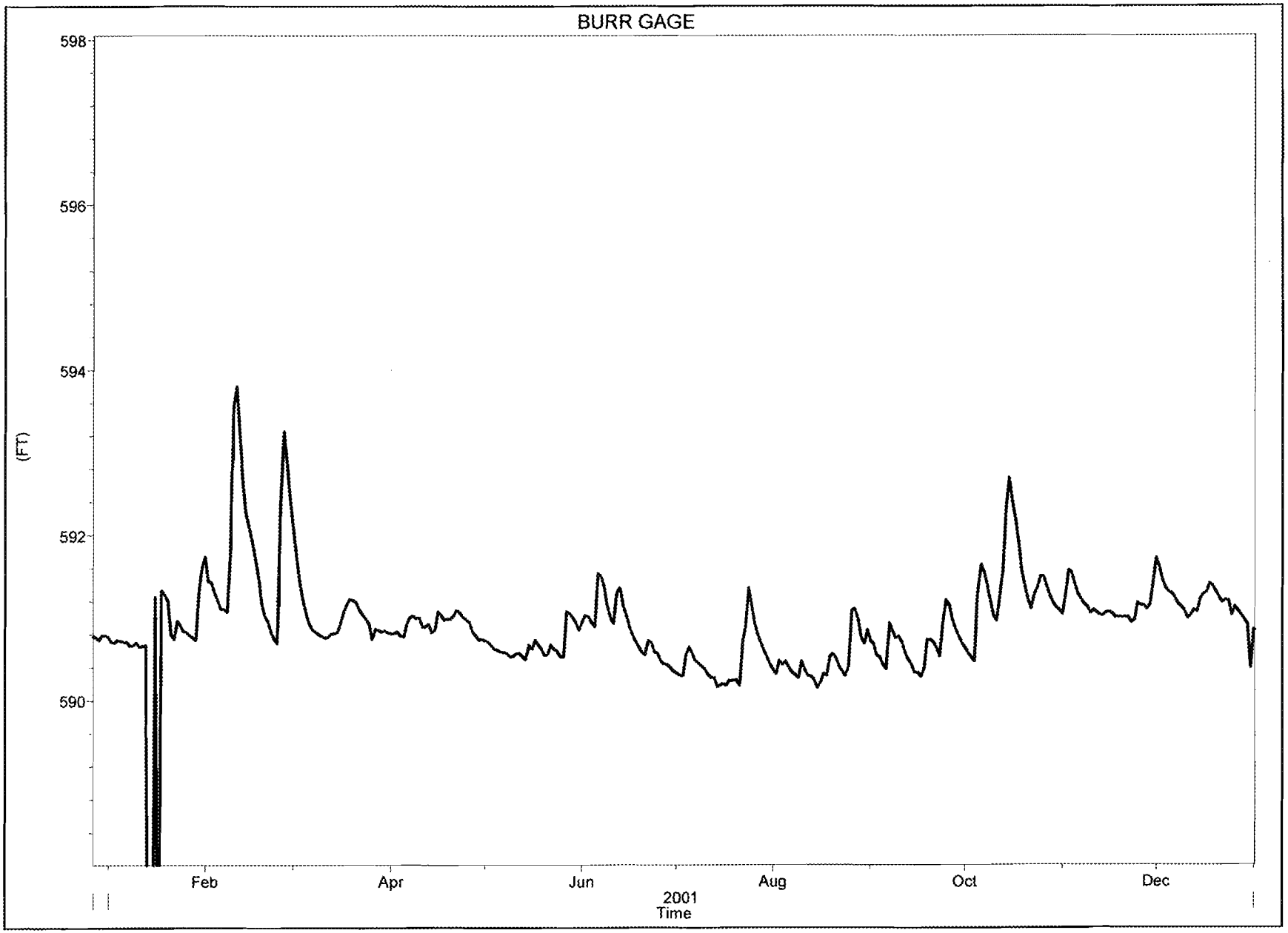


Plate 00800-B-3

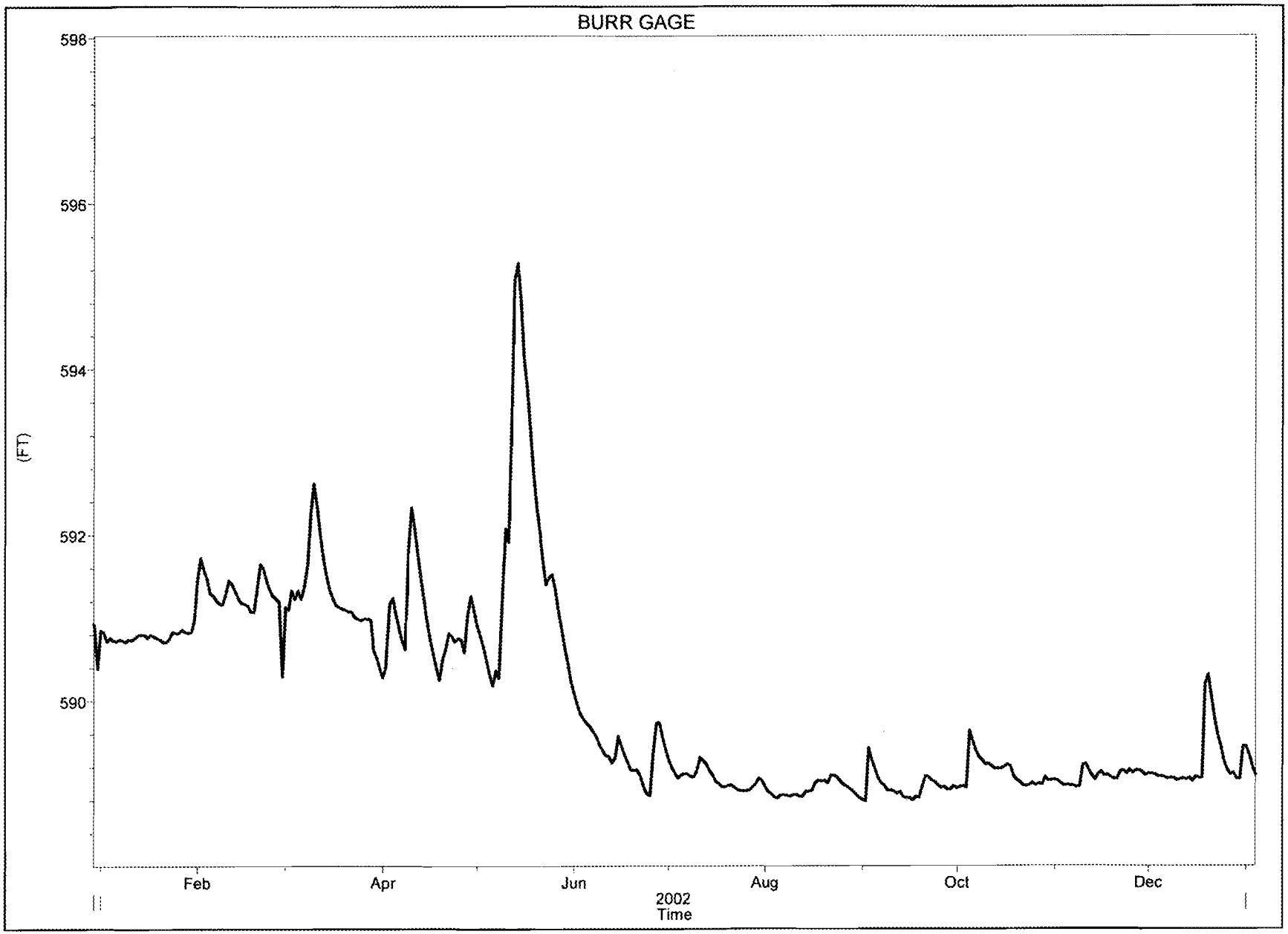


Plate 00800-B-4

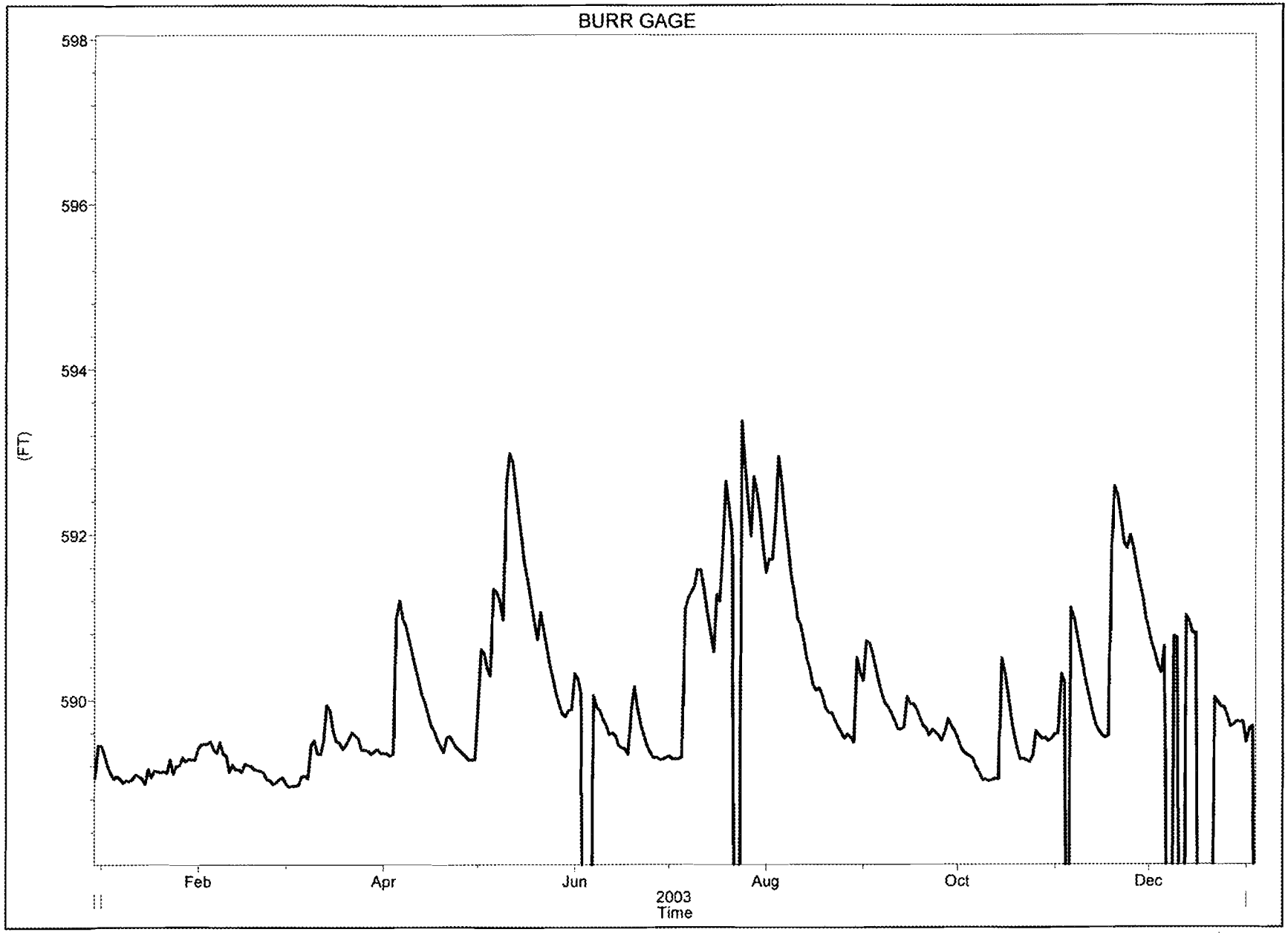


Plate 00800-B-5

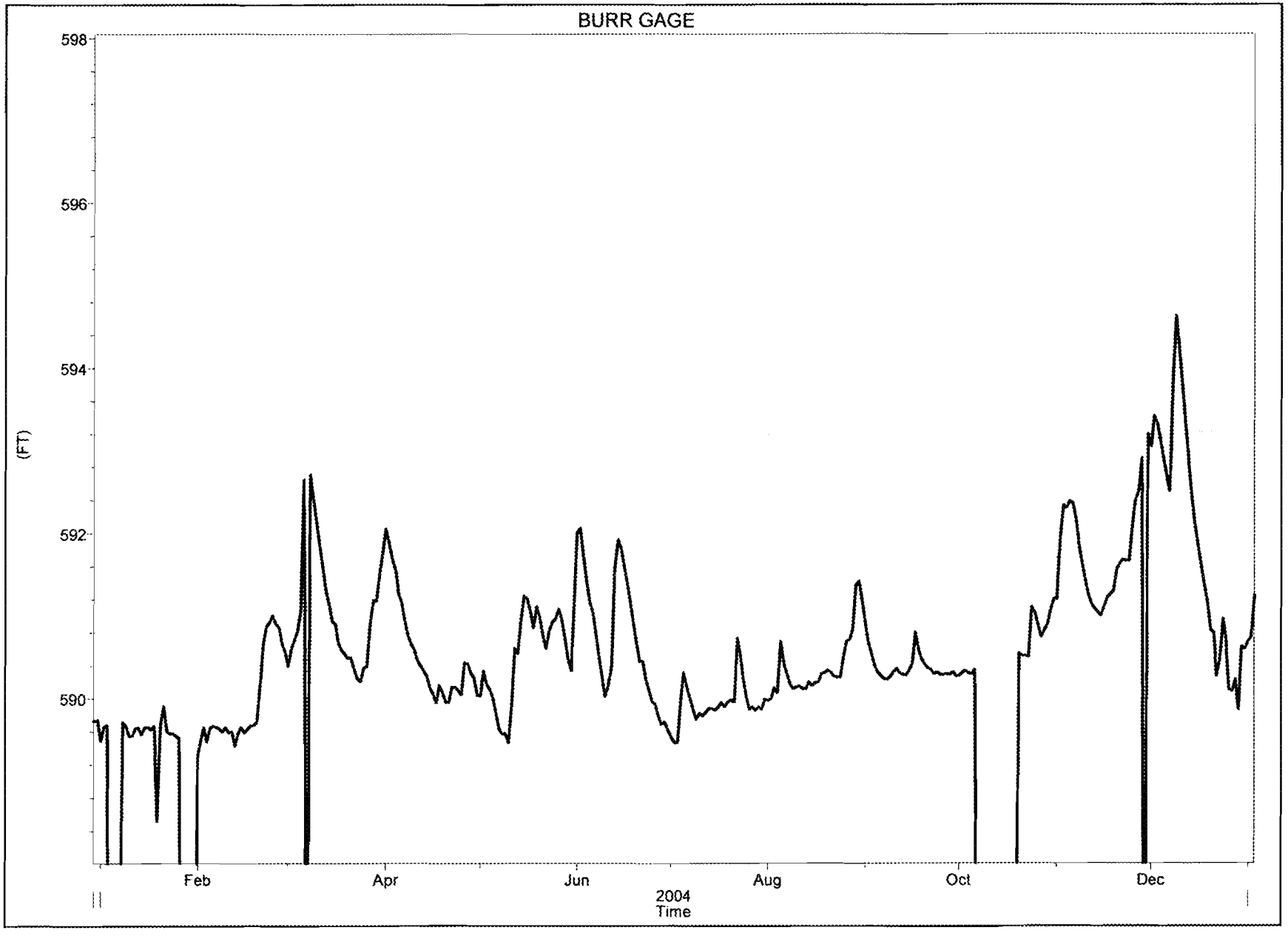


Plate 00800-B-6

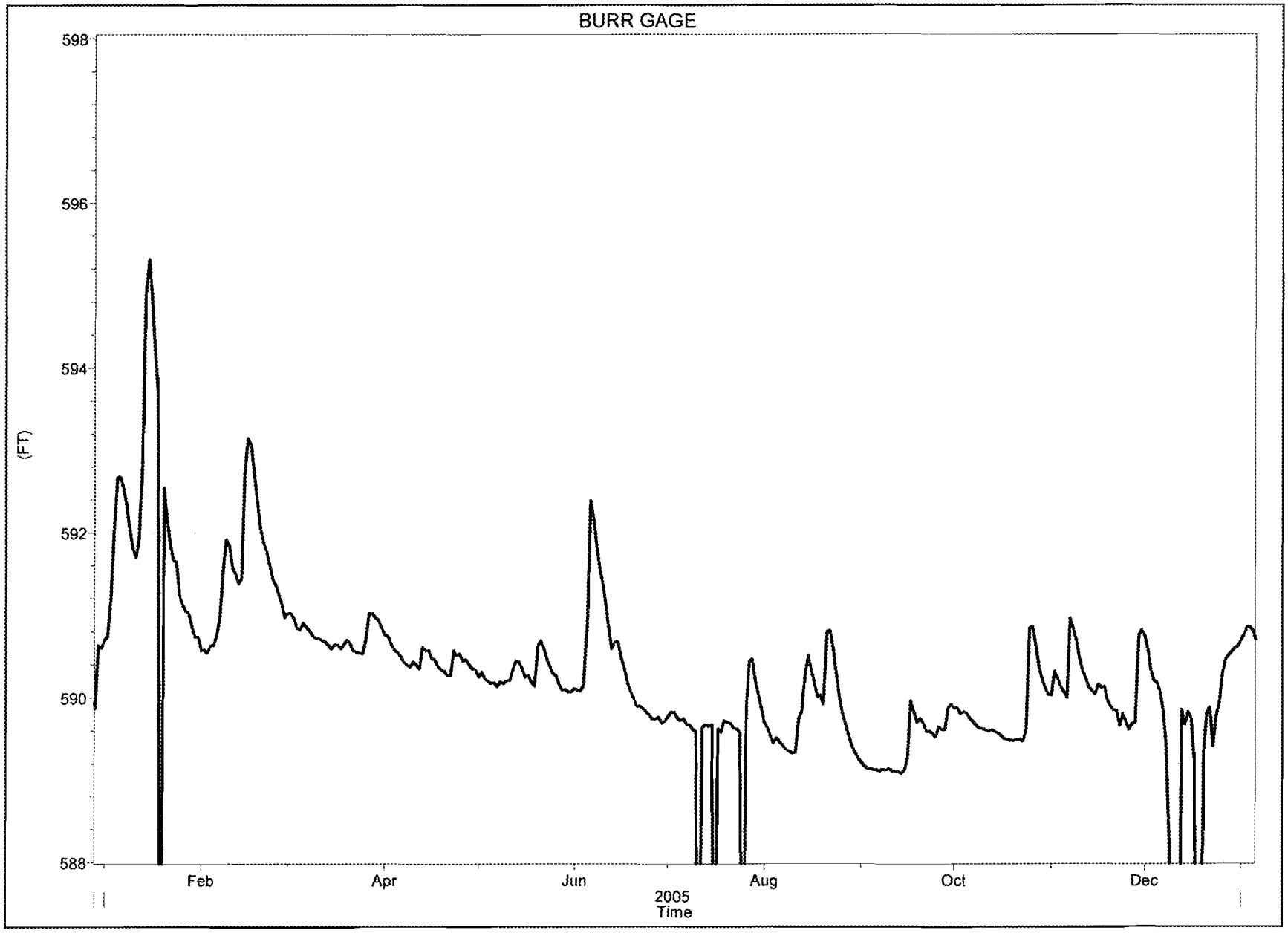


Plate 00800-B-7

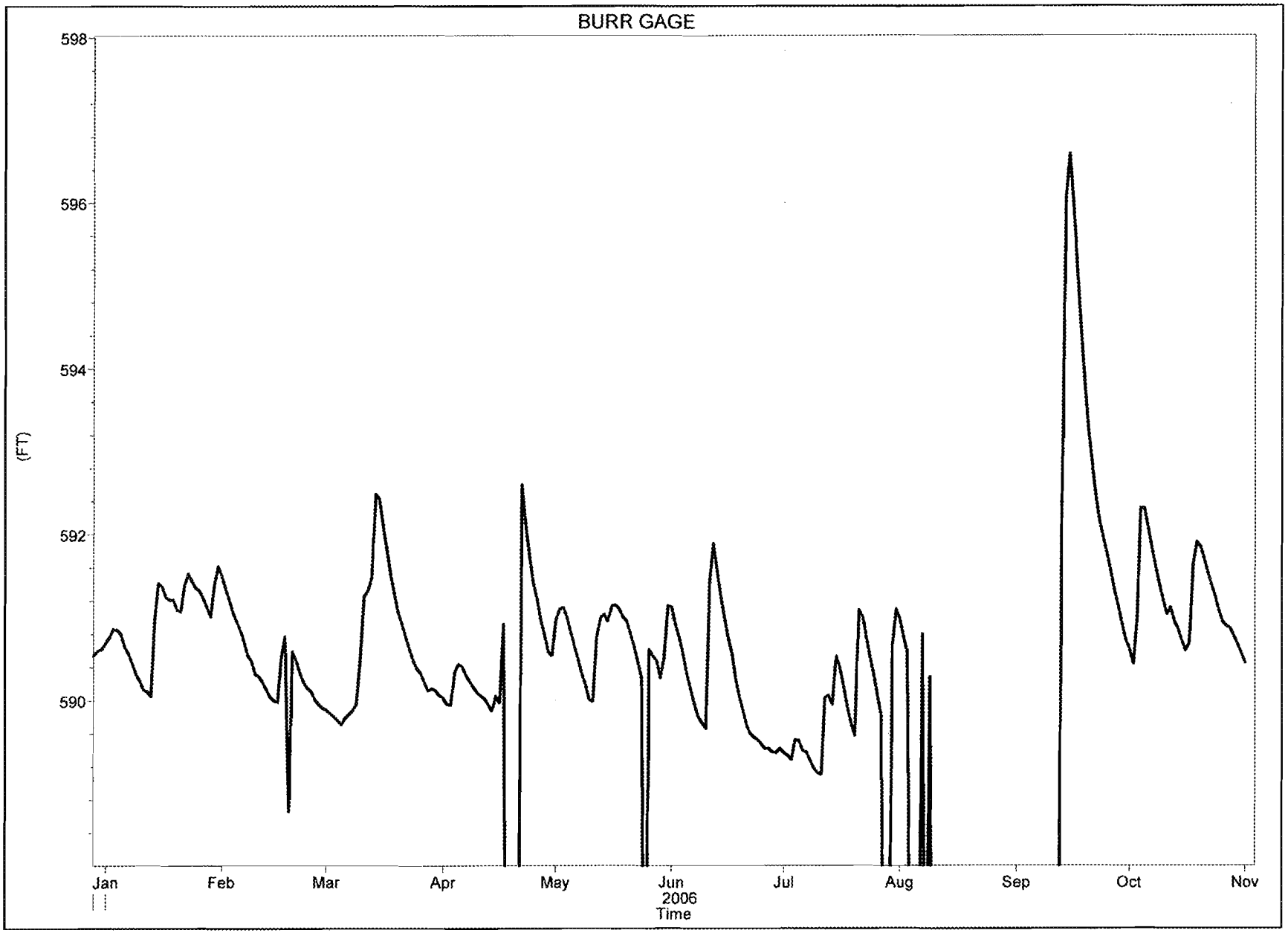
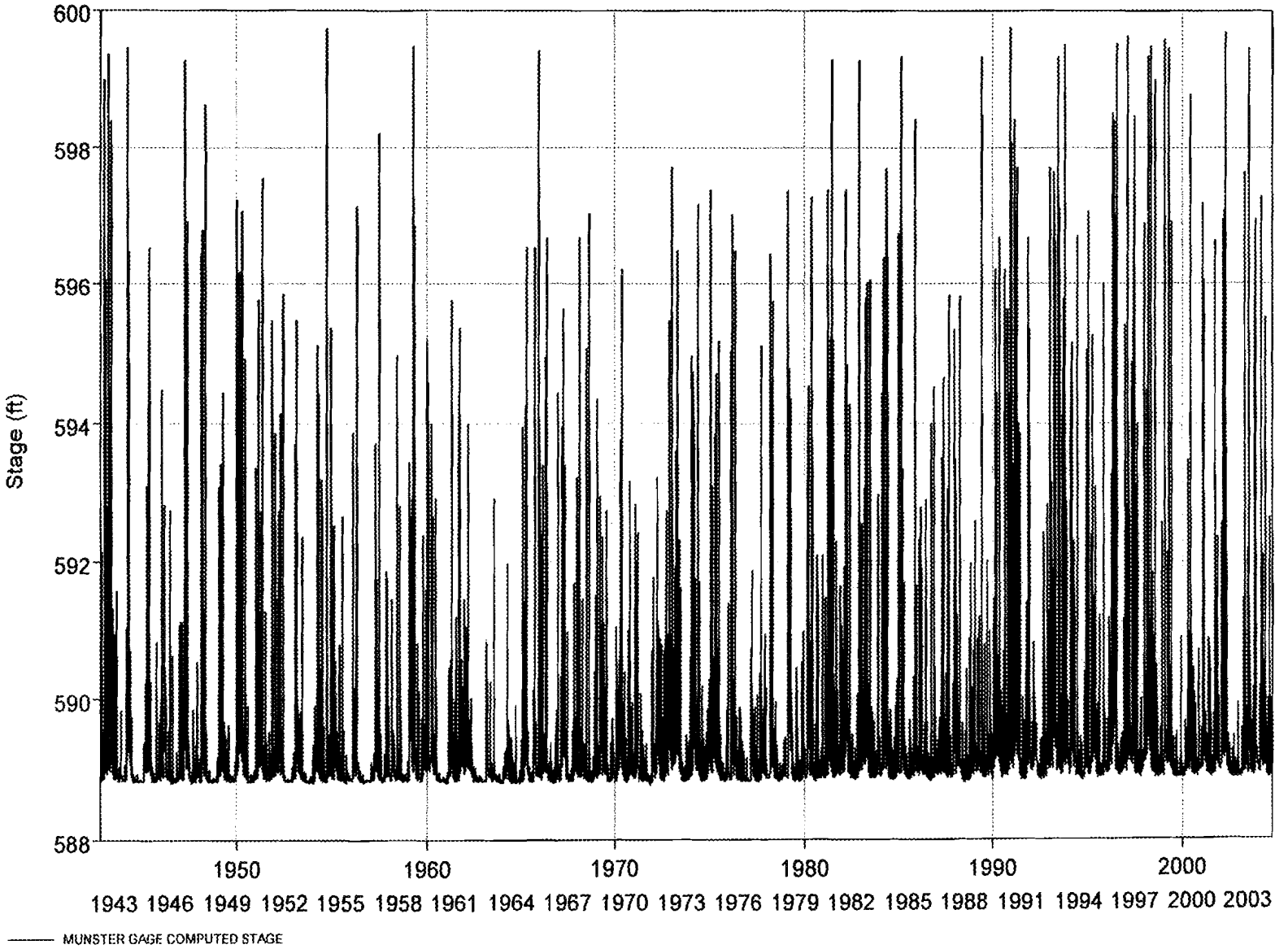
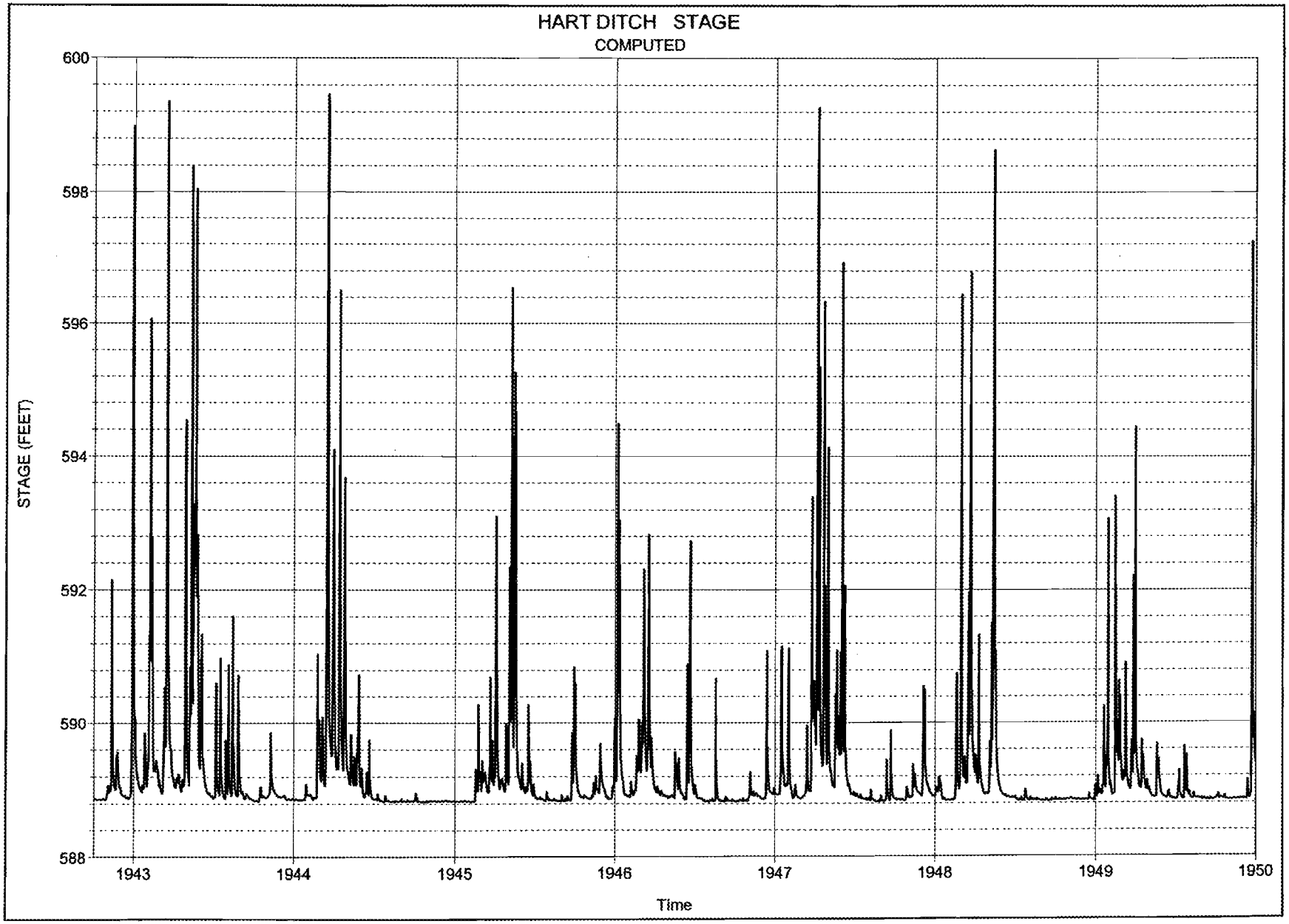
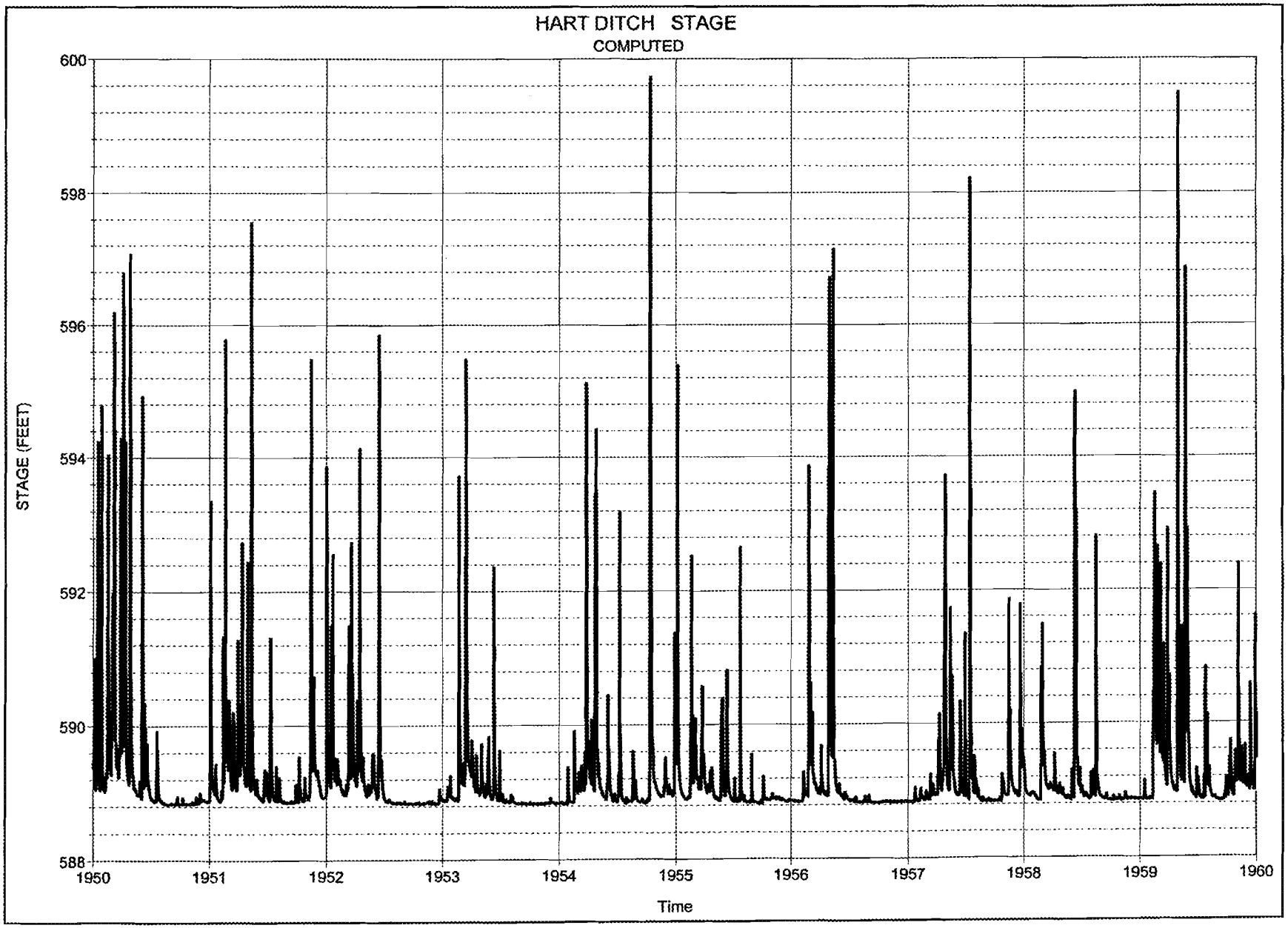


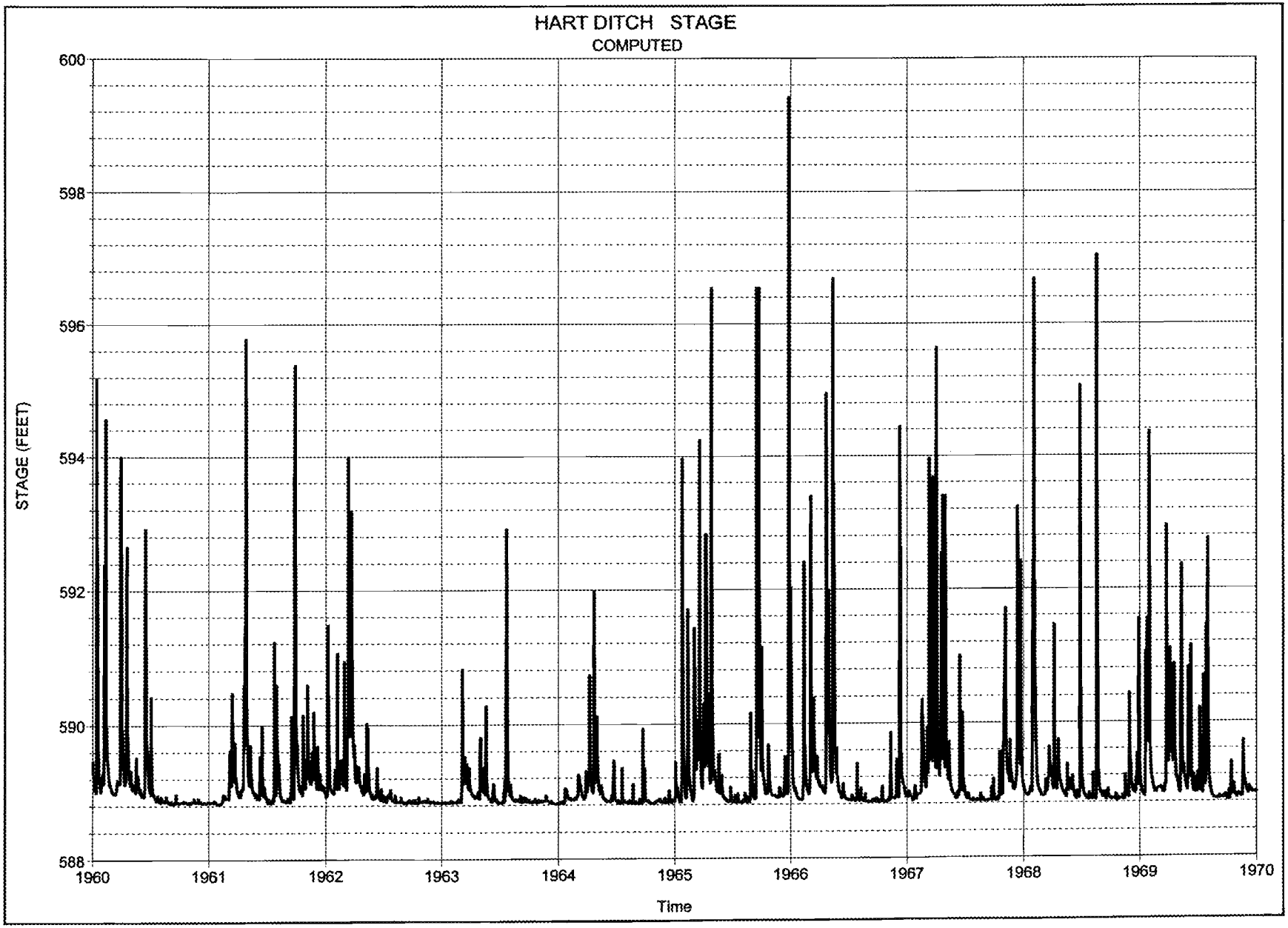
Plate 00800-B-8

Hart Ditch


Stage (ft)
600
598
596
594
592
590
588
1950
1960
1970
1980
1990
2000
1943 1946 1949 1952 1955 1958 1961 1964 1967 1970 1973 1976 1979 1982 1985 1988 1991 1994 1997 2000 2003
MUNSTER GAGE COMPUTED STAGE


HART DITCH STAGE
COMPUTED
STAGE (FEET)
600
598
596
594
592
590
588
1943
1944
1945
1946
1947
1948
1949
1950
Time


HART DITCH STAGE
COMPUTED
STAGE (FEET)
600
598
596
594
592
590
588
1950
1951
1952
1953
1954
1955
1956
1957
1958
1959
1960
Time


HART DITCH STAGE
COMPUTED
STAGE (FEET)
600
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596
594
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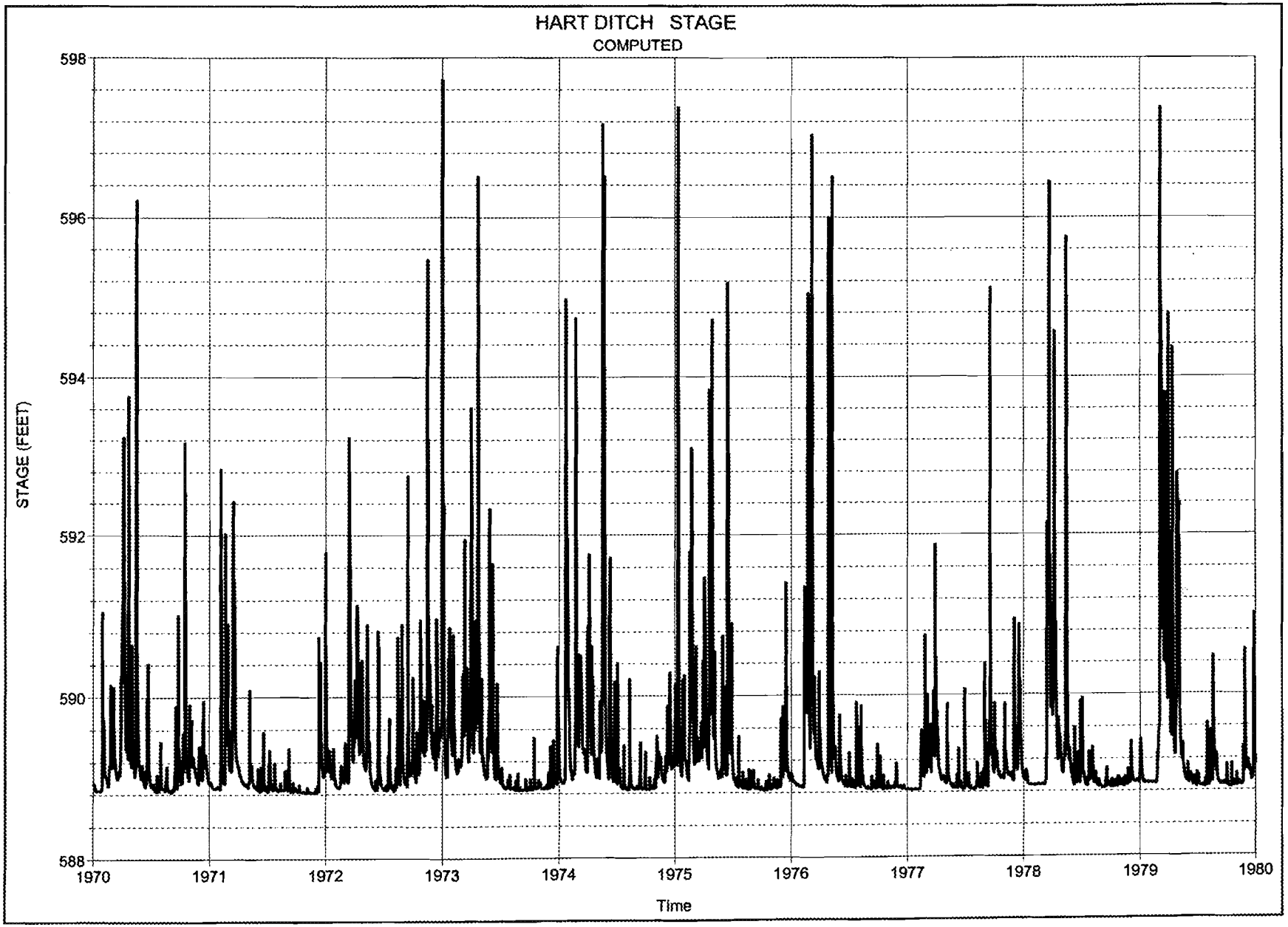
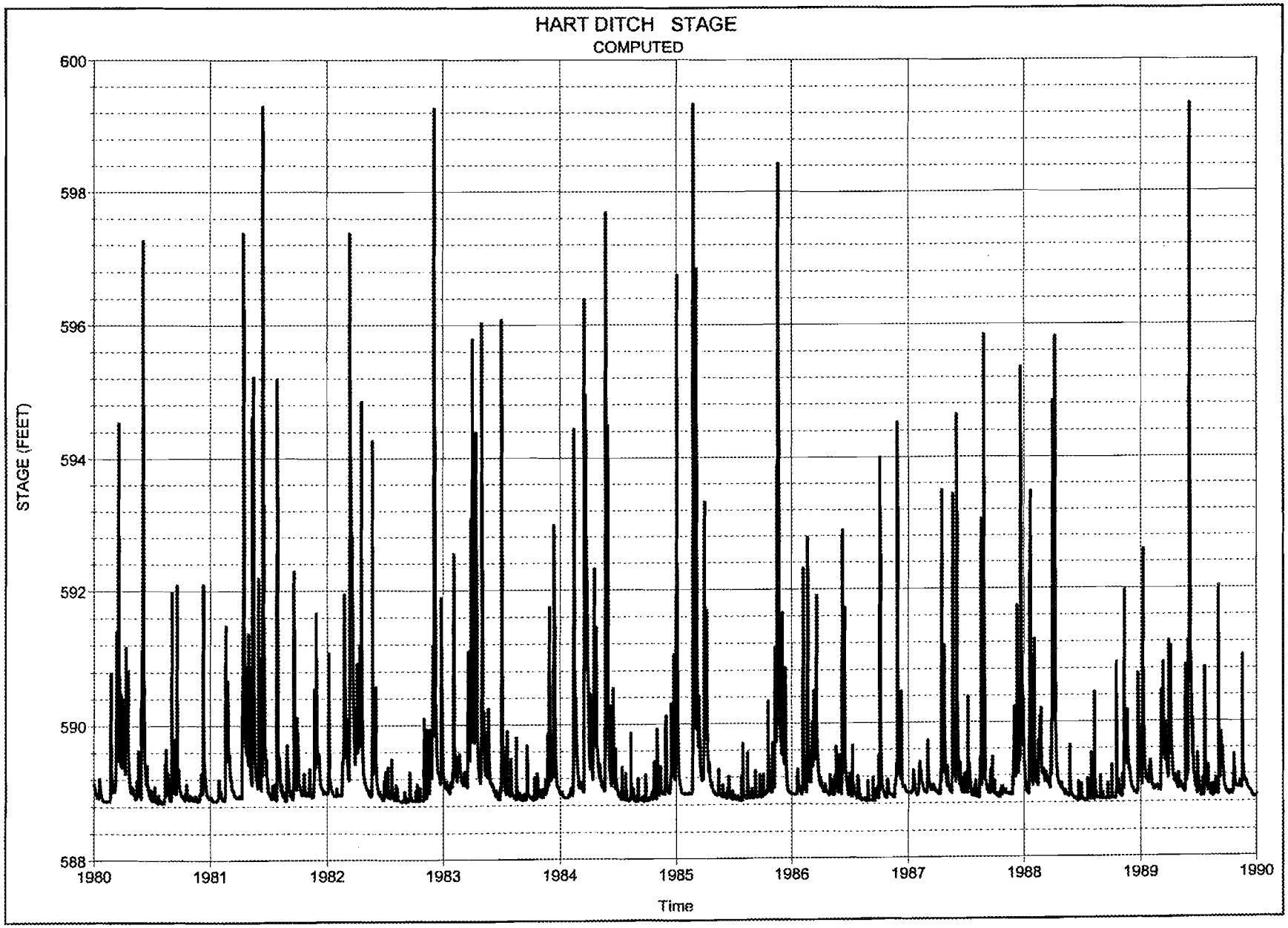
588
1960
1961
1962
1963
1964
1965
1966
1967
1968
1969
1970
Time


HART DITCH STAGE
COMPUTED
STAGE (FEET)
598
596
594
592
590
588
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
Time


HART DITCH STAGE
COMPUTED
STAGE (FEET)
600
598
596
594
592
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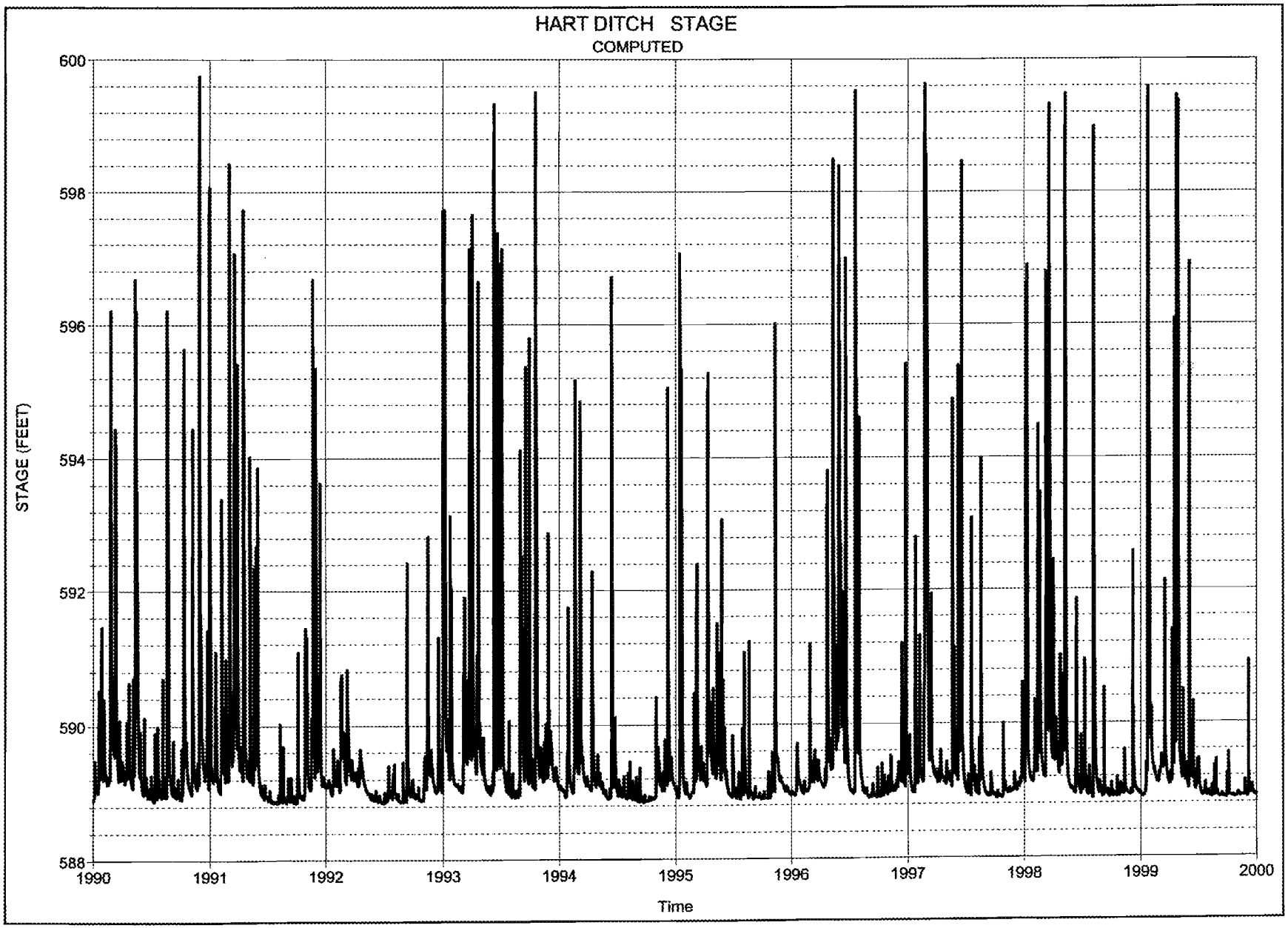
588
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
Time


HART DITCH STAGE
COMPUTED
STAGE (FEET)
600
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596
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592
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588
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
Time

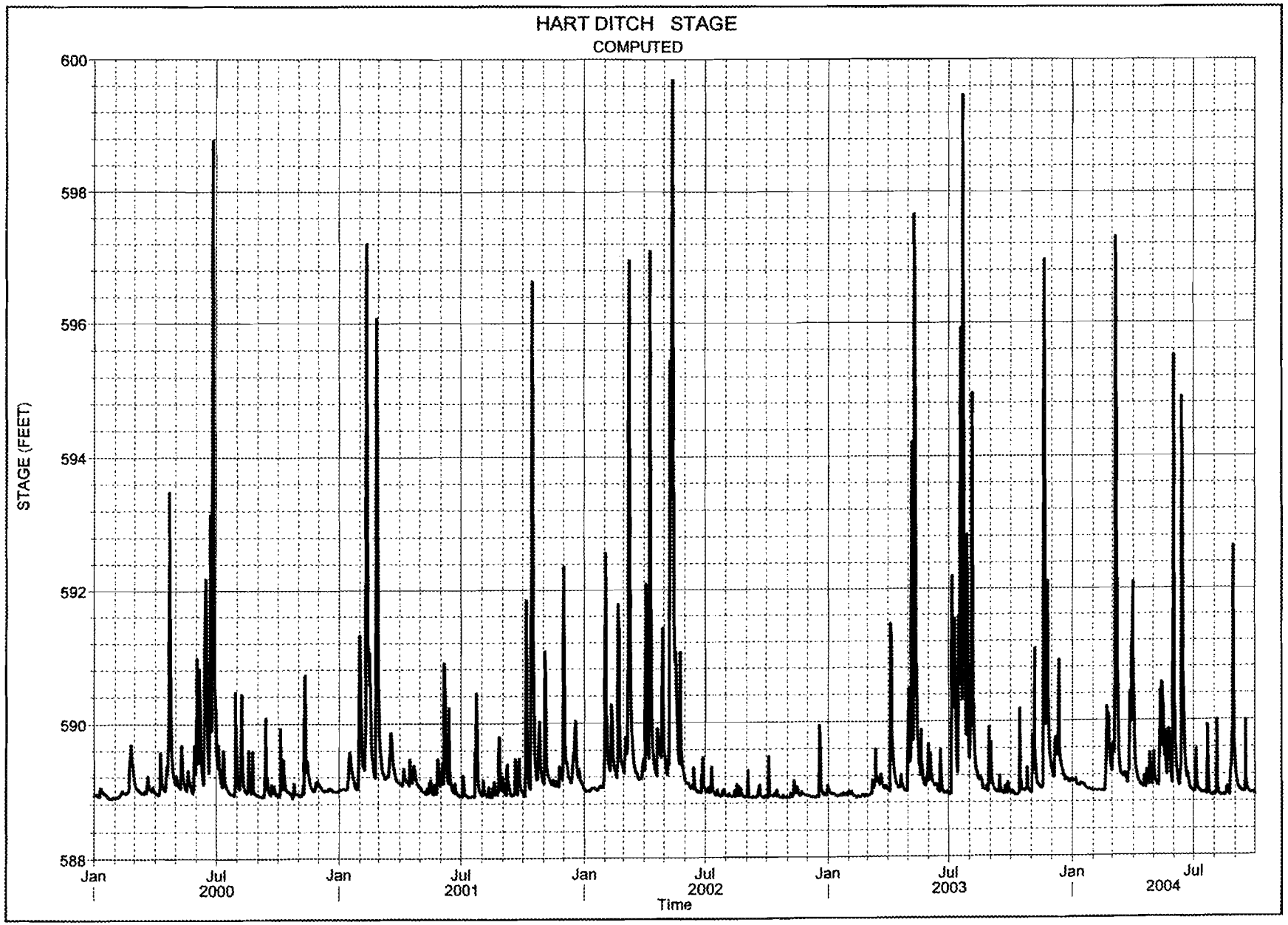
HART DITCH STAGE
COMPUTED
STAGE (FEET)
600
598
596
594
592
590
588
Jan
Jul
2000
Jan
Jul
2001
Jan
Jul
2002
Jan
Jul
2003
Jan
Jul
2004
Time

Table 00 31 19.02 03 –4 – Peak Streamflow for the Hart Ditch Gage in Munster, Indiana

Water Year	Date	Gage Height (feet)	Stream-flow (cfs)	Water Year	Date	Gage Height (feet)	Stream-flow (cfs)
1943	Mar. 16, 1943	6.95	2,280	1974	May 18, 1974	5.59	1,540
1944	Mar. 15, 1944	7.23	2,420	1975	Jan. 11, 1975	6.17	1,450
1945	May 08, 1945	3.73	1,270	1976	Mar. 05, 1976	5.60	1,270
1946	Jan. 06, 1946	2.88	780	1977	Sep. 18, 1977	4.77	1,200
1947	Apr. 06, 1947	6.17	2,490	1978	Mar. 21, 1978	4.50	1,120
1948	May 11, 1948	5.60	1,950	1979	Mar. 05, 1979	6.66	1,390
1949	Feb. 13, 1949	3.00	850	1980	Jun. 02, 1980	6.92	1,380
1950	Dec. 22, 1949	4.83	1,570	1981	Jun. 14, 1981	8.04	1,850[1]
1951	May 11, 1951	5.01	1,430	1982	May 22, 1982	6.42	1,880
1952	Jun. 14, 1952	4.39	1,190	1983	Dec. 04, 1982	8.20	2,110
1953	Mar. 15, 1953	3.84	960	1984	May 23, 1984	5.65	1,560
1954	Mar. 25, 1954	4.25	1,110	1985	Feb. 24, 1985		2,400[2]
1955	Oct. 11, 1954	7.83	2,600	1986	Nov. 19, 1985		1,700[2]
1956	May 11, 1956	5.27	1,550	1987	Aug. 17, 1987	5.46	1,640
1957	Jul. 14, 1957	7.60	2,060	1988	Apr. 06, 1988	4.72	1,300
1958	Jun. 10, 1958	3.76	960	1989	Jun. 01, 1989	8.10	2,100
1959	Apr. 28, 1959	7.61	2,670	1990	Aug. 18, 1990	6.77	2,170
1960	Jan. 13, 1960	3.50	855	1991	Nov. 28, 1990	8.72	3,010
1961	Sep. 25, 1961	4.38	960	1992	Sep. 09, 1992	5.21	1,540
1962	Mar. 12, 1962	3.10	715	1993	Jun. 08, 1993	7.23	2,360
1963	Jul. 21, 1963	3.40	885	1994	Oct. 17, 1993	7.52	2,490
1964	Apr. 21, 1964	2.23	465	1995	Aug. 19, 1995	5.34	1,590
1965	Apr. 26, 1965	4.21	1,160	1996	Jul. 18, 1996	8.03	2,710
1966	Dec. 25, 1965	7.30	2,500	1997	Feb. 21, 1997	8.00	2,700
1967	Apr. 02, 1967	3.96	950	1998	May 08, 1998	7.24	2,370
1968	Aug. 18, 1968	5.77	1,250	1999	Jan. 24, 1999	7.47	2,470
1969	Jan. 30, 1969	3.33	720	2000	Jun. 25, 2000	7.23	1,700[1,2]
1970	May 15, 1970	5.24	1,050	2001	Feb. 10, 2001	7.28	1,250[1,2]
1971	Oct. 14, 1970	2.68	629	2002	May 12, 2002	7.84	
1972	Sep. 13, 1972	4.44	1,250	2003	Jul. 21, 2003	7.32	2,400
1973	Dec. 31, 1972	6.60	1,500	2004	Mar. 05, 2004	4.95	1,440
Gage 0.00=591.27 ft NGVD				2005	Jan. 13, 2005	7.94	2,670

Peak Streamflow Qualification Codes: 1 -- Discharge is a Maximum Daily Average , 2 -- Discharge is an Estimate

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DIVISION 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS

SECTION 00 31 21.03

SURVEY MARKER INFORMATION

PART 1 GENERAL

1.1 SURVEY DATA

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

-- End of Section Table of Contents --

SECTION 00 31 21.03

SURVEY MARKER INFORMATION

PART 1 GENERAL

1.1 SURVEY DATA

Horizontal control station data within the area of the project has been provided at the end of this section for information only.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

-- End of Section --

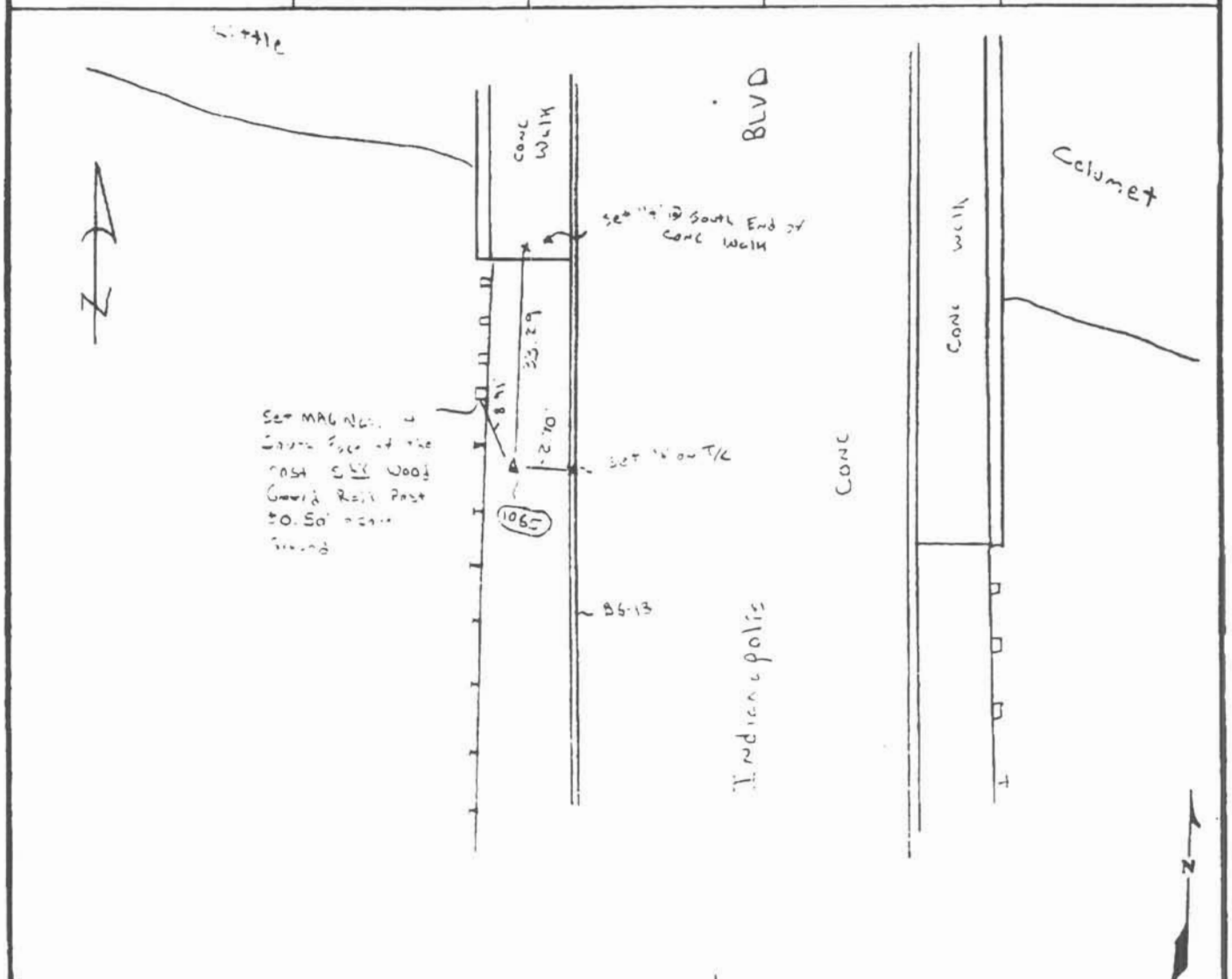
LCR 5-II

COUNTRY	TYPE OF MARK	STATION	
USA	24" IRON Rod w/BLA CCC	106E	
LOCALITY	STAMPING ON MARK	AGENCY (CAST IN MARKS)	ELEVATION (FT)
HIGHLAND			605.77
LATITUDE	LONGITUDE	DATUM	DATUM
		NAD 27	NGVD 29
(NORTHING)(EASTING) (FT)	(EASTING)(NORTHING) (FT)	GRID AND ZONE	ESTABLISHED BY (AGENCY)
1481906.24	392983.06	Indiana West	
(NORTHING)(EASTING) (FT) (M)	(EASTING)(NORTHING) (FT) (M)	GRID AND ZONE	DATE / ORDER

TO OBTAIN GRID AZIMUTH, ADD ° TO THE GEODETIC AZIMUTH

TO OBTAIN GRID AZ. (ADD)(SUB.) ° TO THE GEODETIC AZIMUTH

OBJECT	AZIMUTH OR DIRECTION (GEODETIC)(GRID) (MAGNETIC)	BACK AZIMUTH	GEOD DISTANCE (METERS) (FEET)	GRID DISTANCE (METERS) (FEET)
	° ' "	° ' "		



SKETCH

DA FORM 1 OCT 64 1959 REPLACES DA FORMS 1959 AND 1960, 1 FEB 57 WHICH ARE OBSOLETE.

DESCRIPTION OR RECOVERY OF HORIZONTAL CONTROL STATION

For use of this form, see TM 5-237; the proponent agency is TRADOC.

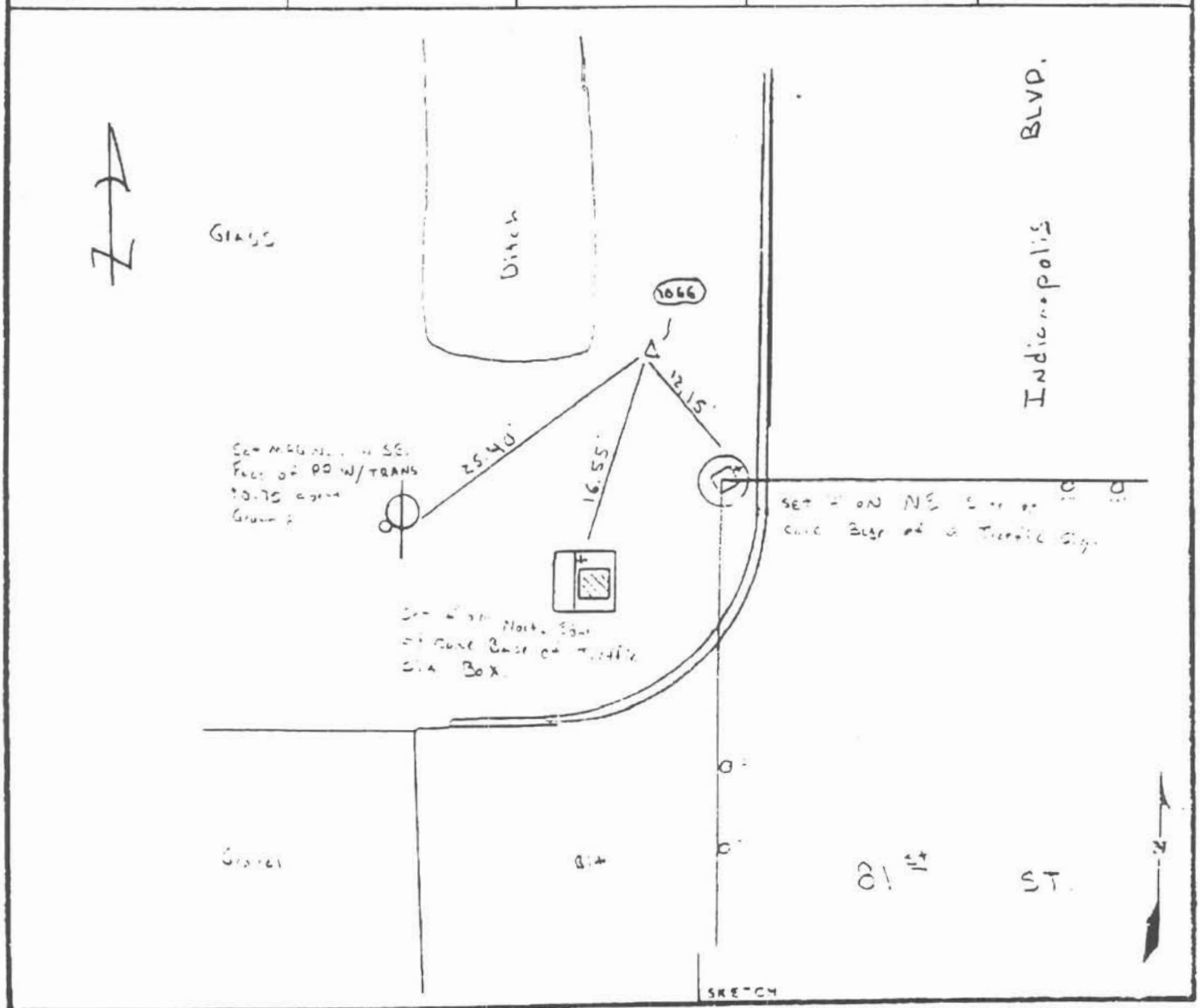
LCR 5-II

COUNTRY	TYPE OF MARK	STATION	
USA	24" IRON ROD w/ 2" A CAP	1066	
LOCALITY	STAMPING ON MARK	AGENCY (CAST IN MARK)	ELEVATION (FT)
HIGHLAND			595.28 —
LATITUDE	LONGITUDE	DATUM	DATUM
		NAD 27	NGVD 29
(NORTHING)(EASTING) (FT)	(EASTING)(NORTHING) (FT)	GRID AND ZONE	ESTABLISHED BY (AGENCY)
1481399.32 —	393349.45 —	Indiana West	
(NORTHING)(EASTING) (FT) (M)	(EASTING)(NORTHING) (FT) (M)	GRID AND ZONE	DATE / ORDER

TO OBTAIN GRID AZIMUTH, ADD ° TO THE GEODETIC AZIMUTH

TO OBTAIN GRID AZ (ADD)(SUB.) TO THE GEODETIC AZIMUTH

OBJECT	AZIMUTH OR DIRECTION (GEODETIC)(GRID) (MAGNETIC)	BACK AZIMUTH	GEOD DISTANCE (METERS) (FEET)	GRID DISTANCE (METERS) (FEET)
	° ′ ″	° ′ ″		



DA FORM 1 OCT 64 1959 REPLACES DA FORMS 1959 AND 1960 WHICH ARE OBSOLETE.

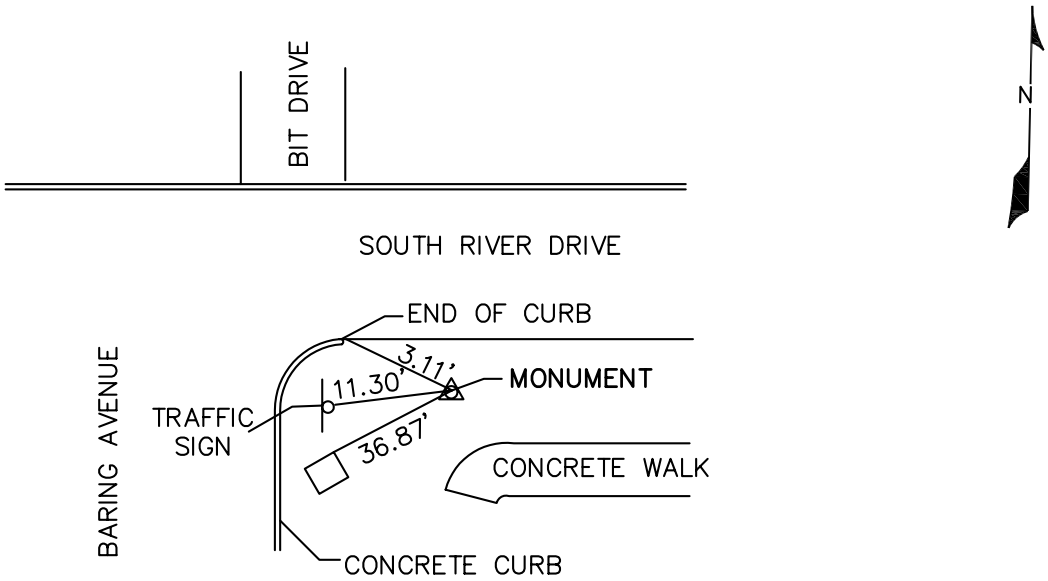
DESCRIPTION OR RECOVERY OF HORIZONTAL CONTROL STATION

For instructions see TM 5-237; the proponent agency is TRADOC.

COUNTRY	TYPE OF MARK	STATION	ELEVATION (USFT) ~~(M)~~
U.S.A.	IRON ROD	CP 13	594.82
LOCALITY	**STAMPING ON MARK**	**AGENCY (CAST IN MARK)**	**DATUM**
MUNSTER, IN			NGVD 29
LATITUDE	**LONGITUDE**	**DATUM**	**ESTABLISHED BY (AGENCY)**
41°33'57.8592"N	87°29'05.7925"W	NAD 27	BLA
(NORTHING) ~~(EASTING)~~ (USFT) ~~(M)~~	**(EASTING) ~~(NORTHING)~~ (USFT) ~~(M)~~**	**GRID AND ZONE**	**DATE / ORDER**
1481273.926	390096.872	IN W	15 SEPT 06 / 3rd

Aerial Map

Detailed Location



DA FORM 1 OCT 04 1959 MODIFIED 1 MAY 2005 BOLLINGER, LACH & ASSOCIATES

DESCRIPTION OR RECOVERY OF HORIZONTAL CONTROL STATION

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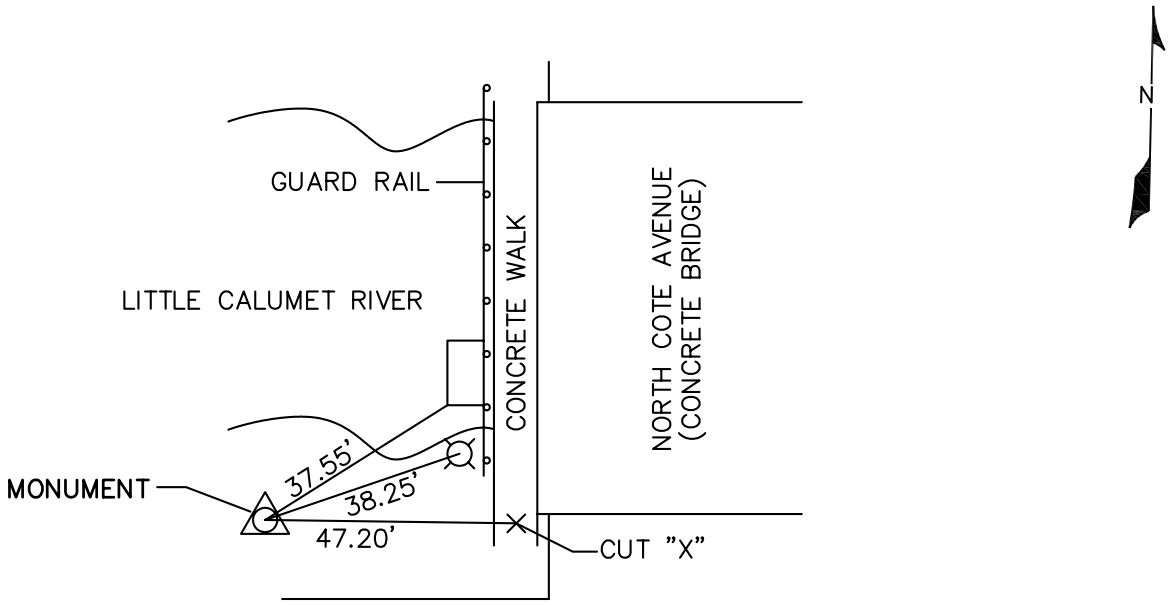
COUNTRY	TYPE OF MARK	STATION	ELEVATION (USFT) ~~(M)~~
U.S.A.	IRON ROD	CP 12	599.72
LOCALITY	**STAMPING ON MARK**	**AGENCY (CAST IN MARK)**	**DATUM**
MUNSTER, IN			NGVD 29
LATITUDE	**LONGITUDE**	**DATUM**	**ESTABLISHED BY (AGENCY)**
41°33'59.2534"N	87°29'09.7178"W	NAD 27	BLA
(NORTHING) ~~(EASTING)~~ (USFT) ~~(M)~~	**(EASTING) ~~(NORTHING)~~ (USFT) ~~(M)~~**	**GRID AND ZONE**	**DATE / ORDER**
1481416.430	389799.143	IN W	15 SEPT 06 / 3rd

Aerial Map

Detailed Location



DA FORM 1 OCT 04 1959 MODIFIED 1 MAY 2005 BOLLINGER, LACH & ASSOCIATES

DESCRIPTION OR RECOVERY OF HORIZONTAL CONTROL STATION

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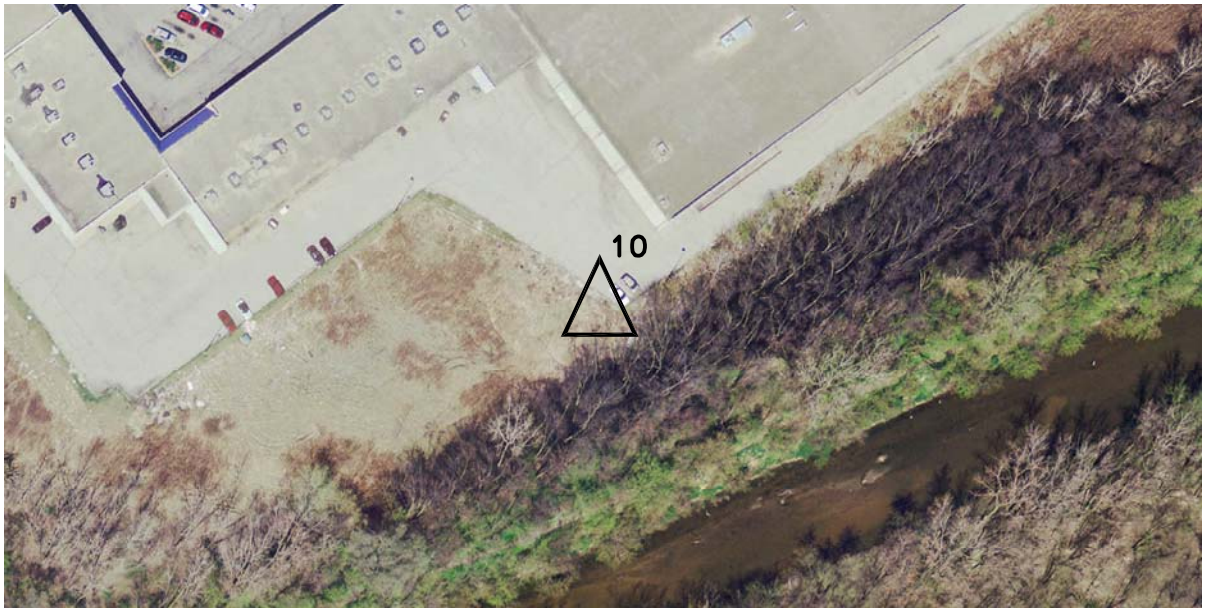
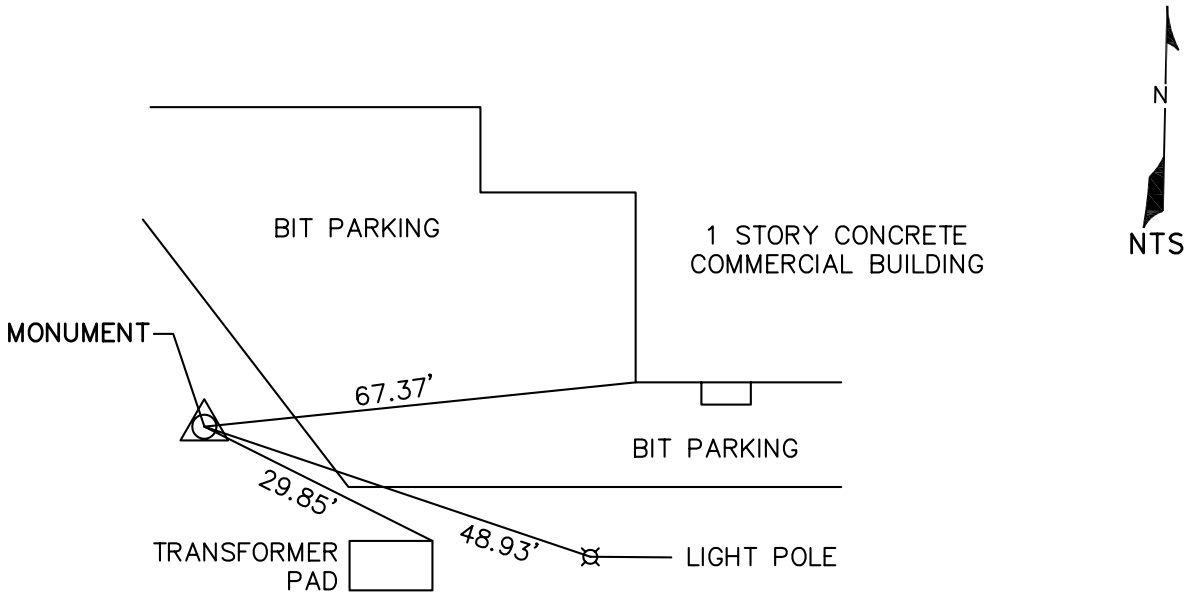
COUNTRY	TYPE OF MARK	STATION	ELEVATION (USFT) ~~(M)~~
U.S.A.	IRON ROD	CP 10	601.22
LOCALITY	**STAMPING ON MARK**	**AGENCY (CAST IN MARK)**	**DATUM**
MUNSTER, IN			NGVD 29
LATITUDE	**LONGITUDE**	**DATUM**	**ESTABLISHED BY (AGENCY)**
41°34'12.5594"N	87°28'13.3365"W	NAD 27	BLA
(NORTHING) ~~(EASTING)~~ (USFT) ~~(M)~~	**(EASTING) ~~(NORTHING)~~ (USFT) ~~(M)~~**	**GRID AND ZONE**	**DATE / ORDER**
1482743.574	394091.035	IN W	15 SEPT 06 / 3rd

Aerial Map



Detailed Location



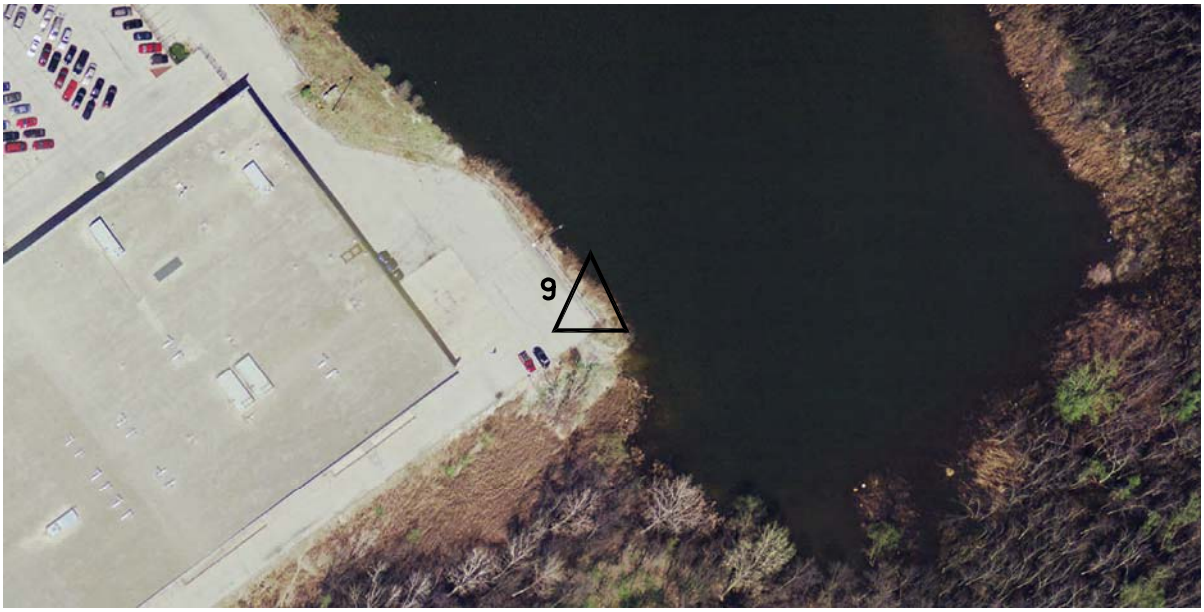
DA FORM 1 OCT 04 1959 MODIFIED 1 MAY 2005 BOLLINGER, LACH & ASSOCIATES

DESCRIPTION OR RECOVERY OF HORIZONTAL CONTROL STATION

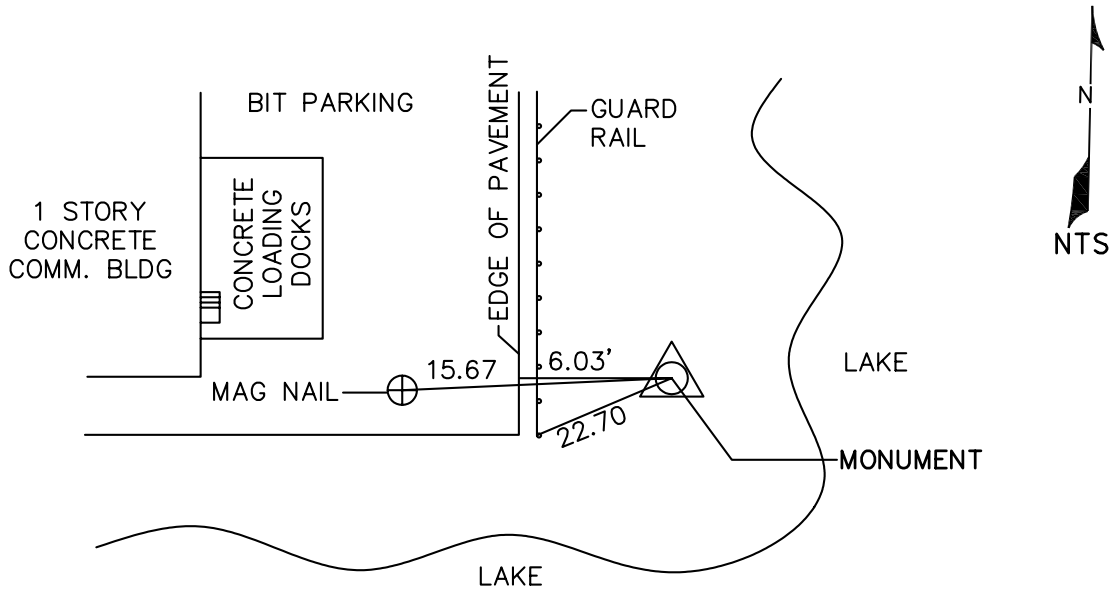
For use of this form, see TM 5-237; the proponent agency is TRADOC.

COUNTRY	TYPE OF MARK	STATION	ELEVATION (USFT) ~~(M)~~
U.S.A.	IRON ROD	CP 9	595.06
LOCALITY	**STAMPING ON MARK**	**AGENCY (CAST IN MARK)**	**DATUM**
MUNSTER, IN			NGVD 29
LATITUDE	**LONGITUDE**	**DATUM**	**ESTABLISHED BY (AGENCY)**
41°34'16.0201"N	87°28'07.2160"W	NAD 27	BLA
(NORTHING) ~~(EASTING)~~ (USFT) ~~(M)~~	**(EASTING) ~~(NORTHING)~~ (USFT) ~~(M)~~**	**GRID AND ZONE**	**DATE / ORDER**
1483091.767	394557.824	IN W	15 SEPT 06 / 3rd

Aerial Map



Detailed Location



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DESCRIPTION OR RECOVERY OF HORIZONTAL CONTROL STATION

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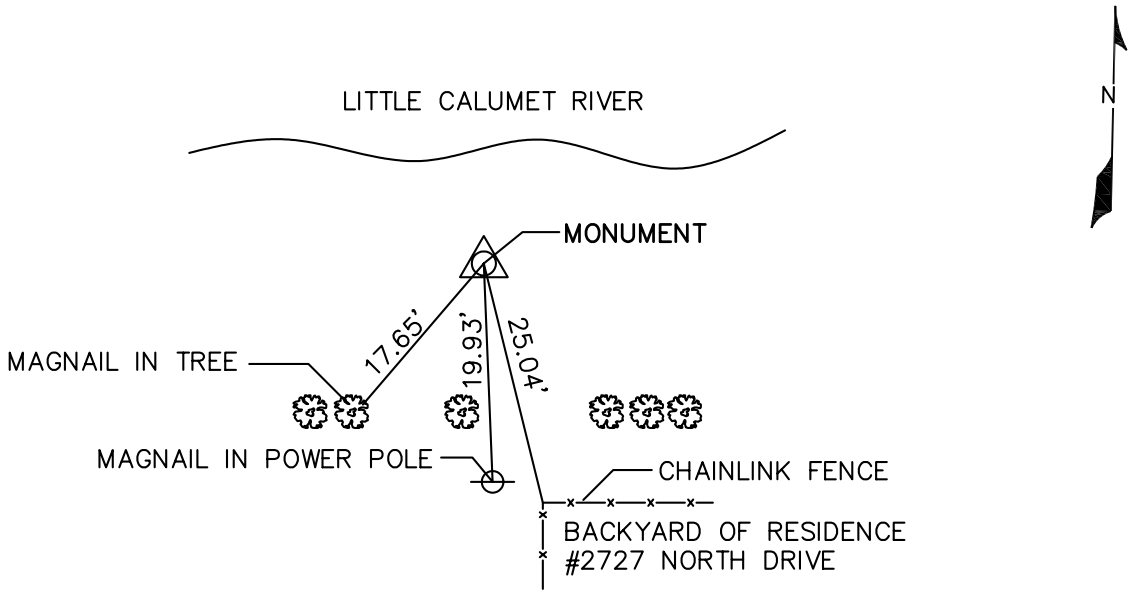
COUNTRY	TYPE OF MARK	STATION	ELEVATION (USFT) ~~(M)~~
U.S.A.	IRON ROD	CP 1	599.67
LOCALITY	**STAMPING ON MARK**	**AGENCY (CAST IN MARK)**	**DATUM**
MUNSTER, IN			NGVD 29
LATITUDE	**LONGITUDE**	**DATUM**	**ESTABLISHED BY (AGENCY)**
41°34'08.0222"N	87°27'48.2252"W	NAD 27	BLA
(NORTHING) ~~(EASTING)~~ (USFT) ~~(M)~~	**(EASTING) ~~(NORTHING)~~ (USFT) ~~(M)~~**	**GRID AND ZONE**	**DATE / ORDER**
1482275.869	395997.749	IN W	15 SEPT 06 / 3rd

Aerial Map

Detailed Location



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DESCRIPTION OR RECOVERY OF HORIZONTAL CONTROL STATION

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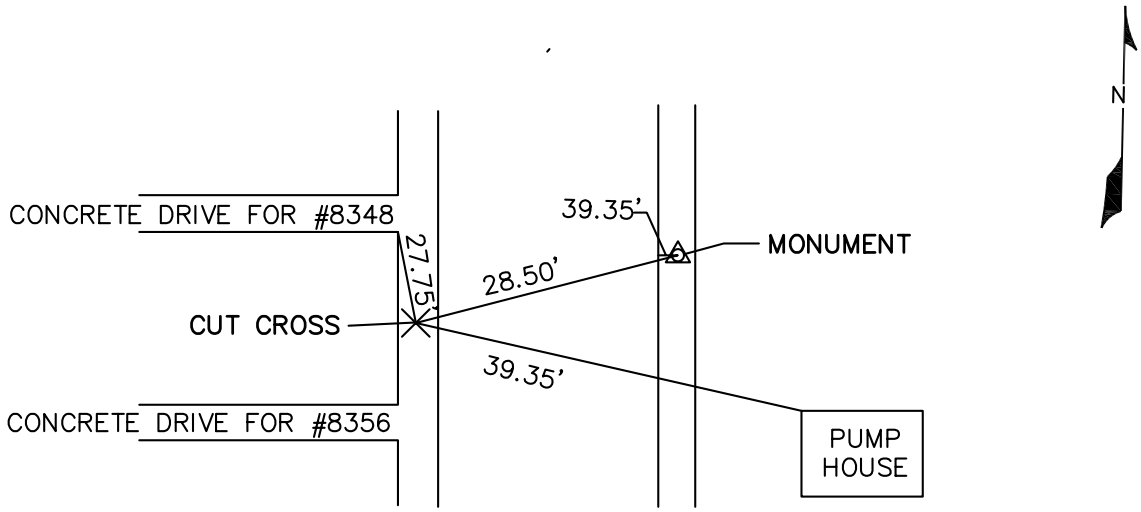
COUNTRY	TYPE OF MARK	STATION	ELEVATION (USFT) ~~(M)~~
U.S.A.	BRASS DISC	CP 605	601.00'
LOCALITY	**STAMPING ON MARK**	**AGENCY (CAST IN MARK)**	**DATUM**
MUNSTER, IN			NGVD 29
LATITUDE	**LONGITUDE**	**DATUM**	**ESTABLISHED BY (AGENCY)**
41°33'40.3204"N	87°28'52.3587"W	NAD 27	BLA
(NORTHING) ~~(EASTING)~~ (USFT) ~~(M)~~	**(EASTING) ~~(NORTHING)~~ (USFT) ~~(M)~~**	**GRID AND ZONE**	**DATE / ORDER**
1479494.042	391109.879	IN W	15 SEPT 06 / 3rd

Aerial Map

Detailed Location



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DESCRIPTION OR RECOVERY OF HORIZONTAL CONTROL STATION

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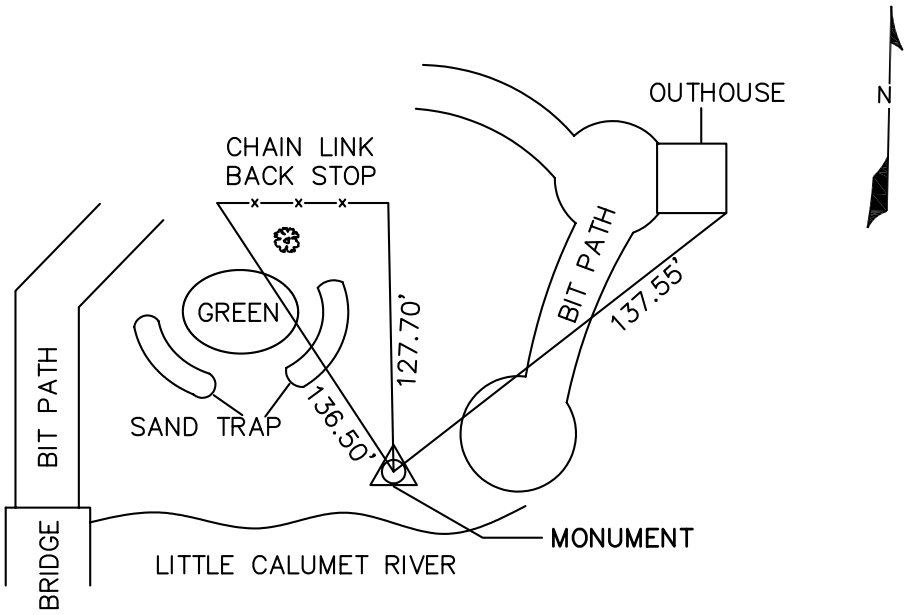
COUNTRY	TYPE OF MARK	STATION	ELEVATION (USFT) ~~(M)~~
U.S.A.	IRON ROD	CP 604	598.34
LOCALITY	**STAMPING ON MARK**	**AGENCY (CAST IN MARK)**	**DATUM**
MUNSTER, IN			NGVD 29
LATITUDE	**LONGITUDE**	**DATUM**	**ESTABLISHED BY (AGENCY)**
41°34'03.5994"N	87°28'51.3833"W	NAD 27	BLA
(NORTHING) ~~(EASTING)~~ (USFT) ~~(M)~~	**(EASTING) ~~(NORTHING)~~ (USFT) ~~(M)~~**	**GRID AND ZONE**	**DATE / ORDER**
1481849.843	391194.874	IN W	15 SEPT 06 / 3rd

Aerial Map

Detailed Location



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DESCRIPTION OR RECOVERY OF HORIZONTAL CONTROL STATION

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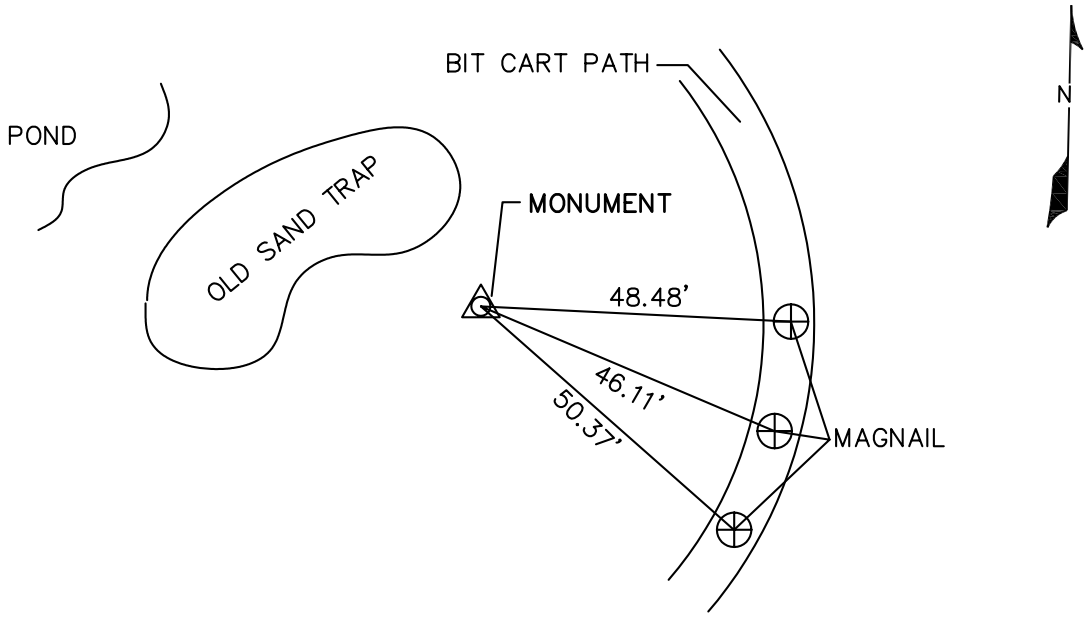
COUNTRY	TYPE OF MARK	STATION	ELEVATION (USFT) ~~(M)~~
U.S.A.	IRON ROD	CP 17	602.19
LOCALITY	**STAMPING ON MARK**	**AGENCY (CAST IN MARK)**	**DATUM**
MUNSTER, IN			NGVD 29
LATITUDE	**LONGITUDE**	**DATUM**	**ESTABLISHED BY (AGENCY)**
41°34'01.6807"N	87°28'33.1304"W	NAD 27	BLA
(NORTHING) ~~(EASTING)~~ (USFT) ~~(M)~~	**(EASTING) ~~(NORTHING)~~ (USFT) ~~(M)~~**	**GRID AND ZONE**	**DATE / ORDER**
1481649.299	392581.474	IN W	15 SEPT 06 / 3rd

Detailed Location



DA FORM 1 OCT 04 1959 MODIFIED 1 MAY 2005 BOLLINGER, LACH & ASSOCIATES

DESCRIPTION OR RECOVERY OF HORIZONTAL CONTROL STATION

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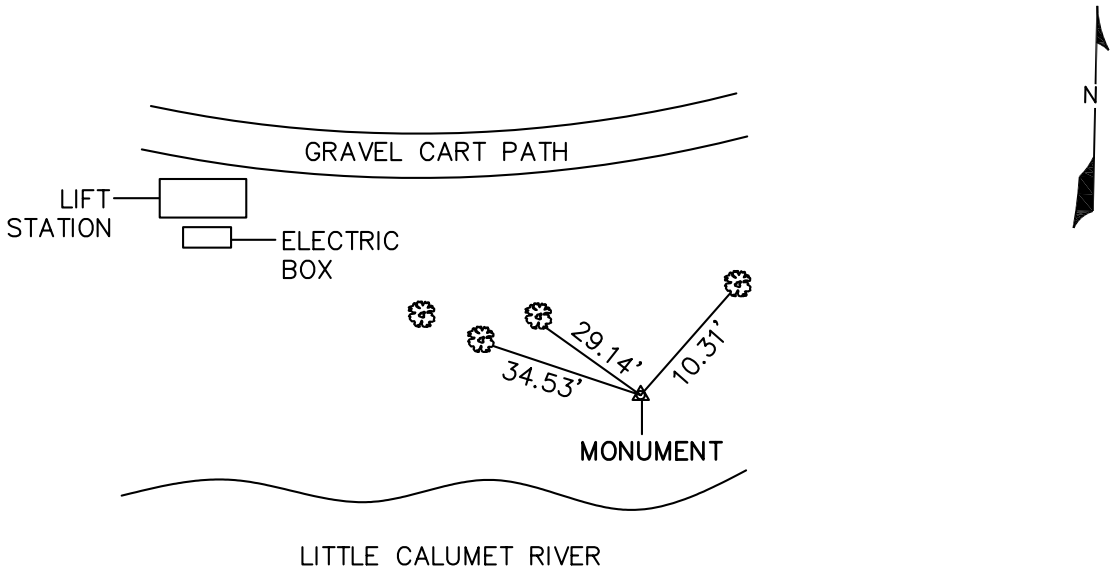
COUNTRY	TYPE OF MARK	STATION	ELEVATION (USFT) ~~(M)~~
U.S.A.	IRON ROD	CP 16	601.57
LOCALITY	**STAMPING ON MARK**	**AGENCY (CAST IN MARK)**	**DATUM**
MUNSTER, IN			NGVD 29
LATITUDE	**LONGITUDE**	**DATUM**	**ESTABLISHED BY (AGENCY)**
41°34'04.1869"N	87°28'43.8614"W	NAD 27	BLA
(NORTHING) ~~(EASTING)~~ (USFT) ~~(M)~~	**(EASTING) ~~(NORTHING)~~ (USFT) ~~(M)~~**	**GRID AND ZONE**	**DATE / ORDER**
1481906.677	391766.923	IN W	15 SEPT 06 / 3rd

Aerial Map

Detailed Location



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DESCRIPTION OR RECOVERY OF HORIZONTAL CONTROL STATION
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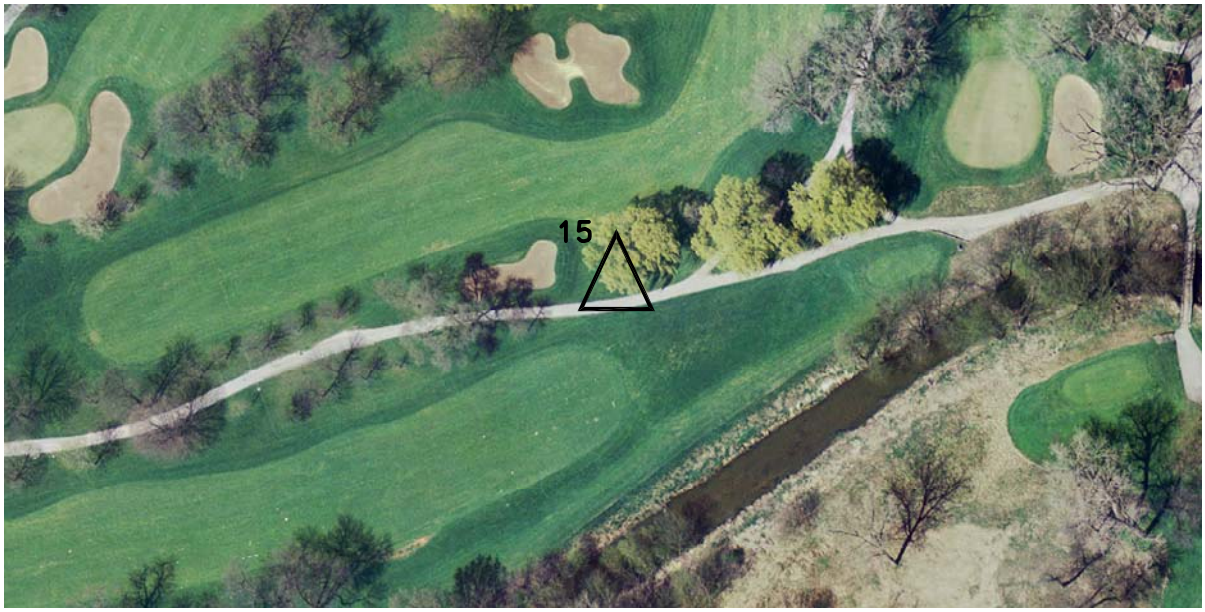
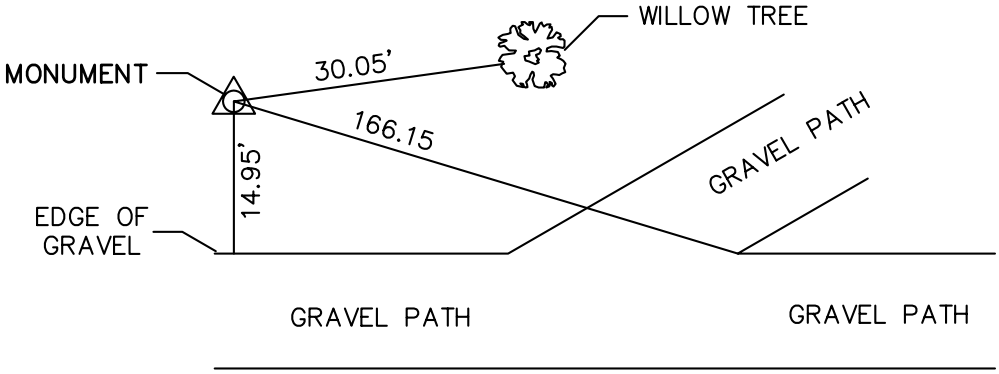
COUNTRY	TYPE OF MARK	STATION	ELEVATION (USFT) ~~(M)~~
U.S.A.	IRON ROD W/ SPACECO CAP	CP 15	594.11
LOCALITY	**STAMPING ON MARK**	**AGENCY (CAST IN MARK)**	**DATUM**
MUNSTER, IN			NGVD 29
LATITUDE	**LONGITUDE**	**DATUM**	**ESTABLISHED BY (AGENCY)**
41°34'03.1733"N	87°28'58.4389"W	NAD 27	BLA
(NORTHING) ~~(EASTING)~~ (USFT) ~~(M)~~	**(EASTING) ~~(NORTHING)~~ (USFT) ~~(M)~~**	**GRID AND ZONE**	**DATE / ORDER**
1481809.192	390658.349	IN W	15 SEPT 06 / 3rd

Aerial Map



Detailed Location



DA FORM 1 OCT 04 1959 MODIFIED 1 MAY 2005 BOLLINGER, LACH & ASSOCIATES

DESCRIPTION OR RECOVERY OF HORIZONTAL CONTROL STATION

For use of this form, see TM 5-237; the proponent agency is TRADOC.

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SUBSURFACE DRILLING AND SAMPLING INFORMATION

PART 1 GENERAL

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1.3 ADDITIONAL INFORMATION ON SUBSURFACE CONDITIONS

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

-- End of Section Table of Contents --

SECTION 00 31 32.13

SUBSURFACE DRILLING AND SAMPLING INFORMATION

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 on the Drawings, and the logs of those borings that fall within the area of this contract 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 A.

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. Little Calumet River Levee System - West Reach, Lake County, Indiana. Feature Design Memorandum 5. December 1991 (revised December 1992).

b. Subsurface Investigation Report. Prepared by STS Consultants, 2006.

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: Yuki Shinbori, 312-846-5458).

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

-- End of Section --

List of Borings

L-575
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OPL-3-95
OPL-4-95
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OPL-6-95
OPL-7-95

RD-1-95
RD-2-95
RD-3-95

Hole No. L-575

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 4¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1481380.2, E 389914.5	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B-57
4. HOLE NO. (As shown on drawing title and file number) L-575	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 10; UNDISTURBED 0
5. NAME OF DRILLER William Wallace	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 8-31-91; COMPLETED 8-31-91
7. THICKNESS OF OVERBURDEN 25.0	17. ELEVATION TOP OF HOLE 601.4
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 25.0	19. SIGNATURE OF INSPECTOR Jeffrey L. Doyle

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 of weathering, etc., if significant) g
601.1	0.3		Topsoil - 4"			
			Dark brown silt, little clay, little fine to coarse sand, medium dense, very low plasticity, damp, contains root fragments, fill ML	15/18"	SS- 1 1.0-2.5	6-6-8 wc = 18.7%
598.4	3.0		Gray silty clay, some fine to coarse sand, trace gravel very stiff, medium plasticity damp to moist, contains sand seam, fill CL	16/18"	SS- 2 3.5-5.0	5-10-8 qu* = 4.0 tsf wc = 17.5%
	5					
595.9	5.5		Dark gray clayey silt, little fine to coarse sand, trace gravel, stiff, low plasticity, damp to moist CL-ML	9/18"	SS- 3 6.0-7.5	4-6-7 No H.P. reading wc = 21.5%
593.4	8.0		Gray and brown silty clay, some fine to coarse sand, trace gravel, very stiff, medium plasticity, damp to moist CL	13/18"	SS- 4 8.5-10.0	4-6-11 qu* = 4.0 tsf wc = 17.4%
	10					
590.4	11.0		Gray silty clay, some fine to coarse sand, little gravel, very stiff, medium plasticity, damp CL	13/18"	SS- 5 11.0-12.5	4-9-12 qu* = 3.0 tsf wc = 16.5%
587.9	13.5		Gray silty clay, little fine to coarse sand, trace gravel, stiff to very stiff, medium plasticity, moist CL	16/18"	SS- 6 13.5-15.0	5-9-11 qu* = 3.0 tsf wc = 22.1%
	15					
			@ 16.0' - 17.5', iron-stained	16/18"	SS- 7 16.0-17.5	2-6-9 qu* = 2.0 tsf wc = 20.9%
				18/18"	SS- 8 18.5-20.0	3-7-9 qu* = 2.0 tsf wc = 21.7%

Hole No. L-575

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 2 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 4¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1481380.2, E 389914.5	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B-57
4. HOLE NO. (As shown on drawing title and file number) L-575	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 10; UNDISTURBED 0
5. NAME OF DRILLER William Wallace	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 8-31-91; COMPLETED 8-31-91
7. THICKNESS OF OVERBURDEN 25.0	17. ELEVATION TOP OF HOLE 601.4
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 25.0	19. SIGNATURE OF INSPECTOR Jeffrey L. Doyle

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 of weathering, etc., if significant) g
			Gray silty clay, little fine to coarse sand, trace gravel, stiff to very stiff, medium plasticity, moist CL	18/18"	SS-9 21.0-22.5	3-6-10 qu* = 2.0 tsf wc = 19.3%
				18/18"	SS-10 23.5-25.0	5-7-9 qu* = 2.0 tsf wc = 20.5%
576.4	25		End of boring at 25.0'			No water encountered while drilling. No water encountered immediately after drilling. No water encountered after 24 hours. Hole caved to 18.4'

Hole No. L-576

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 4¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1481512.5, E 390136.0	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B-57
4. HOLE NO. (As shown on drawing title and file number) L-576	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED 3
5. NAME OF DRILLER William Wallace	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 10-1-91; COMPLETED 10-1-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 594.5
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Jeffrey L. Snyder

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 of weathering, etc., if significant) g
594.2	0.3		Topsoil - 3.5"			
			Dark brown clayey silt, some fine to coarse sand, trace gravel, stiff to very stiff, low plasticity, moist, contains organic material, fill CL-ML	14/18"	SS-1 1.0-2.5	3-3-3 qu* = 2.0 tsf wc = 20.6%
591.5	3.0		@ 1.2' - 1.4', sand seam			
			Gray silt "and" fine sand, little clay, loose, low plasticity, wet, contains root fragments, iron-stained fill ML	14/18"	SS-2 3.5-5.0	1-3-3 wc = 30.5% Water at 3.5' while drilling.
	5					
588.5	6.0		Brown fine sand, trace silt, very loose, wet SP-SM	14/18"	SS-3 6.0-7.5	0-0-1 wc = 25.8%
			@ 8.5' - 11.0', dark gray, little silt, contains organic material and shell fragments	12/18"	SS-4 8.5-10.0	2-2-1 wc = 24.5% Gravel = 7% Sand = 79% Fines = 14% Sand heaved 3' into hollow stem augers
	10					
583.5	11.0		Gray silty clay, little fine to coarse sand, trace gravel, stiff, medium plasticity, moist CL	16/18"	SS-5 11.0-12.5	6-8-12 qu* = 1.5 tsf wc = 20.0%
				16/18"	SS-6 13.5-15.0	4-8-12 qu* = 1.5 tsf wc = 20.4% R-Test (3T-1): c = 0.31 tsf Ø = 22.9° γd = 110.4 pcf
	15					
			@ 16.0' - 17.5', some fine to coarse sand, little gravel	16/18"	SS-7 16.0-17.5	4-5-7 qu* = 1.5 tsf wc = 17.9% Q-Test (3T-2): wc = 16.2% c = 0.91 tsf Ø = 0.3° γd = 116.3 pcf LL = 34 PI = 18
			@ 18.5' - 19.3', "and" fine to coarse sand, little gravel	16/18"	SS-8AB 18.5-20.0	4-5-8 qu* = 1.5 tsf wc = 15.4% (SS-8A) wc = 20.3% (SS-8B)

Hole No. L-576

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 2 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 4¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1481512.5, E 390136.0	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B-57
4. HOLE NO. (As shown on drawing title and file number) L-576	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED 3
5. NAME OF DRILLER William Wallace	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 10-1-91; COMPLETED 10-1-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 594.5
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Jeffrey L. Snyder

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 of weathering, etc., if significant) g
			Gray silty clay, little fine to coarse sand, trace gravel, stiff to very stiff medium plasticity, moist, contains silt lenses CL	18/18"	SS-9 21.0-22.5	4-9-11 qu* = 2.0 tsf wc = 21.5%
			@ 23.5' - 25.0', some fine to coarse sand	18/18"	SS-10 23.5-25.0	5-8-11 qu* = 2.0 tsf wc = 21.9%
570.0	24.5					
	25		Gray clayey silt, some fine to coarse sand, trace gravel, very stiff, low plasticity, moist CL-ML	14/18"	SS-11 26.0-27.5	4-7-9 qu* = 2.5 tsf wc = 16.6%
567.0	27.5		Gray silty clay, little fine to coarse sand, trace gravel, very stiff, medium plasticity, moist CL	16/18"	SS-12 28.5-30.0	5-9-11 qu* = 2.5 tsf wc = 20.2%
564.5	30		End of boring at 30.0'			Water at 14.3' immediately after drilling. Water at 5.0' at 24 hours.
						A boring was drilled offset to obtain Shelby tubes 3T-1, 3T-2, and 3T-3 at 14.0' - 20.0' 3T-1 Recovery = 24/24" 3T-2 Recovery = 22/24" 3T-3 Recovery = 24/24"

Hole No. L-577

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT	Little Calumet River Levees - West Reach
2. LOCATION (Coordinates or Station)	N 1481334.4, E 390282.1
3. DRILLING AGENCY	Dodson-Lindblom Associates, Inc.
4. HOLE NO. (As shown on drawing title and file number)	L-577
5. NAME OF DRILLER	William Wallace
6. DIRECTION OF HOLE	☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	30.0
8. DEPTH DRILLED INTO ROCK	0.0
9. TOTAL DEPTH OF HOLE	30.0
10. SIZE AND TYPE OF BIT	4-¼" I.D. HSA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	NGVD
12. MANUFACTURER'S DESIGNATION OF DRILL	Mobile B-57
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 12 / UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	0
15. ELEVATION GROUND WATER	See remarks
16. DATE HOLE	STARTED 9-3-91 / COMPLETED 9-3-91
17. ELEVATION TOP OF HOLE	595.5
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	Jeff L. Snyder

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 of weathering, etc., if significant) g
595.2	0.3		Topsoil - 3"			
			Brown clayey silt, some fine to coarse sand, trace gravel, very stiff, low plasticity, damp, contains wood fragments, fill CL-ML	13/18"	SS- 1 1.0-2.5	4-9-10 qu*= 3.5 tsf wc = 13.6%
592.0	3.5					
			Light brown silt, trace fine to coarse sand, trace clay, medium dense, non-plastic, dry to damp, fill ML	15/18"	SS- 2 3.5-5.0	8-13-11 wc = 5.7%
	5.0					
590.0	5.5		Brown and gray silty clay, little fine to coarse sand, trace gravel, very stiff, medium plasticity, damp to moist CL	14/18"	SS- 3 6.0-7.5	3-8-10 qu* = 4.0 tsf wc = 20.3%
587.0	8.5					
			Gray silty clay, little fine to coarse sand, trace gravel, very stiff, medium plasticity, damp to moist CL	16/18"	SS- 4 8.5-10.0	2-7-6 qu* = 2.5 tsf wc = 19.1%
	10.0					
			@ 11.0-20.0, medium stiff to stiff, moist	18/18"	SS- 5 11.0-12.5	1-5-6 qu* = 1.0-2.0 tsf wc = 18.1%
				18/18"	SS- 6 13.5-15.0	2-4-6 qu* = 0.5-2.0 tsf wc = 20.8%
	15.0					
				18/18"	SS- 7 16.0-17.5	2-5-6 qu* = 1.0 tsf wc = 21.7%
				18/18"	SS- 8 18.5-20.0	2-6-8 qu* = 1.5 tsf wc = 20.3%

(TRANSLUCENT)

Hole No. L-577

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 2 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 4-1/4" I.D. HSA
2. LOCATION (Coordinates or Station) N 1481334.4, E 390282.1	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B-57
4. HOLE NO. (As shown on drawing title and file number) L-577	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED 0
5. NAME OF DRILLER William Wallace	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 9-3-91; COMPLETED 9-3-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 595.5
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Jeff L. Snyder

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 of weathering, etc., if significant) g
			Gray silty clay, little fine to coarse sand, trace gravel, stiff to very stiff, medium plasticity, moist CL	18/18"	SS-9 21.0-22.5	4-9-13 qu* = 1.5 tsf
571.7	23.8		Gray clayey silt, little fine to coarse sand, very stiff, low plasticity, damp to moist CL-ML	18/18"	SS-10AB 23.5-25.0	4-7-11 qu* = 2.0 tsf (10A) qu* = 3.0 tsf (10B) wc = 18.2% (SS-10A wc = 16.7% (SS-10B)
	25.0					
569.5	26.0		Gray silt, trace fine sand, dense to very dense, non-plastic, damp to moist ML	16/18"	SS-11 26.0-27.5	12-26-23 wc = 18.7%
				18/18"	SS-12 28.5-30.0	14-31-39 wc = 15.9%
565.5	30.0		End of boring at 30.0'.			No water encountered while drilling. No water encountered immediately after drilling. Water at 25.8' after 24 hours. Hole caved to 28.2'.

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - West Reach | HOLE NO. L-577

Hole No. L-578

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 4-¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1481763.2, E 390792.0	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B-57
4. HOLE NO. (As shown on drawing title and file number) L-578	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED --
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See Remarks
	16. DATE HOLE: STARTED 9-11-91; COMPLETED 9-11-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 597.0
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Robert C. Reese

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 of weathering, etc., if significant) g
596.7	0.3		Sandy topsoil - 4"			
			Gray clayey silt "and" fine to coarse sand, medium stiff, low plasticity, moist, fill CL-ML	12/18"	SS-1 1.0-2.5	1-2-4 qu* = 1.0 tsf wc = 18.1%
593.5	3.5		Brown and gray silty clay, some fine to coarse sand, trace gravel, very stiff, medium plasticity, moist CL	12/18"	SS-2 3.5-5.0	4-8-11 qu* = 3.0 tsf wc = 21.1%
	5.0		@ 6.0-7.5, stiff, little fine to coarse sand, iron-stained, contains silt seam	13/18"	SS-3 6.0-7.5	3-6-7 qu* = 2.0 tsf wc = 20.2%
588.5	8.5		Brown and gray silt, trace fine sand, trace clay, loose to medium dense, very low-plasticity, moist, contains clay lumps ML	12/18"	SS-4 8.5-10.0	3-4-6 wc = 22.1%
	10.0					
586.0	11.0		Gray silty clay, little fine to coarse sand, trace gravel, very stiff, medium plasticity, moist CL	18/18"	SS-5 11.0-12.5	8-9-14 qu* = 3.0 tsf wc = 18.8%
				18/18"	SS-6 13.5-15.0	9-9-12 qu* = 2.5 tsf wc = 18.6%
	15.0					
				13/18"	SS-7 16.0-17.5	2-6-7 qu* = 2.5 tsf wc = 19.7%
			@ 18.5-20.0, stiff to very stiff	16/18"	SS-8 18.5-20.0	2-5-8 qu* = 2.0-2.5 tsf wc = 20.0%

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

(TRANSLUCENT)

(TRANSLUCENT)

PROJECT Little Calumet River Levees - West Reach HOLE NO. L-578

Hole No. L-578

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 2 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 4-¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1481763.2, E 390792.0	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B-57
4. HOLE NO. (As shown on drawing title and file number) L-578	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED --
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See Remarks
	16. DATE HOLE: STARTED 9-11-91; COMPLETED 9-11-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 597.0
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Robert C. Rem

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 of weathering, etc., if significant) g
			Gray silty clay, little fine to coarse sand, trace gravel, very stiff, medium plasticity, moist CL	18/18"	SS- 9 21.0-22.5	7-11-14 qu* = 3.0 tsf wc = 18.9%
				18/18"	SS- 10 23.5-25.0	7-9-14 qu* = 3.0 tsf wc = 25.5%
	25			18/18"	SS- 11 26.0-27.1	6-8-11 qu* = 3.0 tsf wc = 24.5%
			@ 28.5-30.0, stiff to very stiff	16/18"	SS-12 28.5-30.0	8-9-13 qu* = 2.0 - 3.0 tsf wc = 22.9%
567.0	30		End of boring at 30.0'.			No water encountered while drilling. Water at 28.4' immediately after drilling. Water at 7.2' after 24 hours. Hole caved to 19.0'.

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - West Reach | HOLE NO. L-578

Hole No. L-579

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 4-¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1481355.1, E 390865.13	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B-57
4. HOLE NO. (As shown on drawing title and file number) L-579	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 10; UNDISTURBED 0
5. NAME OF DRILLER William Wallace	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 9-3-91; COMPLETED 9-3-91
7. THICKNESS OF OVERBURDEN 25.0	17. ELEVATION TOP OF HOLE 595.1
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 25.0	19. SIGNATURE OF INSPECTOR Jeffrey L. Snyder

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 of weathering, etc., if significant) g
594.8	0.3		Topsoil - 4"			
			Brown fine sand, little silt, very loose, damp, fill SM	10 / 18"	SS- 1 1.0-2.5	1-1-2 wc = 4.6%
			@ 3.5'-4.8'. loose	12 / 18"	SS- 2AB 3.5-5.0	3-3-5 No H.P. reading (SS-2B) wc = 3.2% (SS-2A) wc = 35.9% (SS-2B)
590.3	4.8					
	5.0		Dark gray and black organic clayey silt, some fine to coarse sand, stiff, low plasticity, moist OL			
589.1	6.0			14 / 18"	SS- 3 6.0-7.5	4-5-8 qu* = 2.5 tsf wc = 23.5%
588.1	7.0		Dark gray organic silty clay, some fine to coarse sand, trace gravel, very stiff, medium plasticity, damp to moist OL			
			Brown and gray silty clay, little fine to coarse sand, trace gravel, very stiff, medium plasticity, moist CL	14 / 18"	SS- 4 8.5-10.0	4-8-7 qu* = 2.5 tsf wc = 17.8%
	10.0					
584.6	10.5		Gray silty clay, little fine to coarse sand, trace gravel, stiff to very stiff medium plasticity, moist CL	10 / 18"	SS- 5 11.0-12.5	5-7-8 qu* = 2.0 tsf wc = 18.8%
				16 / 18"	SS- 6 13.5-15.0	3-6-9 qu* = 2.0 tsf wc = 20.1%
	15.0					
				16 / 18"	SS- 7 16.0-17.5	4-5-8 qu* = 1.5 tsf wc = 16.9%
				16 / 18"	SS- 8 18.5-20.0	3-8-9 qu* = 1.5 tsf wc = 19.5%
	20.0					

Hole No. L-579

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 2 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 4-¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1481355.1, E 390865.13	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B-57
4. HOLE NO. (As shown on drawing title and file number) L-579	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 10; UNDISTURBED 0
5. NAME OF DRILLER William Wallace	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 9-3-91; COMPLETED 9-3-91
7. THICKNESS OF OVERBURDEN 25.0	17. ELEVATION TOP OF HOLE 595.1
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 25.0	19. SIGNATURE OF INSPECTOR Jeff L. Smith

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 of weathering, etc., if significant) g
			Gray silty clay, little fine to coarse sand, trace gravel, stiff to very stiff, medium plasticity, moist CL	14/18"	SS- 9 21.0-22.5	3-9-12 qu* = 4.0 tsf wc = 18.8%
				15/18"	SS- 10 23.5-25.0	5-13-16 qu* = 3.5 tsf wc = 19.2%
570.1	25.0		End of boring at 25.0'.			No water encountered while drilling. No water encountered immediately after drilling. No water encountered after 24 hours. Hole caved to 21.2'.

Hole No. L-580

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 4¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1480825.2, E 391085.6	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B-57
4. HOLE NO. (As shown on drawing title and file number) L-580	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 10; UNDISTURBED 0
5. NAME OF DRILLER William Wallace	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 9-2-91; COMPLETED 9-2-91
7. THICKNESS OF OVERBURDEN 25.0	17. ELEVATION TOP OF HOLE 596.9
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 25.0	19. SIGNATURE OF INSPECTOR Jeffrey L. Snyder

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 of weathering, etc., if significant) g
596.6	0.3		Topsoil - 3"			
			Brown fine sand, trace silt, loose, dry to damp, fill SP-SM	14/18"	SS- 1 1.0-2.5	3-4-5 wc = 3.7%
593.9	3.0		Brown clayey silt, some fine to coarse sand, trace gravel hard, low to medium plasticity, damp, fill CL-ML	15/18"	SS- 2 3.5-5.0	6-10-11 qu* = 4.5 tsf wc = 12.1%
	5			16/18"	SS- 3 6.0-7.5	5-10-9 qu* = 4.5 tsf wc = 17.6%
588.9	8.0		Brown silty clay, some fine to coarse sand, trace gravel very stiff, medium plasticity, damp to moist CL	14/18"	SS- 4 8.5-10.0	2-8-11 qu* = 3.5 tsf wc = 17.4%
	10					
585.9	11.0		Gray silty clay, little fine to coarse sand, trace gravel very stiff, medium plasticity, moist CL	14/18"	SS- 5 11.0-12.5	2-7-8 qu* = 2.5 tsf wc = 18.8%
			@ 13.5' - 20.0', stiff to very stiff	16/18"	SS- 6 13.5-15.0	3-7-9 qu* = 2.0 tsf wc = 19.0%
	15			18/18"	SS- 7 16.0-17.5	2-5-7 qu* = 2.0 tsf wc = 20.0%
				18/18"	SS- 8 18.5-20.0	1-6-8 qu* - 2.0 tsf wc = 19.6%

(TRANSLUCENT)

Hole No. L-580

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 2 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 4¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1480825.2, E 391085.6	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B-57
4. HOLE NO. (As shown on drawing title and file number) L-580	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 10; UNDISTURBED 0
5. NAME OF DRILLER William Wallace	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 9-2-91; COMPLETED 9-2-91
7. THICKNESS OF OVERBURDEN 25.0	17. ELEVATION TOP OF HOLE 596.9
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 25.0	19. SIGNATURE OF INSPECTOR Jeff L. Snyder

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 of weathering, etc., if significant) g
			Gray silty clay, little fine to coarse sand, trace gravel, stiff to very stiff, medium plasticity, moist CL	18/18"	SS-9AB 21.0-22.5	6-21-44 qu* = 2.0 tsf Water at 21.8' while drilling. wc = 18.3% (SS-9A) wc = 22,5% (SS-9B)
575.1	21.8		Gray silt, trace fine sand, trace clay, very dense, very low plasticity, wet ML			
574.4	22.5		Gray silty clay, little fine to coarse sand, trace gravel, very stiff, medium plasticity, damp to moist, contains silt lenses and sand seams CL	16/18"	SS-10 23.5-25.0	15-21-16 qu* = 3.0 tsf wc = 15.7%
571.9	25		End of boring at 25.0'			No water encountered immediately after drilling. Water at 15.7' after 24 hours. Hole caved to 21.5'

Hole No. L-581

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT	Little Calumet River Levees - West Reach
2. LOCATION (Coordinates or Station)	N 1480297.7, E 391101.92
3. DRILLING AGENCY	Dodson-Lindblom Associates, Inc.
4. HOLE NO. (As shown on drawing title and file number)	L-581
5. NAME OF DRILLER	William Wallace
6. DIRECTION OF HOLE	☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	25.0
8. DEPTH DRILLED INTO ROCK	0.0
9. TOTAL DEPTH OF HOLE	25.0
10. SIZE AND TYPE OF BIT	4-1/4" I.D. HSA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	NGVD
12. MANUFACTURER'S DESIGNATION OF DRILL	Mobile B-57
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 10; UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	0
15. ELEVATION GROUND WATER	See remarks
16. DATE HOLE	STARTED 9-2-91; COMPLETED 9-2-91
17. ELEVATION TOP OF HOLE	597.4
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	Jeffrey L. Smyda

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 of weathering, etc., if significant) g
596.9	0.5		Topsoil - 6"			
			Brown fine sand, trace silt, loose, damp, fill SM	14/18"	SS- 1 1.0-2.5	4-5-5 wc = 2.9%
594.4	3.0		Brown clayey silt, little fine to coarse sand, very stiff, low plasticity, damp to moist, fill CL-ML	3/18"	SS- 2 3.5-5.0	6-11-9 No H.P. reading wc = 12.4%
	5.0					
591.9	5.5		Brown and gray silty clay, little fine to coarse sand, trace gravel, very stiff, medium plasticity, damp to moist, laminated, contains silt lenses and seams CL	14/18"	SS- 3 6.0-7.5	4-7-10 qu* = 4.0 tsf wc = 23.6%
588.9	8.5		Gray silty clay, little fine to coarse sand, trace gravel, stiff to very stiff, medium plasticity, moist CL @ 8.5-10.0', contains silt lenses	16/18"	SS- 4 8.5-10.0	2-6-7 qu* = 2.0 tsf wc = 21.4%
	10.0			12/18"	SS- 5 11.0-12.5	2-5-7 qu* = 2.0 tsf wc = 20.0%
				12/18"	SS- 6 13.5-15.0	3-7-9 qu* = 2.0 tsf wc = 9.7%
	15.0		@ 16.0-17.5', medium stiff to stiff	16/18"	SS- 7 16.0-17.5	2-4-5 qu* = 0.5 to 2.0 tsf wc = 21.6%
				15/18"	SS- 8 18.5-20.0	3-5-7 qu* = 1.5 tsf wc = 20.0%
	20.0					

(TRANSLUCENT)

Hole No. L-581

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 2 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 4-¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1480297.7, E 391101.92	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B-57
4. HOLE NO. (As shown on drawing title and file number) L-581	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 10; UNDISTURBED 0
5. NAME OF DRILLER William Wallace	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 9-2-91; COMPLETED 9-2-91
7. THICKNESS OF OVERBURDEN 25.0	17. ELEVATION TOP OF HOLE 597.4
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 25.0	19. SIGNATURE OF INSPECTOR Jeffrey L. Snyder

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 of weathering, etc., if significant) g
			Gray silty clay, little fine to coarse sand, trace gravel, stiff to very stiff, medium plasticity, moist CL	16/18"	SS- 9 21.0-22.5	3-6-9 qu* = 2.0 tsf wc = 19.5%
573.9	23.5		Gray clayey silt, little fine to coarse sand, very stiff, low plasticity, damp to moist CL-ML	16/18"	SS- 10 23.5-25.0	6-12-17 qu* = 4.0 tsf wc = 16.3%
572.4	25.0		End of boring at 25.0'.			No water encountered while drilling. No water encountered immediately after drilling. Water at 19.3 after 24 hours. Hole caved to 20.5'.

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - West Reach | HOLE NO. L-581

Hole No. L-582

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1480124.9, E 391219.44	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-582	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED 0
5. NAME OF DRILLER William Wallace	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 9-28-91; COMPLETED 9-28-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 597.3
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Jeffry L. Smyla

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 of weathering, etc., if significant) g
			Dark brown silt "and" fine sand, trace clay, loose, dry to damp, contains root fragments ML	10/18"	SS- 1 1.0-2.5	No topsoil 3-4-6 wc = 8.8%
593.8	3.5		Brown fine sand, some silt, trace clay, very loose, dry to damp, contains root fragments SM	14/18"	SS- 2 3.5-5.0	3-3-3 wc = 9.3%
	5		@ 6.0' - 7.5', brown and gray, wet	14/18"	SS- 3 6.0-7.5	Water at 6.0' while drilling. 2-3-4 wc = 21.8%
589.3	8.0		Brown and gray silt, little clay, trace fine sand, loose, moist to wet ML	14/18"	SS- 4AB 8.5-10.0	2-4-6 qu* = 2.0 tsf (SS-4B) wc = 21.9% (SS-4A) wc = 24.3% (SS-4B)
588.1	9.2		Gray silty clay, little fine to coarse sand, trace gravel, stiff to very stiff, medium plasticity, moist, laminated, iron-stained CL			
	10					
586.3	11.0		Gray silty clay, some fine to coarse sand, trace gravel, stiff to very stiff, medium plasticity, moist CL	15/18"	SS- 5 11.0-12.5	2-4-6 qu* = 2.0 tsf wc = 14.5% LL = 25 PI = 10
	15		@ 14.6' - 20.0', little fine to coarse sand	17/18"	SS- 6AB 13.5-15.0	3-4-6 qu* = 2.0 tsf wc = 17.9% (SS-6A) wc = 19.9% (SS-6B)
				18/18"	SS- 7 16.0-17.5	4-5-6 qu* = 2.0 tsf wc = 20.2%
				18/18"	SS- 8 18.5-20.0	4-5-7 qu* = 2.0 tsf wc = 14.7%

(TRANSLUCENT)
(TRANSLUCENT)

Hole No. L-582

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 2 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3¼" I.D. SHA
2. LOCATION (Coordinates or Station) N 1480124.9, E 391219.44	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-582	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED 0
5. NAME OF DRILLER William Wallace	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 9-28-91; COMPLETED 9-28-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 597.3
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Jeffrey L. Snyder

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 of weathering, etc., if significant) g
			Gray silty clay, little fine to coarse sand, trace gravel, stiff to very stiff, medium plasticity, moist CL			
575.8	21.5		Gray clayey silt, little fine to coarse sand, very stiff, low plasticity, moist, contains sand seams CL-ML	16/18"	SS-9AB 21.0-22.5	4-6-8 qu* = 2.0 tsf (SS-9A) qu* = 3.5 tsf (SS-9B) wc = 19.2% (SS-9A) wc = 17.9% (SS-9B)
				16/18"	SS-10 23.5-25.0	5-8-9 qu* = 3.0 tsf wc = 16.8%
	25					
571.8	25.5		Gray silt, trace fine sand, medium dense, non-plastic, moist to wet ML	15/18"	SS-11AB 26.0-27.5	13-15-11 qu* = 3.5 tsf (SS-11B) wc = 18.4% (SS-11A) wc = 14.9% (SS-11B)
570.3	27.0		Gray clayey silt, little fine to coarse sand, very stiff, low plasticity CL-ML			
568.8	28.5		Gray silt, trace fine sand, very dense, non-plastic, wet ML	14/18"	SS-12 28.5-30.0	16-30-26 wc = 20.0%
567.3	30		End of boring at 30.0'			Water at 18.6' immediately after drilling. Water at 7.8' after 24 hours. Hole caved to 14.8'

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - West Reach | HOLE NO. L-582

Hole No. L-583

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 4-¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1479865.3, E 391140.6	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B-57
4. HOLE NO. (As shown on drawing title and file number) L-583	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 10; UNDISTURBED 0
5. NAME OF DRILLER William Wallace	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 9-2-91; COMPLETED 9-2-91
7. THICKNESS OF OVERBURDEN 25.0	17. ELEVATION TOP OF HOLE 599.10
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 25.0	19. SIGNATURE OF INSPECTOR Jeffrey L. Snyder

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 of weathering, etc., if significant) g
598.8	0.3		Topsoil - 3"			
			Brown fine sand, trace silt, loose, damp, fill SP-SM	14/18"	SS-1 1.0-2.5	4-5-4 wc = 3.4%
596.1	3.0		Dark gray organic clayey silt, some fine to coarse sand, very stiff, low plasticity, moist, fill OL	8/18"	SS-2 3.5-5.0	4-9-9 No H.P. reading wc = 17.6%
	5.0					
593.1	6.0		Brown silt, trace fine to coarse sand, medium dense, very low plasticity, damp, contains clay lumps, fill ML	16/18"	SS-3 6.0-7.5	4-8-12 wc = 9.1%
591.1	8.0		Brown silty clay, little fine to coarse sand, very stiff, medium plasticity, moist CL	16/18"	SS-4 8.5-10.0	4-6-9 qu* = 3.0 tsf wc = 20.7%
	10.0					
588.1	11.0		Gray silty clay, little fine to coarse sand, trace gravel, very stiff, medium plasticity, damp to moist CL	18/18"	SS-5 11.0-12.5	4-7-10 qu* = 2.5 tsf wc = 17.1%
				13/18"	SS-6 13.5-15.0	3-8-11 qu* = 3.0 tsf wc = 18.8%
	15.0		@ 13.5-20.0, moist			
				18/18"	SS-7 16.0-17.5	4-8-11 qu* = 3.5 tsf wc = 19.3%
			@ 18.5-20.0', stiff to very stiff	18/18"	SS-8 18.5-20.0	2-7-8 qu* = 2.0 - 3.0 tsf wc = 19.6%
	20.0					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - WestReach HOLE NO. L-583

Hole No. L-583

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 2 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 4-¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1479865.3, E 391140.6	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B-57
4. HOLE NO. (As shown on drawing title and file number) L-583	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 10; UNDISTURBED 0
5. NAME OF DRILLER William Wallace	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 9-2-91; COMPLETED 9-2-91
7. THICKNESS OF OVERBURDEN 25.0	17. ELEVATION TOP OF HOLE 599.10
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 25.0	19. SIGNATURE OF INSPECTOR Jeff L. Smith

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 of weathering, etc., if significant) g
			Gray silty clay, little fine to coarse sand, trace gravel, very stiff, medium plasticity, moist CL	16/18"	SS-9 21.0-22.5	2-7-9 qu* = 2.5 tsf wc = 20.9%
				18/18"	SS-10 23.5-25.0	3-7-11 qu* = 3.0 tsf
574.1	25.0		End of boring at 25.0'.			No water encountered while drilling. No water encountered immediately after drilling. Water at 22.8 after 24 hours. Hole caved to 23.5'.

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - West Reach | HOLE NO. L-583

Hole No. L-584

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1479537.6, E 391104.0	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B-57
4. HOLE NO. (As shown on drawing title and file number) L-584	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 10; UNDISTURBED 0
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 9-22-91; COMPLETED 9-22-91
7. THICKNESS OF OVERBURDEN 25.0	17. ELEVATION TOP OF HOLE 600.1
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 25.0	19. SIGNATURE OF INSPECTOR [signature]

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 of weathering, etc., if significant) g
599.4	0.7		Asphalt concrete - 8"			
			Brown fine sand, little silt, loose to medium dense, damp, fill SP-SM	13/18"	SS-1 1.0-2.5	5-5-5 wc = 11.7%
597.1	3.0		Brown and gray clayey silt, trace fine sand, very stiff, low plasticity, moist, contains silt lenses CL-ML	12/18"	SS-2 3.5-5.0	3-5-5 qu* = 2.25 tsf wc = 20.5%
	5			16/18"	SS-3 6.0-7.5	17-15-12 qu* = 3.5 tsf wc = 20.7% Gravel = 1% Sand = 1% LL = 23 Fines = 98% PI = 5
592.1	8.0		Gray silty clay, trace fine to coarse sand, trace gravel, stiff, medium plasticity, moist, contains silt seams CL	14/18"	SS-4 8.5-10.0	4-5-8 qu* = 1.75 tsf wc = 24.2%
	10			18/18"	SS-5 11.0-12.5	4-7-10 qu* = 1.75 tsf wc = 20.7%
			@ 13.5' - 15.0', very stiff	16/18"	SS-6 13.5-15.0	5-8-9 qu* = 3.25 tsf wc = 18.6%
	15		@ 16.0' - 17.5', little fine to coarse sand	15/18"	SS-7 16.0-17.5	5-7-10 qu* = 1.75 tsf wc = 19.8%
			@ 18.5' - 20.0', very stiff	18/18"	SS-8 18.5-20.0	5-7-10 qu* = 2.25 tsf wc = 19.0%

(TRANSLUCENT)

Hole No. L-584

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1479537.6, E 391104.0	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B-57
4. HOLE NO. (As shown on drawing title and file number) L-584	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 10; UNDISTURBED 0
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 9-22-91; COMPLETED 9-22-91
7. THICKNESS OF OVERBURDEN 25.0	17. ELEVATION TOP OF HOLE 600.1
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 25.0	19. SIGNATURE OF INSPECTOR [signature]

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 of weathering, etc., if significant) g
			Gray silty clay, trace fine to coarse sand, trace gravel, stiff medium plasticity, moist, contains silt seams CL	18/18"	SS-9 21.0-22.5	5-7-13 qu* = 1.5 tsf wc = 19.8%
			@ 23.5' - 25.0', very stiff	18/18"	SS-10 23.5-25.0	6-9-15 qu* = 2.75 tsf wc = 18.0%
575.1	25		End of boring at 25.0'			No water encountered while drilling. No water encountered immediately after drilling. Boring was drilled in street and backfilled upon completion. No 24 hour water level measurement.

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - West Reach | HOLE NO. L-584

Hole No. L-585

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3-¼" I.D. H.S.A.
2. LOCATION (Coordinates or Station) N 1479327.2, E 391094.6	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B-57
4. HOLE NO. (As shown on drawing title and file number) L-585	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 10; UNDISTURBED 2
5. NAME OF DRILLER William Wallace	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See Remarks
	16. DATE HOLE: STARTED 9-26-91; COMPLETED 9-26-91
7. THICKNESS OF OVERBURDEN 25.0	17. ELEVATION TOP OF HOLE 601.1
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 25.0	19. SIGNATURE OF INSPECTOR Jeffrey L. Smyla

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 of weathering, etc., if significant) g
			Asphalt concrete - 2" Portland cement concrete-5" Aggregate base - 5"			
600.1	1.0		Black organic silt, "and" fine sand, medium stiff, very low plasticity, damp to moist OL	16/18"	SS-1AB 1.0-2.5	3/3/5 No H.P. reading (SS-1B) wc = 23.2% (SS-1A) wc = 19.2% (SS-1B)
599.3	1.8		Brown and gray silty clay, little fine to coarse sand, trace gravel, medium stiff to stiff, medium plasticity, moist CL	16/18"	SS-2 3.5-5.0	4/7/7 wc = 20.2%
598.1	3.0		Brown and gray silt, trace fine to coarse sand, little clay, medium dense, very low plasticity, damp ML			
	5.0		@ 5.0-8.0', brown	14/18"	SS-3 6.0-7.5	8/9/9 wc = 25.7%
593.1	8.0		Gray silty clay, trace fine to coarse sand, stiff, medium plasticity, moist CL	16/18"	SS-4 8.5-10.0	2/5/6 qu* = 1.5 tsf wc = 26.5%
	10.0		@ 11.0-12.5', contains silt lenses	17/18"	SS-5 11.0-12.5	2/5/7 qu* = 1.75 tsf wc = 26.2%
			@ 13.5-15.0', some fine to coarse sand, trace gravel	18/18"	SS-6 13.5-15.0	3/5/7 wc = 16.5% No H.P. reading wc = 18.3% (3T-2) Q - Test (3T-2): c = 1.23 tsf Ø = 0° γd = 113.3 pcf LL = 30 PI = 15
	15.0		@ 16.0-17.5', little fine to coarse sand, trace gravel	17/18"	SS-7 16.0-17.5	3/6/9 qu* = 1.5 tsf wc = 17.8%
			@ 18.0-20.0', very stiff	18/18"	SS-8 18.5-20.0	4/8/10 qu* = 2.25 tsf wc = 19.3%

Hole No. L-585

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 2 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3-¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1479327.2, E 391094.6	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B-57
4. HOLE NO. (As shown on drawing title and file number) L-585	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 10; UNDISTURBED 2
5. NAME OF DRILLER William Wallace	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See Remarks
	16. DATE HOLE: STARTED 9-26-91; COMPLETED 9-26-91
7. THICKNESS OF OVERBURDEN 25.0	17. ELEVATION TOP OF HOLE 601.1
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 25.0	19. SIGNATURE OF INSPECTOR Jeffrey L. Snyder

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 of weathering, etc., if significant) g
			Gray silty clay, trace fine to coarse sand, trace gravel very stiff, medium plasticity, moist CL			
				16/18"	SS- 9 21.0-22.5	4/8/12 qu* = 2.75 tsf wc = 19.1%
				18/18"	SS- 10 23.5-25.0	5/10/12 qu* = 2.5 tsf wc = 19.3%
576.1	25		End of boring at 25.0'.			No water encountered while drilling. No water encountered immediately after drilling. Boring was drilled in street and backfilled upon completion. No 24 hour water level measurement.

A boring was drilled offset to obtain Shelby tube 3T-1 at 8.5-10.5' and Shelby tube 3T-2 at 14.5-16.5'.
3T-1 Recovery=24/24"
3T-2 Recovery=24/24"

Attempts were made to obtain Shelby tube 3T-2 at 10.5-12.5' and 12.5-14.5' but these attempts resulted in low recoveries.

Hole No. L-586

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 4¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1479117.7, E 391127.7	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B-57
4. HOLE NO. (As shown on drawing title and file number) L-586	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 10; UNDISTURBED 0
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 9-22-91; COMPLETED 9-22-91
7. THICKNESS OF OVERBURDEN 25.0	17. ELEVATION TOP OF HOLE 602.7
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 25.0	19. SIGNATURE OF INSPECTOR Robert C. Reed

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 of weathering, etc., if significant) g
			Sandy topsoil - 10"			
601.8	0.9		Dark brown fine sand, "and" clayey silt, dense, damp, possible fill SM-SC	4/18"	SS- 1 1.0-2.5	5-14-17 wc = 14.0%
599.7	3.0		Brown and gray silty clay, little fine to coarse sand, trace gravel, hard, medium plasticity, damp CL-ML	15/18"	SS- 2 3.5-5.0	4-15-11 qu* = 4.5+ tsf wc = 18.0%
	5					
597.2	5.5		Brown and gray silt, little clay, trace fine sand, medium dense, very low plasticity, moist, contains silty clay seams ML	10/18"	SS- 3 6.0-7.5	4-10-12 wc = 22.0%
			@ 8.5' - 10.5', wet	14/18"	SS- 4 8.5-10.0	Water at 8.5' while drilling. 7-5-10 wc = 22.0%
	10					
592.2	10.5		Gray silty clay, trace fine sand, stiff, medium plasticity, moist, contains silt seams, laminated CL	16/18"	SS- 5 11.0-12.5	4-5-11 qu* = 1.5 tsf wc = 23.3% Gravel = 0% LL = 30 Sand = 0% PI = 13 Fines =100%
589.7	13.0		Gray silty clay, little to some fine to coarse sand, trace gravel, very stiff, medium plasticity, moist CL	18/18"	SS- 6 13.5-15.0	5-8-13 qu* = 2.5 tsf wc = 21.0%
	15					
				17/18"	SS- 7 16.0-17.5	4-5-7 qu* = 2.25 tsf wc = 19.0%
			@ 18.5' - 20.0', medium stiff to stiff	17/18"	SS- 8 18.5-20.0	5-7-9 qu* = 1.0 - 1.25 tsf wc = 20.0%

Hole No. L-586

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 2 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 4¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1479117.7, E 391127.7	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B-57
4. HOLE NO. (As shown on drawing title and file number) L-586	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 10; UNDISTURBED 0
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 9-22-91; COMPLETED 9-22-91
7. THICKNESS OF OVERBURDEN 25.0	17. ELEVATION TOP OF HOLE 602.7
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 25.0	19. SIGNATURE OF INSPECTOR [signature]

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 of weathering, etc., if significant) g
			Gray silty clay, little to some fine to coarse sand, trace gravel, very stiff, medium plasticity, moist CL			
				18/18"	SS-9 21.0-22.5	4-9-12 qu* = 2.75 tsf wc = 19.0%
				18/18"	SS-10 23.5-25.0	5-10-13 qu* = 2.25 tsf wc = 19.0%
577.7	25		End of boring at 25.0'			No water encountered immediately after drilling. Water at 6.0' after 24 hours. Hole caved to 8.0'

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - West Reach | HOLE NO. L-586

Hole No. L-587

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 1 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 4-¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1481047.3, E 391431.7	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B-57
4. HOLE NO. (As shown on drawing title and file number) L-587	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 8; UNDISTURBED 0
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 9-10-91; COMPLETED 9-10-91
7. THICKNESS OF OVERBURDEN 20.0	17. ELEVATION TOP OF HOLE 596.8
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 20.0	19. SIGNATURE OF INSPECTOR [signature]

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 of weathering, etc., if significant) g
			Asphalt 4" Concrete pad 7"			
595.9	0.9		Brown fine sand, little silt, trace gravel, loose, moist, fill SM	10/18"	SS-1 1.0-2.5	4-5-3 wc = 13.1% Gravel = 8% Sand = 84% Fines = 16%
593.3	3.5		Brown and gray silty clay, some fine to coarse sand, trace gravel, stiff to very stiff, medium plasticity, moist, fill CL	10/18"	SS-2 3.5-5.0	2-4-5 qu* = 2.0-2.5 tsf wc = 20.1%
	5.0					
591.3	5.5		Brown and gray silt, little fine sand, trace clay, medium dense, very low plasticity, moist, contains clay seams ML	15/18"	SS-3 6.0-7.5	6-5-6 wc = 22.4%
				8/18"	SS-4 8.5-10.0	4-5-7 wc = 22.6%
	10.0					
				17/18"	SS-5A,B 11.0-12.5	8-8-13 wc = 23.0% (SS-5A) wc = 19.6% (SS-5B)
584.4	12.4		Gray silty clay, little fine to coarse sand, trace gravel, stiff to very stiff, low plasticity, moist CL @ 12.4-13.5', contains silt seams @ 13.5-17.5', some fine to coarse sand	17/18"	SS-6A,B 13.5-15.0	5-7-9 qu* = 1.75 wc = 17.8%
	15.0					
				16/18"	SS-7 16.0-17.5	3-5-6 wc = 15.9% qu* = 1.5-3.0 tsf No water encountered while drilling. Water at 20.0 immediately after drilling. Boring was drilled through roadway and backfilled upon completion. No 24 hour water level measurement
				18/18"	SS-8 18.5-20.0	5-7-11 wc = 19.4% qu* = 2.0 tsf
			End of boring at 20.0'.			

Hole No. L-588

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 1 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 4¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1480232.7, E 391419.3	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B57
4. HOLE NO. (As shown on drawing title and file number) L-588	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 8; UNDISTURBED 0
5. NAME OF DRILLER	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 9-10-91; COMPLETED 9-10-91
7. THICKNESS OF OVERBURDEN 20.0	17. ELEVATION TOP OF HOLE 598.6
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 20.0	19. SIGNATURE OF INSPECTOR [signature]

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 of weathering, etc., if significant) g
			Asphalt - 3" Concrete - 6"			
597.8	0.8		Brown fine sand, trace silt, medium dense, damp, fill SP-SM	13/18"	SS- 1 1.0-2.5	1-3-9 wc = 11.2%
595.6	3.0		Brown clayey silt, little fine sand, very stiff, low plasticity, moist, contains roots CL-ML	9/18"	SS- 2 3.5-5.0	1-4-6 qu* = 2.5 tsf wc = 18.2%
	5					
592.6	6.0		Dark gray organic clayey silt, little fine sand, very stiff, low plasticity, moist OL	9/18"	SS- 3 6.0-7.5	3-5-20 qu* = 2.5 tsf wc = 18.2%
591.6	7.0		Brown silt, trace fine sand, trace clay, medium dense to dense, non-plastic, moist ML			
589.6	9.0		Gray silty clay, trace fine sand, very stiff, medium plasticity, moist CL	17/18"	SS- 4AB 8.5-10.0	7-7-8 qu* = 2.25 tsf (SS-4B) wc = 19.5% (SS-4A) wc = 23.3% (SS-4B)
	10					
588.1	10.5		Gray silty clay, little fine to coarse sand, trace gravel, stiff, medium plasticity, moist, contains sand seams CL	14/18"	SS- 5 11.0-12.5	4-5-6 qu* = 1.5 tsf wc = 16.6%
				15/18"	SS- 6 13.5-15.0	4-6-8 qu* = 1.0 - 1.25 tsf wc = 17.2% Gravel = 1% Sand = 19% Fines =80% LL = 31 PI = 15
	15					3-3-7 qu* = 1.5 tsf wc =16.8%
				13/18"	SS- 7 16.0-17.5	No water encountered while drilling. No water encountered immediately after drilling. Water at 15.1' after 24 hours. Hole caved to 17.2'
580.6	18.0		Gray silty clay, little fine to coarse sand, trace gravel, very stiff, medium plasticity, moist CL	14/18"	SS- 8 18.5-20.0	4-7-10 qu* = 2.5+ tsf wc = 19.9%
			End of boring at 20.0'			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - WestReach HOLE NO. L-588

Hole No. L-589

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3-¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1480129.5, E 391297.2	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B-57
4. HOLE NO. (As shown on drawing title and file number) L-589	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED 2
5. NAME OF DRILLER William Wallace	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 9-26-91; COMPLETED 9-26-91
7. THICKNESS OF OVERBURDEN 30.0'	17. ELEVATION TOP OF HOLE 598.7
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0'	19. SIGNATURE OF INSPECTOR Jeff L. Smyth

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 of weathering, etc., if significant) g
598.6	0.1		Topsoil - 1"			
			Light brown fine sand, some silt, loose, damp, fill SM	14/18"	SS-1 1.0-2.5'	6/4/4 wc = 4.5% Gravel = 0% Sand = 67% Fines = 33%
595.7	3.0		Brown and dark gray clayey silt, little fine to coarse sand, very stiff, low plasticity, damp, fill CL-ML	9/18"	SS-2 3.5-5.0	6/10/11 No H.P. reading wc = 18.8%
593.2	5.0 5.5		Light brown clayey silt, some fine sand, very stiff, low plasticity, moist, possible fill CL-ML	15/18"	SS-3 6.0-7.5	4/10/12 No H.P. reading wc = 15.5%
590.7	8.0		Brown silty clay, little fine to coarse sand, very stiff, medium plasticity, moist, possible fill CL	14/18"	SS-4 8.5-10.0	5/6/7 qu* = 2.25 tsf wc = 25.4%
587.0	10.0 11.7		Gray silty clay, some fine to coarse sand, trace gravel, stiff, medium plasticity, moist CL	14/18"	SS-5AB 11.0-12.5	3/6/7 qu* = 2.25 tsf (SS-5A) No H.P. reading (SS-5B) wc = 27.1% (SS-5A) wc = 16.6% (SS-5B)
				16/18"	SS-6 13.5-15.0	3/6/8 qu* = 1.75 tsf wc = 17.7% wc = 18.8% (3T-1) UC Test (3T-1): qu = 2.26 tsf γ_d = 112.8 pcf LL = 26 PI = 11
	15.0			16/18"	SS-7 16.0-17.5	2/4/7 qu* = 1.25 tsf wc = 21.0% wc = 16.1% (3T-2) Q-Test (3T-2): c = 0.66 tsf, Ø = 5.2% Gravel = 6% γ_d=117.1 pcf Sand = 16% Fines = 78%
			@ 18.0-20.0', little fine to coarse sand	17/18"	SS-8 18.5-20.0	2/5/7 qu* = 1.75 tsf wc = 17.4% wc = 16.1% (3T-2)

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - West Reach HOLE NO. L-589

Hole No. L-589

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 2 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3-¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1480129.5, E 391297.2	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B-57
4. HOLE NO. (As shown on drawing title and file number) L-589	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED 2
5. NAME OF DRILLER William Wallace	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 9-26-91; COMPLETED 9-26-91
7. THICKNESS OF OVERBURDEN 30.0'	17. ELEVATION TOP OF HOLE 598.7
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0'	19. SIGNATURE OF INSPECTOR Jeff L. Snyder

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 of weathering, etc., if significant) g
			Gray silty clay, little fine to coarse sand, trace gravel, stiff, medium plasticity, moist CL			
			@ 21.0-26.5', very stiff	16/18"	SS-9 21.0-22.5	4/8/11 qu* = 2.75 tsf wc = 19.2%
				16/18"	SS-10 23.5-25.0	3/6/10 qu* = 2.0 tsf wc = 19.2%
	25					
572.2	26.5		Gray silt, trace fine sand, non-plastic, medium dense, damp ML	16/18"	SS-11AB 26.0-27.0'	8/13/14 No H.P. reading (SS-11A) wc = 19.4% (SS-11A) wc = 15.7% (SS-11B)
570.7	28.0		Gray silty clay, little fine to coarse sand, very stiff, medium plasticity, moist, contains silt seams CL	17/18"	SS-12 28.5-30.0	5/7/7 qu* = 3.0 tsf wc = 18.6%
568.7	30		End of boring at 30.0'.			No water encountered while drilling. No water encountered immediately after drilling. Water at 27.5' after 24 hours. Hole caved to 27.8'. A boring was drilled offset to obtain Shelby tubes 3T-1 at 16.0'-18.0' and 3T-2 at 18.0'-20.0'. Recovery = 24/24" for both tubes.

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT Little Calumet River Levees - West Reach | HOLE NO. L-589

(TRANSLUCENT)

Hole No. L-590

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 4¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1479695.5, E 391290.1	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B57
4. HOLE NO. (As shown on drawing title and file number) L-590	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 10; UNDISTURBED -
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 9-10-91; COMPLETED 9-10-91
7. THICKNESS OF OVERBURDEN 25.0	17. ELEVATION TOP OF HOLE 600.1
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 25.0	19. SIGNATURE OF INSPECTOR Robert C. Pearson

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 of weathering, etc., if significant) g
			Asphalt - 4" Concrete - 6"			
599.3	0.8		Brown fine sand, trace silt, trace gravel, medium dense, damp, contains roots, possible fill SP-SM	12/18"	SS-1 1.0-2.5	4-6-6 wc = 4.9%
597.1	3.0		Brown silt, trace fine sand, medium dense, damp, contains roots, possible fill ML	10/18"	SS-2 3.5-5.0	6-9-11 wc = 10.7%
	5		@ 6.0' - 8.0', brown and gray, contains silty clay lenses	13/18"	SS-3 6.0-7.5	5-10-11 wc = 15.7%
592.1	8.0		Gray silty clay, trace fine sand, stiff, medium plasticity, moist CL	16/18"	SS-4 8.5-10.0	3-5-8 qu* = 1.75 tsf wc = 23.3%
	10					
589.6	10.5		Gray silty clay, some fine to coarse sand, trace gravel, very stiff to hard, medium plasticity, damp to moist CL	16/18"	SS-5 11.0-12.5	5-9-13 qu* = 4.5+ tsf wc = 15.3%
				17/18"	SS-6 13.5-15.0	4-8-9 qu* = 2.25 tsf wc = 13.8% Gravel = 1% LL = 23 Sand = 33% PI = 11 Fines = 66%
	15		@ 15.5' - 21.0', moist			
				6/18"	SS-7 16.0-17.5	10-10-15 No H.P. reading wc = 15.9%
			@ 18.5' - 21.0', stiff	18/18"	SS-8 18.5-22.0	4-5-7 qu* = 1.5 tsf wc = 18.0%

Hole No. L-590

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 2 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 4¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1479695.5, E 391290.1	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B57
4. HOLE NO. (As shown on drawing title and file number) L-590	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 10; UNDISTURBED -
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 9-10-91; COMPLETED 9-10-91
7. THICKNESS OF OVERBURDEN 25.0	17. ELEVATION TOP OF HOLE 600.1
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 25.0	19. SIGNATURE OF INSPECTOR Robert C. Reem

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 of weathering, etc., if significant) g
			Gray silty clay, some fine to coarse sand, trace gravel, stiff, medium plasticity, moist CL			
579.1	21.0		Gray silty clay, trace fine to coarse sand, trace gravel, very stiff, medium plasticity, moist CL	16/18"	SS-9 21.0-22.5	4-9-11 qu* = 2.5 tsf wc = 19.7%
				16/18"	SS-10 23.5-25.0	4-7-12 qu* = 2.25 tsf wc = 18.7%
575.1	25		End of boring at 25.0'			No water encountered while drilling. No water encountered immediately after drilling. No water encountered after 24 hours. Hole caved to 18.1'

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - West Reach | HOLE NO. L-590

Hole No. L-591

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 4¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1481837.8. E 391242.5	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B57
4. HOLE NO. (As shown on drawing title and file number) L-591	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED -
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 9-11-91; COMPLETED 9-11-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 598.7
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Robert C. Rear

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 of weathering, etc., if significant) g
598.4	0.3		Topsoil - 3"			
			Brown fine to coarse sand, some silt, trace gravel, medium dense, damp, fill SM	10/18"	SS- 1 1.0-2.5	5-6-7 wc = 6.7%
595.7	3.0		Brown and gray silty clay, some fine sand, medium dense, medium plasticity, moist, fill CL	12/18"	SS- 2 3.5-5.0	14-8-11 qu* = 1.25 tsf wc = 18.0%
	5					
593.2	5.5		Brown fine sand, trace silt, loose, moist, possible fill SP	7/18"	SS- 3 6.0-7.5	6-3-2 wc = 11.0%
590.2	8.5		Brown fine to coarse sand, "and" gravel, trace silt, medium dense, wet, possible fill SP-SM	10/18"	SS- 4 8.5-10.0	4-8-5 Water at 9.0' while drilling wc = 10.8% Gravel = 40% Sand = 53% Fines = 7%
	10					
588.2	10.5		Gray silty clay, little fine to coarse sand, trace gravel, stiff to very stiff, medium plasticity, moist, contains silt lenses CL	16/18"	SS- 5 11.0-12.5	5-8-11 qu* = 3.0 tsf wc = 19.7%
				15/18"	SS- 6 13.5-15.0	14-12-14 qu* = 1.5 tsf wc = 19.1%
	15					
				15/18"	SS- 7 16.0-17.5	6-8-10 qu* = 2.5 tsf wc = 17.2%
				18/18"	SS- 8 18.5-20.0	12-11-7 qu* = 2.0 tsf wc = 20.1%

Hole No. L-591

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 2 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 4¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1481837.8, E 391242.5	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B57
4. HOLE NO. (As shown on drawing title and file number) L-591	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED -
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☐ VERTICAL (X) ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 9-11-91; COMPLETED 9-11-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 598.7
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Robert C. Bruce

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 of weathering, etc., if significant) g
			Gray silty clay, little fine to coarse sand, trace gravel, stiff to very stiff, medium plasticity, moist CL	18/18"	SS-9 21.0-22.5	7-11-15 qu* = 3.0 tsf Water at 21.0' while drilling wc = 19.3%
574.7	24.0		Gray clayey silt, little fine sand, very stiff to hard, low plasticity, damp to moist CL-ML	12/18"	SS-10AB 23.5-25.0	4-7-27 qu* = 2.0 tsf (SS-10A) qu* = 4.5+ tsf (SS-10B wc = 19.7% (SS-10A) wc = 14.2% (SS-10B)
	25		@ 26.0' - 27.5', contains silt seams	10/18"	SS-11 26.0-27.5	37-51-46 qu* = 2.75 tsf wc = 20.0%
				16/18"	SS-12 28.5-30.0	13-33-36 qu* = 4.0 tsf wc = 17.3%
568.7	30		End of boring at 30.0'			Water at 11.8' immediately after drilling. Water at 8.4' after 24 hours. Hole caved to 13.3'

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - West Reach | HOLE NO. L-591

Hole No. L-592

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 1 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 4¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1481450.5, E 391593.9	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B57
4. HOLE NO. (As shown on drawing title and file number) L-592	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 8; UNDISTURBED 0
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 9-10-91; COMPLETED 9-10-91
	17. ELEVATION TOP OF HOLE 595.1
7. THICKNESS OF OVERBURDEN 20.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
8. DEPTH DRILLED INTO ROCK 0.0	19. SIGNATURE OF INSPECTOR Robert C. Ream
9. TOTAL DEPTH OF HOLE 20.0	

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 of weathering, etc., if significant) g
			Asphalt - 3" Concrete - 6"			
594.3	0.8		Brown fine sand, some silt, medium dense, damp, fill SM	12/18"	SS-1 1.0-2.5	3-5-9 wc = 6.9%
592.1	3.0		Brown clayey silt, some fine to medium sand, very stiff, low plasticity, moist, contains roots, fill CL-ML	10/18"	SS-2 3.5-5.0	5-4-7 qu* = 3.0 tsf wc = 16.4%
	5					
			@ 6.0' - 7.0', little fine sand	15/18"	SS-3AB 6.0-7.5	6-7-7 qu* = 1.8 tsf qu* = 0.5 - 0.75 tsf wc = 22.5% (SS-3A) wc = 29.4% (SS-3B)
588.1	7.0		Brown and gray silty clay, trace fine sand, medium stiff, medium plasticity, moist, contains roots and organic matter, possible fill CL	16/18"	SS-4AB 8.5-10.0	4-6-6 qu* = 0.5 - 0.75 tsf wc = 32.0% (SS-4A) wc = 22.8% (SS-4B)
	10					
584.6	10.5		Gray silty clay, trace fine sand, medium stiff, medium plasticity, moist CL	15/18"	SS-5 11.0-12.5	3-5-7 qu* = 0.75 - 1.0 tsf wc = 26.0%
582.1	13.0		Gray silty clay, some fine to coarse sand, medium stiff to stiff, medium plasticity, moist CL	18/18"	SS-6 13.5-15.0	5-5-7 qu* = 1.0 tsf wc = 17.8%
	15					4-6-7 wc = 16.9% qu* = 1.0 - 1.25 tsf No water encountered while drilling.
				14/18"	SS-7 16.0-17.5	No water encountered immediately after drilling. Water at 18.8' after 24 hours. Hole caved to 18.9'
577.1	18.0		Gray silty clay, trace fine to coarse sand, very stiff, medium plasticity, moist CL	13/18"	SS-8 18.5-20.0	4-5-9 qu* = 2.5 tsf wc = 19.5%
			End of boring at 20.0'			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - West Reach HOLE NO. L-592

Hole No. L-593

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 4¼" I.S. HSA
2. LOCATION (Coordinates or Station) N 1481828.4, E 391628.3	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B57
4. HOLE NO. (As shown on drawing title and file number) L-593	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED -
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 9-11-91; COMPLETED 9-11-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 597.6
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Robert C. Ferr

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 of weathering, etc., if significant) g
			Clayey topsoil - 8"			
596.9	0.7		Dark brown fine sand, little medium to coarse sand, trace gravel, trace silt, loose, damp, fill SP-SM	10/18"	SS- 1 1.0-2.5	3-3-4 wc = 6.7%
594.6	3.0		Brown and gray clayey silt, little fine sand, stiff, low plasticity, moist, contains roots and organic material, fill CL-ML	6/18"	SS- 2 3.5-5.0	3-4-5 qu* = 1.0 - 1.25 tsf wc = 28.4%
	5					
			@ 6.0'-8.0', very soft to soft	14/18"	SS- 3 6.0-7.5	1-1-1 qu* = 0.25 - 0.5 tsf wc = 30.3%
589.6	8.0		Dark gray organic silty clay, trace fine sand, very soft to soft, medium plasticity, moist OL	11/18"	SS- 4A,B 8.5-10.0	1-2-4 qu* = 0.25 tsf (SS-4A) qu* = 1.5 tsf (SS-4B) wc = 32.3% (SS-4A) wc = 23.0% (SS-4B)
588.6	9.0		Brown and gray clayey silt, trace fine sand, stiff, low plasticity, moist, contains silt lenses and roots CL-ML			
	10					
587.1	10.5		Brown and gray silt, little clay, trace fine sand, medium dense, very low plasticity, damp ML	18/18"	SS- 5 11.0-12.5	6-7-9 wc = 21.8%
584.6	13.0		Gray silty clay, some fine to medium sand, stiff, medium plasticity, moist, laminated CL	18/18"	SS- 6 13.5-15.0	3-5-6 qu* = 1.25 - 1.50 wc = 22.6%
	15					
			@ 16.0' - 23.0', stiff to very stiff	16/18"	SS- 7 16.0-17.5	3-5-8 qu* = 1.5 - 2.5 tsf wc = 19.1%
				15/18"	SS- 8 16.5-20.0	4-6-8 qu* = 1.75 tsf wc = 19.6%

Hole No. L-593

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 2 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 4 1/4" I.S. HSA
2. LOCATION (Coordinates or Station) N 1481828.4, E 391628.3	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B57
4. HOLE NO. (As shown on drawing title and file number) L-593	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED -
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 9-11-91; COMPLETED 9-11-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 597.6
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR [signature]

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 of weathering, etc., if significant) g
			Gray silty clay, some fine to coarse sand, stiff to very stiff, medium plasticity, moist CL	18/18"	SS-9 21.0-22.5	10-13-15 qu* = 2.5 tsf wc = 18.6%
574.6	23.0		Gray silt, trace fine sand, trace clay, dense to very dense, non-plastic, moist ML	4/4"	SS-10 23.5-23.8	50 wc = 19.2% Gravel = 0% Sand = 3% Fines = 97%
	25		@ 25.5' - 29.0', damp			
				10/12"	SS-11 26.0-27.0	30-65 wc = 15.9%
			@ 28.5' - 29.0', little clay	15/18"	SS-12A,B 28.5-30.0	11-12-15 qu* = 4.25 tsf (SS-12B)
568.6	29.0		Gray silty clay, some fine to coarse sand, trace gravel, hard, medium plasticity, moist CL			
567.6	30		End of boring at 30.0'			No water encountered while drilling. Water at 23.5' immediately after drilling. Water at 8.8' after 24 hours. Hole caved to 13.8'

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - West Reach | HOLE NO. L-593

Hole No. L-594

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 1 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 4¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1481448.5, E 391950.7	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B57
4. HOLE NO. (As shown on drawing title and file number) L-594	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 7; UNDISTURBED 1
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER see remarks
	16. DATE HOLE: STARTED 9-10-91; COMPLETED 9-10-91
7. THICKNESS OF OVERBURDEN 20.0	17. ELEVATION TOP OF HOLE 594.3
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 20.0	19. SIGNATURE OF INSPECTOR Robert C. Ryan

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 of weathering, etc., if significant) g
			Asphalt - 4" Concrete - 6"			
593.4	0.9		Gray and brown silty clay, little fine to coarse sand, trace gravel, hard, medium plasticity, damp, fill CL	7/18"	SS-1 1.0-2.5	6-7-11 qu* = 4.5+ tsf wc = 15.7%
591.3	3.0		Brown silt, trace fine to medium sand, trace clay, stiff to very stiff, low plasticity, damp, possible fill ML	11/18"	SS-2 3.5-5.0	7-12-10 wc = 11.1%
	5			12/18"	SS-3 6.0-7.5	4-10-16 wc = 14.0%
585.3	9.0		Gray silty clay, little fine to coarse sand, stiff, medium plasticity, moist CL	15/18"	SS-4AB 8.5-10.0	4-6-7 qu* = 1.75 tsf (SS-4B wc = 18.1% (ss-4A) wc = 18.6% (ss-4B)
	10					
583.5	10.8		Brown silt, trace fine sand, medium dense, damp ML	12/18"	SS5AB 11.0-12.5	7-11-17 qu* = 4.5+ tsf wc = 15.2% (ss-5A) gravel = 0% sand = 4% fines = 96% wc = 19.5 (SS-5B)
582.8	11.5		Gray silty clay, some fine to coarse sand, trace gravel, hard, medium plasticity, moist CL			
581.3	13.0		Gray silty clay, little fine to coarse sand, trace gravel very stiff, medium plasticity, moist CL	16/18"	SS-6 13.5-15.0	6-7-11 qu* = 2.5 tsf wc = 19.0%
	15			24/24"	3T-1 15.0-17.0	UC Test: qu=1.74 tsf γd=110.3pcf LL=36 PI=20 wc=19.6% No water encountered while drilling. No water encountered immediately after drilling. Water at 15.1' after 24 hours. Hole caved to 17.2'.
					-	
				15/18"	SS-7 18.5-20.0	5-8-12 qu* = 2.75 tsf wc = 18.7%
574.3	20		End of boring at 20.0'			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - WestReach | HOLE NO. L-594

Hole No. L-595

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 4¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482119.39, E 392064.9	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B57
4. HOLE NO. (As shown on drawing title and file number) L-595	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN — DISTURBED 12 — UNDISTURBED -
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER see remarks
	16. DATE HOLE — STARTED 9-11-91 — COMPLETED 9-11-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 600.4
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR [signature]

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 of weathering, etc., if significant) g
			Topsoil - 8"			
599.7	0.7		Brown fine to coarse sand, some silt, little gravel, medium dense, damp, fill SM	15/18"	SS- 1 1.0-2.5	4-5-7 wc = 9.7%
597.4	3.0		Brown fine sand, some silt, loose, moist, possible fill SM	12/18"	SS- 2 3.5-5.0	4-5-4 wc = 15.3%
	5			16/18"	SS- 3 6.0-7.5	2-2-4 wc = 19.6%
				0/18"	SS- 4 8.5-10.0	2-2-3 No recovery from 8.5' - 10.0'
	10					
589.9	10.5		Gray organic clayey silt, some fine sand, very soft, moist to wet, contains roots and shells OL	15/18"	SS- 5 11.0-12.5	1-0-1 qu* = 0.0 - 0.25 tsf wc = 31.5%
587.4	13.0		Gray and brown silty clay, little fine to coarse sand, trace gravel, hard, medium plasticity CL	18/18"	SS- 6 13.5-15.0	7-8-12 qu* = 4.5+ tsf wc = 18.4%
	15					
584.9	15.5		Gray silty clay, little fine to coarse sand, very stiff, medium plasticity, moist CL	14/18"	SS- 7 16.0-17.5	5-8-11 qu* = 2.00 - 2.50 tsf wc = 21.1%
				18/18"	SS- 8 18.5-20.0	6-9-11 qu* = 2.75 tsf wc = 19.4%

Hole No. L-595

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 2 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 4¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482119.39, E 392064.9	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B57
4. HOLE NO. (As shown on drawing title and file number) L-595	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED -
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER see remarks
	16. DATE HOLE: STARTED 9-11-91; COMPLETED 9-11-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 600.4
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Robert C. Ryan

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 of weathering, etc., if significant) g
			Gray silty clay, little fine to coarse sand, very stiff, medium plasticity, moist CL	18/18"	SS-9 21.0-22.5	6-8-9 qu* = 2.0 - 2.25 tsf wc = 19.9%
				16/18"	SS-10 23.5-25.0	6-9-14 qu* = 2.5 tsf wc = 18.0%
	25		@ 25.5' - 30.0', contains silt lenses			
				17/18"	SS-11 26.0-27.5	5-10-15 qu* = 3.0 tsf wc = 17.7%
				17/18"	SS-12 28.5-30.0	8-10-19 qu* = 3.5 tsf wc = 16.7%
570.4	30		End of boring at 30.0'			No water encountered while drilling. No water encountered immediately after drilling. Water at 10.0' after 24 hours. Hole caved to 13.5'

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - West Reach | HOLE NO. L-595

Hole No. L-596

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 1 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 4¼" I.D. SHA
2. LOCATION (Coordinates or Station) N 1481442.5, E 392484.2	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B57
4. HOLE NO. (As shown on drawing title and file number) L-596	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 8; UNDISTURBED -
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER see remarks
	16. DATE HOLE: STARTED 9-10-91; COMPLETED 9-10-91
7. THICKNESS OF OVERBURDEN 20.0	17. ELEVATION TOP OF HOLE 593.8
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 20.0	19. SIGNATURE OF INSPECTOR Robert C. Perry

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 of weathering, etc., if significant) g
			Asphalt - 4" Concrete pad - 6"			
592.9	0.9		Gray silty clay, some fine to coarse sand, trace gravel, very stiff to hard, medium plasticity, damp, contains root fragments, fill CL	9/18"	SS-1 1.0-2.5	3-6-6 qu* = 4.5 tsf wc =14.5%
			@ 3.5' - 5.0', contains silt lenses	8/18"	SS-2 3.5-5.0	3-7-8 qu* = 4.0 tsf wc =17.5%
	5					
587.8	6.0		Gray clayey silt, little fine to coarse sand, trace gravel, stiff to very stiff, low plasticity, damp to moist, contains clay lenses and root fragments CL-ML	15/18"	SS-3 6.0-7.5	5-6-8 qu* = 2.0 tsf wc =19.7%
585.3	8.5		Gray silt, little fine to coarse sand, trace clay, medium dense, very low plasticity, moist, contains clay seams ML	15/18"	SS-4 8.5-10.0	4-6-8 wc = 19.3%
	10					
582.8	11.0		Gray silty clay, little fine to coarse sand, trace gravel, stiff to very stiff, medium plasticity, moist CL	15/18"	SS-5 11.0-12.5	8-9-10 qu* = 2.0 - 2.5 tsf wc =20.4%
			@ 11.0' - 12.5', contains silt seams			
			@ 13.5' - 17.5', some fine to coarse sand	18/18"	SS-6 13.5-15.0	4-7-8 qu* = 1.5 - 2.0 tsf wc =18.1%
	15					3-7-8 qu* = 1.5 - 2.0 tsf (SS-7) wc =13.8%
						No water encountered while drilling.
				15/18"	SS-7 16.0-17.5	No water encountered immediately after drilling.
						Boring was drilled through roadway and backfilled upon completion.
				15/18"	SS-8 18.5-20.0	No 24 hour water level measurement. 2-4-6 qu* = 1.5 tsf wc =21.0%
573.8	20		End of boring at 20.0'			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - WestReach | HOLE NO. L-596

Hole No. L-597

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 3 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 4-¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482120.0, E 392602.6	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B-57
4. HOLE NO. (As shown on drawing title and file number) L-597	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 9-25-91; UNDISTURBED 9-25-91
5. NAME OF DRILLER William Wallace	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 9-25-91; COMPLETED 9-25-91
7. THICKNESS OF OVERBURDEN 40.0'	17. ELEVATION TOP OF HOLE 600.6
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 40.0'	19. SIGNATURE OF INSPECTOR Jeff L. Snyder

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 of weathering, etc., if significant) g
600.2	0.4		Topsoil = 5"			
			Dark brown fine to coarse sand, some to "and" silt, little gravel, loose to medium dense, damp, contains wood fragments and roots, fill SM	8/18"	SS-1 1.0-2.5	6/5/7 wc = 10.0%
				8/18"	SS-2 3.5-5.0	2/2/6 wc = 22.2%
	5.0					
				14/18"	SS-3 6.0-7.5	6/8/10 wc = 14.2%
			@ 8.5-10.0', contains asphalt fragments			
				10/18"	SS-4 8.5-10.0	4/8/7 wc = 14.8%
	10.0					
590.1	10.5		Brown and gray clayey silt, some fine to coarse sand, soft to medium stiff, low plasticity, moist, possible fill CL-ML	13/18"	SS-5 11.0-12.5	1/1/1 qu* = 0.5 tsf wc = 34.6%
587.6	13.0		Gray silty clay, trace fine sand, stiff to very stiff, medium plasticity, moist, contains silt seams CL	14/18"	SS-6 13.5-15.0	3/3/4 qu* = 1.5 tsf wc = 26.7%
	15.0					
				15/18"	SS-7 16.0-17.5	3/5/7 qu* = 2.0 tsf wc = 20.1%
582.6	18.0		Gray silty clay, some fine to coarse sand, trace gravel, stiff to very stiff, medium plasticity, moist CL	16/18"	SS-8 18.5-20.0	2/5/7 qu* = 2.25 tsf wc = 14.4%

(TRANSLUCENT)

Hole No. L-597

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 2 OF 3 SHEETS

1. PROJECT	Little Calumet River Levees - West Reach
2. LOCATION (Coordinates or Station)	N 1482120.0, E 392602.6
3. DRILLING AGENCY	Dodson-Lindblom Associates, Inc.
4. HOLE NO. (As shown on drawing title and file number)	L-597
5. NAME OF DRILLER	William Wallace
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	40.0
8. DEPTH DRILLED INTO ROCK	0.0
9. TOTAL DEPTH OF HOLE	40.0
10. SIZE AND TYPE OF BIT	4-¼" I.D. HSA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	NGVD
12. MANUFACTURER'S DESIGNATION OF DRILL	Mobile B-57
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 16 / UNDISTURBED 2
14. TOTAL NUMBER CORE BOXES	0
15. ELEVATION GROUND WATER	See remarks
16. DATE HOLE	STARTED 9-25-91 / COMPLETED 9-25-91
17. ELEVATION TOP OF HOLE	600.6
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	Jeff L. Smyth

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 of weathering, etc., if significant) g
			Gray silty clay, little fine to coarse sand, trace gravel, stiff to very stiff, medium plasticity, moist CL	15/18"	SS-9 21.0-22.5	3/6/7 qu* = 1.25 tsf wc = 19.7% wc = 18.1% (3T-1) Q-Test (3T-1) c = 0.99 tsf, Ø = 6.4° Gravel = 1% d = 113.5 pcf Sand = 10% LL = 33 Fines = 89% PI = 17
				16/18"	SS-10 23.5-25.0	3-7-9 qu* = 2.0 tsf wc = 19.7%
	25					
575.1	25.5					
				16/18"	SS-11 26.0-27.5	3/7/8 qu* = 2.0 tsf wc = 19.6%
			@ 28.5-32.0', contains silt seams			
				17/18"	SS-12 28.5-30.0	4/9/14 qu* = 2.5 tsf wc = 18.0%
	30					
				18/18"	SS-13AB 31.0-32.5	14/25/30 No H.P. reading (SS-13A) Water at 32.0' while drilling. wc = 15.8% (SS-13A)
568.6	32.0		Gray silt, little fine sand, very dense, non-plastic, wet ML			
567.6	33.0		Gray silty clay, little fine to coarse sand, hard, medium plasticity, damp to moist, contains silt seams CL			
566.5	34.1			16/18"	SS-14AB 33.5-35.0	9/27/50 qu* = 4.5+ tsf (SS-14A) No H.P. reading wc = 21.7% (SS-14A) wc = 13.6% (SS-14B)
	35		Gray clayey silt, trace fine sand, hard, low plasticity, damp, contains silt lenses CL-ML			
				16/18"	SS-15 36.0-37.5	13/23/25 qu* = 4.5+ tsf wc = 15.9%
562.6	38.0		Gray silt, trace fine sand, trace clay, very dense, non-plastic, damp ML	16/18"	SS-16 38.5-40.0	19/42/44 wc = 14.8%
560.6			End of boring at 40.0'.			See next page for notes

Hole No. L-597

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 3 OF 3 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 4-¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482120.0, E 392602.6	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B-57
4. HOLE NO. (As shown on drawing title and file number) L-597	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 16; UNDISTURBED 2
5. NAME OF DRILLER William Wallace	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 9-25-91; COMPLETED 9-25-91
7. THICKNESS OF OVERBURDEN 40.0'	17. ELEVATION TOP OF HOLE 600.6
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 40.0'	19. SIGNATURE OF INSPECTOR Jeffrey L. Smyth

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 of weathering, etc., if significant) g
			End of boring at 40.0'.			No water encountered immediately after drilling. Water at 19.5' after 24 hours. Hole caved to 27.4'. A boring was drilled offset 5.0' to obtain Shelby tubes 3T-1 and 3T-2 at 21.0' and 25.0'. 3T-1 Recovery = 24/24" 3T-3 Recovery = 24/24"

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - West Reach | HOLE NO. L-597

Hole No. L-598

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 3 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3-¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1481980.9, E 392610.7	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-598	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 16; UNDISTURBED 1
5. NAME OF DRILLER William Wallace	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See Remarks
	16. DATE HOLE: STARTED 9-30-91; COMPLETED 9-30-91
7. THICKNESS OF OVERBURDEN 40.0'	17. ELEVATION TOP OF HOLE 600.8
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 40.0'	19. SIGNATURE OF INSPECTOR Jeff L. Snyder

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 of weathering, etc., if significant) g
			Brown and gray silty clay, little fine to coarse sand, trace gravel, hard, medium plasticity, damp, fill CL	10/18"	SS-1 1.0-2.5'	4/4/5 qu* = 4.5+ tsf wc = 13.3%
597.8	3.0		Brown gravel, trace silt, little fine to coarse sand, very loose, damp, fill GP	10/18"	SS-2 3.5-5.0'	2/2/1 wc = 0.6%
595.3	5.0 / 5.5		Dark gray fine to coarse sand, little gravel, little silt, very loose, damp, fill SM	10/18"	SS-3 6.0-7.5'	1/2/1 wc = 13.5% Gravel = 18% Sand = 66% Fines = 16%
592.8	8.0		Dark gray silty clay, little fine to coarse sand, medium stiff, medium plasticity, moist, contains organic material CL	12/18"	SS-4 8.5-10.0'	2/1/1 qu* = 0.75 tsf wc = 33.7%
590.3	10.0 / 10.5		Black and gray organic silty clay, little fine to coarse sand, soft to very soft, medium plasticity, moist, contains shells OL	18/18"	SS-5 11.0-12.5'	Water at 11.0' while drilling. 1/0/1 qu* = 0.25 tsf wc = 38.4%
				13/18"	SS-6 13.5-15.0'	1/0/1 qu* = 0.25 tsf wc = 49.5%
585.3	15.0 / 15.5		Gray silty clay, trace fine sand, medium stiff to stiff, medium plasticity moist CL	18/18"	SS-7 16.0-17.5'	3/3/4 qu* = 1.0 tsf wc = 24.4% wc = 24.2% ((3T-1) UC Test (3T-1) qu = 1.16 tsf LL = 33 γd = 103.3 pcf PI = 17 Consolidation Test (3T-1): C_c = 0.30 e_o = 0.6777
				18/18"	SS-8 18.5-20.0	3/3/3 qu* = 0.5 tsf wc = 23.0%

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - West Reach HOLE NO. L-598

Hole No. L-598

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 2 OF 3 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3-¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1481980.9, E 392610.7	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-598	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 16; UNDISTURBED 1
5. NAME OF DRILLER William Wallace	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See Remarks
	16. DATE HOLE: STARTED 9-30-91; COMPLETED 9-30-91
7. THICKNESS OF OVERBURDEN 40.0'	17. ELEVATION TOP OF HOLE 600.8
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 40.0'	19. SIGNATURE OF INSPECTOR Jeffry L. Snyder

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 of weathering, etc., if significant) g
			Gray silty clay CL			
580.3	20.5		Dark gray silty clay, some fine to coarse sand, trace gravel, stiff, medium plasticity, moist CL	18/18"	SS-9 21.0-22.5'	3/4/6 qu* = 1.5 tsf wc = 17.4%
				18/18"	SS-10AB 23.5-25.0	3/4/6 qu* = 1.5 tsf (SS-10A) qu* = 2.5 tsf (SS-10B) wc = 17.9% (SS-10A) wc = 18.1% (SS-10B)
576.3	24.5		Gray silty clay, little fine to coarse sand, trace gravel, very stiff, medium plasticity, moist CL			
	25.0		@ 26.0-27.5', stiff to very stiff	18/18"	SS-11 26.0-27.5'	4/4/6 qu* = 2.0 tsf wc = 19.9%
				18/18"	SS-12 28.5-30.0'	4/6/8 qu* = 2.5 tsf wc = 19.6%
	30.0					
570.3	30.5		Gray silt, trace fine sand, trace clay, very dense, non plastic, moist ML	14/18"	SS-13 31.0-32.5'	19/30/35 wc = 19.3%
			@ 33.5-35.5', medium dense, contains silty clay lenses	15/18"	SS-14 33.5-35.0'	15/13/12 wc = 19.6%
565.3	35.5		Gray silty clay, little fine to coarse sand, trace gravel, hard, medium plasticity, moist CL			
564.3	36.5		Gray silt, trace fine sand, little clay, medium dense, very low plasticity damp to moist ML	16/18"	SS-15AB 36.0-37.5'	5/12/16 qu* = 4.5+ tsf (SS-15A) wc = 16.8% (SS-15A wc = 14.6% (SS-15B)
562.8	38.0					
560.8	40.0		Gray silty clay, little fine to coarse sand, trace gravel, very stiff, medium plasticity, moist CL	15/18"	SS-16 38.5-40.0	3/6/8 wc = 18.2% qu* = 3.5 tsf See next page for remarks.

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - WestReach HOLE NO. L-598

Hole No. L-598

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 3 OF 3 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3-¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1481980.9, E 392610.7	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-598	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 16; UNDISTURBED 1
5. NAME OF DRILLER William Wallace	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See Remarks
	16. DATE HOLE: STARTED 9-30-91; COMPLETED 9-30-91
7. THICKNESS OF OVERBURDEN 40.0'	17. ELEVATION TOP OF HOLE 600.8
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 40.0'	19. SIGNATURE OF INSPECTOR Jeffry L. Snyder

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 of weathering, etc., if significant) g
			End of boring at 40.0'.			Water at 13.5' immediately after drilling. Water at 10.2' after 24 hours. Hole caved to 17.1'. A boring was drilled offset 5.0' to obtain Shelby tube 3T-1 at 17.0-19.0'. Recovery = 21.5/24" Attempts were made to obtain Shelby tube 3T-1 at 11.0-13.0', 13.0-15.0', and 15.0-17.0' but these attempts resulted in low recoveries.

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - WestReach HOLE NO. L-598

Hole No. L-599

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 4-¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482309.0, E 392824.6	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B-57
4. HOLE NO. (As shown on drawing title and file number) L-599	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 10; UNDISTURBED 0
5. NAME OF DRILLER William Wallace	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 8-28-91; COMPLETED 8-28-91
7. THICKNESS OF OVERBURDEN 25.0	17. ELEVATION TOP OF HOLE 595.60
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 25.0	19. SIGNATURE OF INSPECTOR Robert C. Pearn

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 of weathering, etc., if significant) g
595.1	0.5		Sandy Topsoil - 6"			
			Dark gray clayey silt, some fine to coarse sand, trace gravel, hard, low plasticity, damp, contains root fragments, fill CL-ML	6/18"	SS-1 1.0-2.5	9-9-9 qu* = 4.5 tsf wc = 18.6%
592.1	3.5		Dark gray organic silty clay, little fine to coarse sand, stiff to very stiff, high plasticity, moist, contains root fragments OH	6/18"	SS-2 3.5-5.0	4-6-6 qu* = 2.0 tsf wc = 26.5%
	5.0					
589.6	6.0		Brown and gray silty clay, little fine to coarse sand, trace gravel, stiff to very stiff, medium plasticity, moist CL	7/18"	SS-3 6.0-7.5	2-4-6 qu* = 2.0 tsf wc = 23.7%
				10/18"	SS-4 8.5-10.0	2-5-6 qu* = 1.5 - 2.5 tsf wc = 23.3%
	10.0					
584.6	11.0		Gray silty clay, little fine to coarse sand, trace gravel, medium stiff to stiff, medium plasticity, moist CL	11/18"	SS-5 11.0-12.5	3-5-7 qu* = 1.0 tsf wc = 23.1%
582.1	13.5		Gray silt, little clay, trace fine sand, medium dense, damp to moist ML	13/18"	SS-6 13.5-15.0	2-5-7 wc = 20.5% Gravel = 0% Sand = 0% Fines =100%
	15.0		@ 16.0-17.5', contains clay lumps			
				16/18"	SS-7 16.0-17.5	2-4-8 wc = 21.9%
	19.2		Gray silty clay CL	18/18"	SS-8AB 18.5 20.0	3-7-8 qu* = 1.5 tsf (SS-8B) wc = 22.5% (SS-8A) wc = 16.2% (SS-8B)

Hole No. L-599

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 2 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 4-¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482309.0, E 392824.6	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B-57
4. HOLE NO. (As shown on drawing title and file number) L-599	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 10; UNDISTURBED 0
5. NAME OF DRILLER William Wallace	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 8-28-91 am; COMPLETED 8-28-91 am
7. THICKNESS OF OVERBURDEN 25.0	17. ELEVATION TOP OF HOLE 595.60
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 25.0	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 of weathering, etc., if significant) g
			Gray silty clay, some fine to coarse sand, trace gravel, stiff to very stiff, medium plasticity, moist CL	14/18"	SS- 9 21.0-22.5	4-8-9 qu* = 2.0 tsf wc = 21.1%
			@ 21.0-25.0', little fine to coarse sand			
			@ 23.5-25.0', medium stiff to very stiff	15/18"	SS- 10 23.5-25.0	4-4-10 qu* = 0.5 - 2.5 tsf wc = 20.2%
570.6	25.0		End of boring at 25.0'.			No water encountered while drilling. Water at 24.5 immediately after drilling. Water at 13.0' after 24 hours. Hole caved to 19.0'.

Hole No. L-600

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 4-¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482126.3, E 392801.8	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B-57
4. HOLE NO. (As shown on drawing title and file number) L-600	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED 0
5. NAME OF DRILLER William Wallace	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 8-30-91; COMPLETED 8-30-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 597.10
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Jeffrey L. Snyder

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 of weathering, etc., if significant) g
			Dark brown fine sand, some gravel, trace silt, dense, damp, fill SP-SM			No topsoil
				15/18"	SS-1 1.0-2.5	6-15-17 wc = 7.2%
594.1	3.0		Brown silt, some fine sand, loose, non-plastic, damp, contains clay lumps, fill ML			
				19/18"	SS-2 3.5-5.0	3-5-5 wc = 21.4%
591.6	5.5		Brown and dark gray silty clay, little fine to coarse sand, soft to medium stiff, medium to high plasticity, moist, fill CL			
				15/18"	SS-3 6.0-7.5	1-3-3 qu* = 0.5 tsf wc = 25.0%
588.6	8.5		Black organic silty clay, little fine to coarse sand, soft to medium stiff, medium to high plasticity, moist, contains shell fragments OH			
				9/18"	SS-4 8.5-10.0	1-3-3 qu* = 0.5 tsf wc = 41.5%
	10.0					
586.1	11.0		Gray silty clay, little fine to coarse sand, trace gravel, stiff, medium plasticity, moist CL			
				15/18"	SS-5 11.0-12.5	2-4-4 qu* = 1.5 tsf wc = 25.7%
584.1	13.0		Gray silt, trace fine sand, loose, very low plasticity, moist, contains clay seams ML			
				18/18"	SS-6 13.5-15.0	2-3-5 wc = 24.6%
	15.0					
			@ 16.0-17.5', medium dense non-plastic, damp	15/18"	SS-7 16.0-17.5	4-10-7 wc = 21.2% Gravel = 0% Sand = 0% Fines =100%
579.1	18.0		Gray silty clay, little fine to coarse sand, trace gravel, stiff to very stiff, medium plasticity, moist CL			
				18/18"	SS-8 18.5-20.0	3-5-7 qu* = 1.0 tsf wc = 19.4%
	20.0					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - West Reach HOLE NO. L-600

Hole No. L-600

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 2 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 4-¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482126.3, E 392801.8	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B-57
4. HOLE NO. (As shown on drawing title and file number) L-600	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED 0
5. NAME OF DRILLER William Wallace	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 8-30-91; COMPLETED 8-30-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 597.10
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Jeffrey L. Snyder

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 of weathering, etc., if significant) g
			Gray silty clay, little fine to coarse sand, trace gravel, stiff to very stiff, medium plasticity, moist CL	18/18"	SS-9 21.0-22.5	3-8-9 qu* = 1.5 tsf wc = 19.8%
				18/18"	SS-10 23.5-25.0	5-7-9 qu* = 2.0 tsf wc = 19.7%
	25.0					
570.5	26.6		Gray silt, trace fine sand, trace clay, dense, very low plasticity, damp to moist ML	18/18"	SS-11AB 26.0-27.5	4-17-20 qu* = 2.5 tsf (SS-11A) wc = 18.1% (SS-11A) wc = 17.3% (SS-11B)
			@ 28.5-30.0', very dense, non-plastic	18/18"	SS-12 28.5-30.0	18-32-36 wc = 21.1%
567.1	30.0		End of boring at 30.0			No water encountered while drilling. No water encountered immediately after drilling. Water at 14.3 after 24 hours. Hole caved to 20.0'.

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - West Reach HOLE NO. L-600

Hole No. L-601

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 4¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1481425.8, E 392998.1	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B-57
4. HOLE NO. (As shown on drawing title and file number) L-601	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED 1
5. NAME OF DRILLER William Wallace	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See Remarks
	16. DATE HOLE: STARTED 10-3-91; COMPLETED 10-3-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 600.2
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Jeffrey L. Smyth

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 of weathering, etc., if significant) g
			Gravel and rock fill			No topsoil
				2/18"	SS-1 1.0-2.5	12-12-8 wc = 4.7%
597.2	3.0		Gray and brown silty clay, some fine to coarse sand, trace gravel, stiff to very stiff, medium plasticity, moist, fill CL	14/18"	SS-2 3.5-5.0	2-3-4 qu* = 2.0 tsf wc = 21.3% wc = 21.0% (3T-1) UC Test (3T-1): qu = 0.95 tsf γd = 107.7 pcf LL = 33 PI = 17
	5					
594.7	5.5		Dark gray organic silty clay, little fine to coarse sand, stiff, medium plasticity, moist OL	14/18"	SS-3 6.0-7.5	2-3-4 qu* = 1.75 tsf Water at 7.5' while drilling. wc = 32.7%
592.2	8.0		Brown and gray silty clay, trace fine sand, stiff to very stiff, medium plasticity, moist CL	15/18"	SS-4 8.5-10.0	3-6-8 qu* = 3.0 tsf wc = 20.8%
	10		@ 10.5' - 12.0', contains silt seams	16/18"	SS-5 11.0-12.5	2-5-6 qu* = 1.5 tsf wc = 23.7%
587.2	13.0		Gray silty clay, trace fine sand, stiff to very stiff, medium plasticity, moist CL	16/18"	SS-6 13.5-15.0	2-4-6 qu* = 1.5 tsf wc = 22.4%
	15		@ 15.5' - 19.0', little fine to coarse sand, contains silt seams	17/18"	SS-7 16.0-17.5	4-6-8 No H.P. reading wc = 17.0%
				16/18"	SS-8AB 18.5-20.0	3-6-9 qu* = 2.25 tsf wc = 16.0% (SS-8A) wc = 17.7% (SS-8B)

Hole No. L-601

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 2 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 4¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1481425.8, E 392998.1	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B-57
4. HOLE NO. (As shown on drawing title and file number) L-601	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED 1
5. NAME OF DRILLER William Wallace	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See Remarks
	16. DATE HOLE: STARTED 10-3-91; COMPLETED 10-3-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 600.2
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Jeffrey L. Smyth

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 of weathering, etc., if significant) g
			Gray silty clay, trace fine sand, very stiff, medium plasticity, moist CL	18/18"	SS-9 21.0-22.5	3-8-11 qu* = 2.25 tsf wc = 19.7%
				18/18"	SS-10 23.5-25.0	5-7-10 qu* = 2.25 tsf wc = 20.3%
	25					
				18/18"	SS-11 26.0-	4-7-11 qu* = 2.25 tsf wc = 19.6%
577.2	23.0		Gray silt, trace fine sand, dense, non-plastic, moist ML	16/18"	SS-12 28.5-30.0	22-25-17 wc = 17.9%
570.2	30		End of boring at 30.0'			Water at 26.6' immediately after drilling. Boring was drilled in parking lot and back-filled upon completion No 24 hour water level measurement. A boring was offset 5.0' to obtain Shelby tube 3T-1 from 3.5-5.5 Recovery 22/24"

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - West Reach | HOLE NO. L-601

Hole No. L-604

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 4¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482584.0, E 393222.0	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B 57
4. HOLE NO. (As shown on drawing title and file number) L-604	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 10; UNDISTURBED -
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER see remarks
	16. DATE HOLE: STARTED 9-6-91; COMPLETED 9-6-91
7. THICKNESS OF OVERBURDEN 25.0	17. ELEVATION TOP OF HOLE 595.2
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 25.0	19. SIGNATURE OF INSPECTOR Robert C. Ryan

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 of weathering, etc., if significant) g
			Clayey topsoil - 8"			
594.2	1.0		Dark gray silty clay, little fine to coarse sand, hard, medium plasticity, damp, fill CL	3/18"	SS-1 1.0-2.5	6-4-2 qu* = 4.5+ tsf wc =19.4%
592.2	3.0		Brown and gray silty clay, little fine to coarse sand, trace gravel, stiff, medium plasticity, moist, contains roots CL	9/18"	SS-2 3.5-5.0	3-5-5 qu* = 1.5 - 1.75 tsf wc =19.6%
	5			12/18"	SS-3 6.0-7.5	4-6-4 qu* = 1.25 tsf wc =21.4%
587.2	8.0		Brown silty clay, trace fine sand, stiff, medium plasticity, moist, contains silt seams CL	16/18"	SS-4 8.5-10.0	5-6-10 qu* = 1.25 tsf wc =23.2%
	10					
584.7	10.5		Gray clayey silt, trace fine sand, soft, low plasticity, moist CL-ML	13/18"	SS-5 11.0-12.5	6-7-6 qu* = 0.25 - 0.50 tsf wc =22.5% gravel = 0% sand = 0% fines =100%
582.2	13.0		Gray silty clay, trace fine sand, very stiff, medium plasticity, moist CL	16/18"	SS-6 13.5-15.0	4-6-8 qu* = 2.5 tsf wc =22.3%
	15					
579.7	15.5		Gray silty clay, little fine to coarse sand, trace gravel, stiff, medium plasticity, moist CL	14/18"	SS-7 16.0-17.5	2-4-6 qu* = 1.25 - 1.5 tsf wc =19.1%
				12/18"	SS-8 18.5-20.0	2-5-7 qu* = 1.5 tsf wc =19.0%

Hole No. L-604

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 2 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 4¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482584.0, E 393222.0	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B 57
4. HOLE NO. (As shown on drawing title and file number) L-604	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 10; UNDISTURBED -
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER see remarks
	16. DATE HOLE: STARTED 9-6-91; COMPLETED 9-6-91
7. THICKNESS OF OVERBURDEN	17. ELEVATION TOP OF HOLE 595.2
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE	19. SIGNATURE OF INSPECTOR Robert C. Shaw

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 of weathering, etc., if significant) g
			Gray silty clay, little fine to coarse sand, trace gravel, stiff, medium plasticity, moist CL	17/18"	SS-9 21.0-22.5	6-9-12 qu* = 1.75 tsf wc =20.4%
			@ 23.5' - 25.0', very stiff	17/18"	SS-10 23.5-25.0	3-8-10 qu* = 2.5 tsf wc =19.7%
570.2	25		End of boring at 25.0'			No water encountered while drilling. Water encountered at 24.5' immediately after drilling. Water at 4.0' after 24 hours. Hole caved to 13.0'

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - West Reach | HOLE NO. L-604

Hole No. L-606

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482556.9, E 393645.4	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-606	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN — DISTURBED: — UNDISTURBED: —
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER see remarks
	16. DATE HOLE — STARTED 8-29-91 — COMPLETED 8-29-91
7. THICKNESS OF OVERBURDEN 25.0	17. ELEVATION TOP OF HOLE 603.2
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 25.0	19. SIGNATURE OF INSPECTOR Jeff L. Snyder

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 of weathering, etc., if significant) g
			Brown silt, trace clay, trace fine sand, medium dense, non-plastic, dry, contains root fragments, fill ML			No topsoil
				10/18"	SS-1AB 1.0-2.5	3-6-6 qu* = 4.5 tsf (SS-1B) wc = 7.8% (SS-1A) wc =15.6% (SS-1B)
601.4	1.8		Dark brown silty clay, some fine to coarse sand, trace gravel, very stiff to hard, medium plasticity, damp, fill CL			
				12/18"	SS- 2 3.5-5.0	6-8-10 qu* = 4.5 tsf wc = 14.4%
	5					
			@ 6.0' - 7.5', brown, "and" fine to coarse sand, damp to moist, contains organics	13/18"	SS- 3 6.0-7.5	6-6-6 qu* = 3.0 tsf wc = 15.9%
			@ 8.5' - 11.0', brown and dark gray, moist	14/18"	SS- 4 8.5-10.0	3-4-5 qu* = 2.5 tsf wc = 17.8%
	10					
592.2	11.0		Dark gray organic silty clay, some fine to coarse sand, trace gravel, stiff, medium plasticity, moist, contains root fragments OL	16/18"	SS- 5 11.0-12.5	3-4-6 qu* = 2.0 tsf wc = 22.2%
589.7	13.5		Brown and gray silty clay, some fine to coarse sand, little gravel, very stiff, medium plasticity, damp to moist, contains root fragments CL	18/18"	SS- 6 13.5-15.0	3-4-5 qu* = 3.0 tsf wc = 17.7% (3T-1) UC Test: (3T-1) qu=1.16 tsf granul=0% γd=111.8 pcf sand=6% LL=39 Fines=94% PI=21
	15					
				18/18"	SS- 7 16.0-17.5	3-4-7 qu* = 2.5 tsf wc = 21.1%
584.7	18.5		Gray silt, trace fine sand, trace clay, medium dense, non-plastic, damp ML @ 18.9' - 20.0', contains clay lumps	18/18"	SS-8AB 18.5-20.0	3-4-5 wc =18.4% (SS-8A) wc =20.6% (SS-8B) Water at 18.5' while drilling

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - WestReach HOLE NO. L-606

Hole No. L-606

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 2 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482556.9, E 393645.4	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-606	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN — DISTURBED: — UNDISTURBED:
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER see remarks
	16. DATE HOLE — STARTED 8-29-91 — COMPLETED 8-29-91
7. THICKNESS OF OVERBURDEN 25.0	17. ELEVATION TOP OF HOLE 603.2
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 25.0	19. SIGNATURE OF INSPECTOR Jeffrey B. Smyth

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 of weathering, etc., if significant) g
582.7	20.5		Gray silt, trace fine sand, medium dense, damp, non-plastic, contains clay lumps ML			wc = 18.4% (SS-8A) wc = 20.6% (SS-8B)
			Gray silty clay, little fine to coarse sand, trace gravel, stiff, medium plasticity, moist CL	18/18"	SS- 9 21.0-22.5	3-5-6 qu* = 2.0 tsf wc = 22.2%
				18/18"	SS- 10 23.5-25.0	4-6-7 qu* = 2.0 tsf wc = 19.6%
578.2	25		End of boring at 25.0'			Water at 23.1' immediately after drilling. Water at 13.3' after 24 hours. Hole caved to 19.2'. A boring was drilled offset 5.0' to obtain Shelby tube 3T-1 at 13.0' - 15.0'. Recovery = 24/24"

Hole No. L-607

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482608.1, E 393790.1	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-607	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED / UNDISTURBED
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER see remarks
	16. DATE HOLE: STARTED 8-30-91; COMPLETED 8-30-91
7. THICKNESS OF OVERBURDEN 25.0	17. ELEVATION TOP OF HOLE 594.5
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 25.0	19. SIGNATURE OF INSPECTOR Jeffrey L. Smyth

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 of weathering, etc., if significant) g
594.0	0.5		Topsoil - 6"			
			Brown and gray silty clay, some fine to coarse sand, trace gravel, hard, medium plasticity, damp, fill CL	13/18"	SS-1 1.0-2.5	5-7-9 qu* = 4.5+ tsf wc =14.6%
591.0	3.5		Brown and dark gray silty clay, little fine to coarse sand, stiff, medium plasticity, moist, contains root fragments CL	10/18"	SS-2 3.5-5.0	2-2-4 qu* = 2.0 tsf wc =23.2%
	5		@ 6.0' - 7.5', contains sand lenses @ 6.0' - 11.0', brown and gray, very stiff	18/18"	SS-3 6.0-7.5	3-4-5 qu* = 3.0 tsf wc =20.0%
				18/18"	SS-4 8.5-10.0	3-4-5 qu* = 2.5 tsf wc =20.0%
	10					
583.5	11.0		Gray silty clay, little fine sand, stiff, medium plasticity, moist, contains silt lenses CL	18/18"	SS-5 11.0-12.5	3-4-5 qu* = 1.5 tsf wc =19.8%
580.4	14.1		Gray silt, some clay, trace fine sand, loose to medium dense, very low plasticity, damp to moist	18/18"	SS-6AB 13.5-15.0	5-5-5 qu* = 1.0 tsf (SS-6A) wc =20.5% (SS-6A) wc =22.2% (SS-6B) Gravel = 0% Sand = 0% Fines =100%
	15					
579.0	15.5		Gray silty clay, little fine sand, stiff to very stiff, medium plasticity, moist, contains silt lenses CL	18/18"	SS-7 16.0-17.5	4-5-6 qu* = 2.0 tsf wc =21.6%
576.0	18.5		Gray silty clay, some fine to coarse sand, trace gravel stiff to very stiff, medium plasticity, damp to moist CL	18/18"	SS-8 18.5-20.0	3-5-6 qu* = 2.0 tsf wc =16.9%

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - West Reach HOLE NO. L-607

Hole No. L-607

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 2 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482608.1, E 393790.1	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-607	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED ; UNDISTURBED
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER see remarks
	16. DATE HOLE: STARTED 8-29-91; COMPLETED 8-29-91
7. THICKNESS OF OVERBURDEN 25.0	17. ELEVATION TOP OF HOLE 594.5
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 25.0	19. SIGNATURE OF INSPECTOR Jeffrey L. Snyder

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 of weathering, etc., if significant) g
			Gray silty clay, some fine to coarse sand, trace gravel, very stiff, medium plasticity, damp to moist CL	18/18"	SS- 9 21.0-22.5	4-6-8 qu* = 2.5 tsf wc =19.7%
				18/18"	SS- 10 23.5-25.0	4-5-7 qu* = 2.5 tsf wc =19.8%
569.5	25		End of boring at 25.0'			No water encountered while drilling. No water encountered immediately after drilling. Water at 3.3' after 24 hours. Hole caved at 6.5'

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - West Reach | HOLE NO. L-607

Hole No. L-608

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 3 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3-¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482548.5, E 393970.9	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-608	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 18; UNDISTURBED --
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER see remarks
	16. DATE HOLE: STARTED 8-29-91; COMPLETED 8-29-91
7. THICKNESS OF OVERBURDEN 45.0	17. ELEVATION TOP OF HOLE 603.5
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 45.0	19. SIGNATURE OF INSPECTOR Jeffrey L. Smyth

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 of weathering, etc., if significant) g
603.2	0.3		Topsoil - 4"			
			Gray silty clay, some fine to coarse sand, trace gravel, very stiff, medium plasticity, damp to moist, fill CL	13/18"	SS- 1 1.0-2.5	4-5-8 qu* = 4.0 tsf wc = 16.6%
				13/18"	SS- 2 3.5-5.0	3-4-6 qu* = 3.0 tsf wc = 17.3%
	5.0					
			@ 6.0-7.5', brown and gray	12/18"	SS- 3 6.0-7.5	4-4-5 qu* = 3.0 tsf wc = 18.7%
			@ 8.5-11.0', brown	15/18"	SS- 4 8.5-10.0	3-4-5 qu* = 2.0 tsf wc = 20.9%
	10.0					
592.5	11.0		Black and brown silty clay, some fine to coarse sand, trace gravel, stiff to very stiff, medium to high plasticity, moist CL	16/18"	SS- 5 11.0-12.5	2-4-5 qu* = 2.0 tsf wc = 30.9%
590.0	13.5		Brown and dark gray silty clay, some fine to coarse sand, trace gravel, stiff to very stiff, medium plasticity, moist, contains root fragments CL	18/18"	SS- 6 13.5-15.0	3-3-6 qu* = 2.0 tsf wc = 23.9%
	15.0		@ 16.0-18.5', brown and gray	18/18"	SS- 7 16.0-17.5	3-3-6 qu* = 2.0 tsf wc = 21.3%
585.0	18.5		Gray silty clay, little fine to coarse sand, trace gravel, stiff to very stiff, medium plasticity, moist, iron-stained CL	18/18"	SS- 8 18.5-20.0	3-4-5 qu* = 2.0 tsf wc = 20.3%

Hole No. L-608

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 2 OF 3 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3-1/4" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482548.5, E 393970.9	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-608	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 18; UNDISTURBED --
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER see remarks
	16. DATE HOLE: STARTED 8-29-91; COMPLETED 8-29-91
7. THICKNESS OF OVERBURDEN 45.0	17. ELEVATION TOP OF HOLE 603.5
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 45.0	19. SIGNATURE OF INSPECTOR Jeff R. Smyth

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 of weathering, etc., if significant) g
			Gray silty clay, little fine to coarse sand, stiff, medium plasticity, moist CL	18/18"	SS-9 21.0-22.5	3-4-5 qu* = 1.5 tsf wc = 21.5%
			@ 23.5-24.5, contains silt lenses	18/18"	SS-10AB 23.5-25.0	3-4-6 qu* = 1.5 tsf wc = 19.7% (SS-10A) wc = 20.3% (SS-10B)
579.0	24.5					
	25.0		Gray silt, little fine sand, medium dense, non-plastic, damp to moist, contains clay lumps ML			
			@ 26.0-27.5', increase in clay content, damp	18/18"	SS-11 26.0-27.5	6-7-8 wc = 21.0%
575.0	28.5		Gray silty clay, little fine to coarse sand, stiff to very stiff, medium plasticity, moist CL	18/18"	SS-12AB 28.5-30.0	4-5-6 qu* = 2.5 tsf (SS-12A) No H.P. reading (SS-12B) wc = 20.7% (SS-12A) wc = 20.7% (SS-12B)
	30.0		@ 29.5-30.0 contains silt seams			
			@ 31.0-35.5', some fine to coarse sand, trace gravel, stiff, contains silt seams	18/18"	SS-13 31.0-32.5	0-2-10 qu* = 1.5 tsf wc = 28.9%
				18/18"	SS-14 33.5-35.0	2-4-7 qu* = 1.5 tsf wc = 19.9%
	35.0					
568.0	35.5		Gray silt, little fine sand, little clay, dense to very dense, very low plasticity, damp ML	18/18"	SS-15 36.0-37.5	4-11-27 wc = 15.5%
			@ 38.5-40.0', trace clay, moist to wet	18/18"	SS-16 38.5-40.0	20-31-33 Water at 38.5 while drilling. wc = 19.2%

Hole No. L-608

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 3 OF 3 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3-1/4" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482548.5, E 393970.9	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-608	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 18; UNDISTURBED --
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER see remarks
	16. DATE HOLE: STARTED 8-29-91; COMPLETED 8-29-91
7. THICKNESS OF OVERBURDEN 45.0	17. ELEVATION TOP OF HOLE 603.5
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 45.0	19. SIGNATURE OF INSPECTOR Jeffrey L. Snyder

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 of weathering, etc., if significant) g
			Gray silt, little fine sand, trace clay, very dense, very low plasticity, moist to wet ML			
				18 / 18"	SS-17 41.0-42.5	10-31-35 wc = 20.5% Gravel = 0% Sand = 10% Fines = 90%
				18 / 18"	SS-18 43.5-45.0	15-31-27 wc = 26.7%
558.5	45		End of boring at 45.0'.			Water at 40.3' immediately after drilling. Water at 13.1' after 24 hours. Hole caved to 27.0.

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - West Reach | HOLE NO. L-608

Hole No. L-610

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482621.1, E 394039.4	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-610	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED / UNDISTURBED
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER see remarks
	16. DATE HOLE: STARTED 8-30-91; COMPLETED 8-30-91
7. THICKNESS OF OVERBURDEN 25.0	17. ELEVATION TOP OF HOLE 593.7
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 25.0	19. SIGNATURE OF INSPECTOR Jeffrey L. Smith

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 of weathering, etc., if significant) g
593.2	0.5		Topsoil - 6"			
			Dark brown clayey silt, little fine sand, hard, low plasticity, damp, contains decomposed wood fragments, fill CL-ML	9/18"	SS-1 1.0-2.5	3-4-6 qu* = 4.5 tsf wc = 26.3%
590.2	3.5		Brown and gray silty clay, some fine to coarse sand, trace gravel, very stiff, medium plasticity, damp to moist CL	14/18"	SS-2 3.5-5.0	3-4-6 qu* = 3.0 tsf wc = 19.4%
	5		@ 6.0' - 7.5', stiff, moist	14/18"	SS-3 6.0-7.5	2-3-4 qu* = 1.5 tsf wc = 22.5%
586.2	7.5		Gray and brown silt, some fine to coarse sand, little clay, little gravel, medium dense, non-plastic, damp to moist ML	16/18"	SS-4 8.5-10.0	10-11-7 wc = 10.4% gravel = 16% sand = 26% fines = 58%
	10					
582.7	11.0		Gray silt, trace fine sand, loose to medium dense, very low plasticity, damp to moist, contains clay lumps and seams ML	16/18"	SS-5 11.0-12.5	4-6-7 wc = 18.4%
			@ 11.0' - 13.5', contains sand seams	18/18"	SS-6 13.5-15.0	3-5-5 wc = 24.7%
				18/18"	SS-7 16.0-17.5	4-5-7 wc = 21.7%
				18/18"	SS-8 18.5-20.0	3-4-5 wc = 21.8%

Hole No. L-610

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 2 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482621.1, E 394039.4	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-610	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED ; UNDISTURBED
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER see remarks
	16. DATE HOLE: STARTED 8-30-91; COMPLETED 8-30-91
7. THICKNESS OF OVERBURDEN 25.0	17. ELEVATION TOP OF HOLE 593.7
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 25.0	19. SIGNATURE OF INSPECTOR Jeffrey L. Snyder

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 of weathering, etc., if significant) g
573.2	20.5		Gray silt, trace fine sand, trace clay, loose, very low plasticity, damp to moist ML	18/18"	SS- 9 21.0-22.5	3-6-8 qu* = 1.5 tsf wc = 20.0%
			Gray silty clay, little fine to coarse sand, trace gravel, stiff, medium plasticity, moist, contains sand and silt seams partially laminated CL			
570.2	23.5		Gray fine to coarse sand, trace silt, medium dense, wet, contains clay lumps SP-SM	18/18"	SS-10 23.5-25.0	5-7-9 wc = 10.4% Gravel = 16% Sand = 26% Fines = 58%
568.7	25		End of boring at 25.0'			Water at 23.5' while drilling. No water encountered immediately after drilling. Water at 3.6' after 2.4 hours. Hole caved to 8.0'.

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - West Reach | HOLE NO. L-610

Hole No. L-611

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3-¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482681.3, E 394100.6	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-611	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 10; UNDISTURBED 0
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 9-4-91; COMPLETED 9-4-91
7. THICKNESS OF OVERBURDEN 25.0	17. ELEVATION TOP OF HOLE 592.7
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 25.0	19. SIGNATURE OF INSPECTOR Robert C. Dunn

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 of weathering, etc., if significant) g
592.0	0.7		Sandy topsoil - 8"			
			Brown silty clay, some fine to coarse sand, little gravel, very stiff, medium plasticity, damp to moist, contains root fragments CL	18/18"	SS- 1 1.0-2.5	1-2-3 qu* = 2.5 tsf wc = 23.5%
			@ 3.5-5.0', contains silt lenses	14/18"	SS- 2 3.5-5.0	2-5-5 qu* = 2.5 tsf wc = 18.1%
	5.0					
586.7	6.0		Brown and gray silty clay, little fine sand, very stiff, medium plasticity, damp to moist CL	18/18"	SS- 3 6.0-7.5	1-5-6 qu*= 2.5 tsf wc = 21.0%
585.2	7.5		Gray silty clay, little fine sand, stiff, medium plasticity, moist, contains silt lenses CL	18/18"	SS- 4 8.5-10.0	2-4-5 qu* = 1.5 tsf wc = 19.5%
	10.0					
582.2	10.5		Gray silt, some clay, little fine sand, loose to medium, very low plasticity, dense, moist ML	18/18"	SS- 5AB 11.0-12.5	4-4-5 wc = 23.8% (SS-5A) wc = 20.9% (SS-5B)
			@ 13.5-15.0', moist to wet	16/18"	SS- 6 13.5-15.0	4-5-7 wc = 22.2%
	15.0					
576.7	16.0		Gray silty clay, trace fine sand, trace gravel, stiff, medium plasticity, moist CL	18/18"	SS- 7 16.0-17.5	2-3-5 qu* = 1.5 tsf wc = 30.0%
			@ 18.5-20.0', little fine to coarse sand, medium stiff to stiff	18/18"	SS- 8 18.5-20.0	2-3-4 qu* = 1.0 tsf wc = 19.1%

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - West Reach HOLE NO. L-611

Hole No. L-611

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 2 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3-¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482681.3, E 394100.6	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-611	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 10; UNDISTURBED 0
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 9-4-91; COMPLETED 9-4-91
7. THICKNESS OF OVERBURDEN 25.0	17. ELEVATION TOP OF HOLE 592.7
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 25.0	19. SIGNATURE OF INSPECTOR Robert C. Ruse

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 of weathering, etc., if significant) g
			Gray silty clay, little fine to coarse sand, trace gravel, medium stiff to stiff, medium plasticity, moist CL	18/18"	SS-9 21.0-22.5	3-5-5 qu* = 1.5 tsf wc = 19.3%
			@ 21.7', sand seam			
				18/18"	SS-10AB 23.5-25.0	4-6-10 qu* = 1.5 tsf (SS-10A) wc = 18.9% (SS-10A) wc = 21.5% (SS-10B)
568.2	24.5		Gray silt, trace fine sand, dense, non-plastic, damp ML			
567.7	25.0		End of boring at 25.0'.			No water encountered while drilling. No water encountered immediately after drilling. Water at 2.0 after 24 hours. Hole caved to 13.0'.

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - West Reach | HOLE NO. L-611

Hole No. L-612

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482735.29, E 394190.07	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-612	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 10; UNDISTURBED -
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER see remarks
	16. DATE HOLE: STARTED 9-4-91; COMPLETED 9-4-91
7. THICKNESS OF OVERBURDEN 25.0	17. ELEVATION TOP OF HOLE 593.1
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 25.0	19. SIGNATURE OF INSPECTOR [signature]

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 of weathering, etc., if significant) g
			Clayey topsoil - 10"			
592.3	0.8		Gray silty clay, some fine to coarse sand, little gravel, very soft, medium plasticity, moist to wet, contains decomposed wood fragments, fill CL	14/18"	SS-1 1.0-2.5	1-2-1 qu* = 0.0 tsf wc = 50.1%
589.6	3.5		Brown and gray silty clay, little fine to coarse sand, trace gravel, stiff to very stiff, medium plasticity, damp to moist, contains root fragments CL	16/18"	SS-2 3.5-5.0	2-5-5 qu* = 2.5 tsf wc = 21.4%
	5		@ 6.0' - 7.5', contains fine sand and silt seams	14/18"	SS-3 6.0-7.5	3-4-5 qu* = 2.0 tsf wc = 20.4%
584.6	8.5		Gray silty clay, little fine sand, stiff, medium plasticity, moist CL	17/18"	SS-4 8.5-10.0	3-3-6 qu* = 1.5 tsf wc = 19.8%
	10		@ 11.0' - 12.5', contains silt seams	18/18"	SS-5 11.0-12.5	3-3-4 qu* = 1.5 tsf wc = 21.6%
579.6	13.5		Gray silt, some clay, medium dense, very low plasticity, damp to moist ML	18/18"	SS-6AB 13.5-15.0	3-4-7 wc = 21.6% (SS-6A) Gravel = 0% Sand = 0% Fines =100%
	15					
577.1	16.0		Dark gray silty clay, "and" fine to coarse sand, trace gravel, stiff, medium plasticity, moist CL	18/18"	SS-7 16.0-17.5	3-3-4 qu* = 1.5 tsf wc = 17.4%
574.6	18.5		Gray silty clay, little fine to coarse sand, stiff to very stiff, medium plasticity, moist CL	18/18"	SS-8 18.5-20.0	4-4-6 qu* = 2.0 tsf wc = 20.5%

Hole No. L-612

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 2 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482735.29, E 394190.07	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-612	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 10; UNDISTURBED -
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER see remarks
	16. DATE HOLE: STARTED 9-4-91; COMPLETED 9-4-91
7. THICKNESS OF OVERBURDEN 25.0	17. ELEVATION TOP OF HOLE 593.1
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 25.0	19. SIGNATURE OF INSPECTOR [signature]

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 of weathering, etc., if significant) g
			Gray silty clay, little fine to coarse sand, stiff to very stiff, medium plasticity, moist CL	18/18"	SS- 9 21.0-22.5	3-4-7 qu* = 2.0 tsf wc = 19.8%
			@ 23.5' - 25.0', contains silt seams	18/18"	SS-10 23.5-25.0	5-12-19 qu* = 2.0 tsf wc = 18.6%
568.1	25		End of boring at 25.0'			No water encountered while drilling. Water at 22.5' immediately after drilling. Water at 2.0' after 24 hours. Hole caved to 21.0'.

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - West Reach HOLE NO. L-612

Hole No. L-634

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3-1/4" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482918.6, E 395136.2	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-634	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 11; UNDISTURBED 0
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 8-21-91; COMPLETED 8-21-91
7. THICKNESS OF OVERBURDEN 27.5	17. ELEVATION TOP OF HOLE 596.6
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 27.5	19. SIGNATURE OF INSPECTOR Jeffrey L. Snyder

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 of weathering, etc., if significant) g
			Black and brown fine to coarse sand, trace silt, little gravel, loose, damp, contains organic material, slag and cinders, fill SP-SM			No topsoil
595.1	1.5		Brown fine sand, trace silt, loose, damp, fill SP	13/18"	SS-1AB 1.0-2.5	4-7-6 wc = 7.1% (SS-1A) wc = 5.8% (SS-1B)
			@ 3.5' - 4.2', trace gravel, moist, contains organic material	14/18"	SS-2AB 3.5-5.0	2-1-2 qu* = 0.75 tsf wc = 20.1% (SS-2A) wc = 35.1% (SS-2B)
592.4	4.2		Gray and black organic silty clay, trace fine to coarse sand, soft, medium plasticity, moist OL			
	5					
590.6	6.0		Brown and gray silty clay, trace fine to coarse sand, very stiff, medium plasticity, moist CL	16/18"	SS- 3 6.0-7.5	0-2-3 qu* = 2.5 tsf wc = 23.0%
			@ 8.5' - 9.6', trace gravel	16/18"	SS-4AB 8.5-10.0	4-2-3 qu* = 2.75 tsf wc = 21.4% (SS-4A) wc = 18.2% (SS-4B) Gravel = 9% Sand = 53% Fines = 38%
587.0	9.6		Brown and gray fine to coarse sand, some silty clay, trace gravel, loose, moist to wet SC			
	10					
585.6	11.0		Brown and gray silty clay, trace fine to coarse sand, very stiff, medium plasticity, moist CL	18/18"	SS- 5 11.0-12.5	4-4-7 qu* = 3.75 tsf wc = 20.9%
584.1	12.5		Gray silty clay, trace fine sand, stiff, medium plasticity, moist CL			
			@ 13.5', sandy gravelly seam	18/18"	SS- 6 13.5-15.0	5-4-5 qu* = 1.5 tsf Water at 13.5' while drilling wc = 16.1%
	15					
			@ 16.0' - 18.5', contains silt lenses	18/18"	SS- 7 16.0-17.5	4-5-7 qu* = 1.5 tsf wc = 21.0%
			@ 18.5' - 20.0', laminated	18/18"	SS- 8 18.5-20.0	4-4-4 qu* = 1.75 tsf wc = 24.3%

Hole No. L-634

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 2 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3-1/4" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482918.6, E 395136.2	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-634	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 11; UNDISTURBED 0
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 8-21-91; COMPLETED 8-21-91
7. THICKNESS OF OVERBURDEN 27.5	17. ELEVATION TOP OF HOLE 596.6
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 27.5	19. SIGNATURE OF INSPECTOR Jeff L. Snyder

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 of weathering, etc., if significant) g
			Gray silty clay, little fine to coarse sand, trace gravel, stiff, medium plasticity, moist CL	18/18"	SS-9 21.0-22.5	0-0-6 qu* = 1.0 tsf wc = 18.1%
			@ 21.6'-22.5', medium stiff to stiff			
				18/18"	SS-10 23.5-25.0	3-6-6 qu* = 1.75 tsf wc = 20.9%
	25					
			@ 26.0' - 27.5', very stiff	18/18"	SS-11 26.0 27.5	4-6-8 qu* = 2.5 tsf wc = 19.4%
569.1	27.5		End of boring at 27.5'			Water at 13.5' immediately after drilling. Water at 5.8' after 24 hours. Hole caved to 21.2'

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - West Reach | HOLE NO. L-634

Hole No. L-635

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3-1/4" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482724.7, E 395140.3	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-635	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 11; UNDISTURBED 1
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 8-21-91; COMPLETED 8-21-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 594.8
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Jeffrey L. Snyder

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 of weathering, etc., if significant) g
			Black fine to coarse sand, little silt, some gravel, loose, damp, contains organic material and cinders, fill SM			No topsoil
				10/18"	SS-1 1.0-2.5	2-4-2 wc = 18.9%
591.8	3.0		Dark brown and gray silty clay, little fine to coarse sand, stiff to very stiff, medium plasticity, moist CL			
				14/18"	SS-2 3.5-5.0	3-4-4 qu* = 2.0 tsf wc = 26.5%
	5					
588.8	6.0		Brown and gray silty clay, trace fine sand, very stiff, medium plasticity, moist, contains roots CL	18/18"	SS-3 6.0-7.5	3-4-6 qu* = 3.25 tsf wc = 21.2%
				18/18"	SS-4 8.5-10.0	4-4-5 qu* = 3.0 tsf wc = 20.3%
	10			22.5/24"	3T-1 10.0-12.0	qu* = 2.5 tsf wc = 14.8% UC Test: qu = 2.24 tsf LL = 33 γd = 123.2 pcf PI = 17
581.3	13.5		Gray silty clay, trace fine sand, stiff, medium plasticity, moist, contains silt lenses CL	18/18"	SS-5 13.5-15.0	4-6-7 qu* = 1.25 tsf wc = 19.9%
	15					
578.8	16.0		Dark gray silty clay, little fine to coarse sand, trace gravel, stiff to very stiff, medium plasticity, moist CL @ 17.0', wet silt seam	18/18"	SS-6 16.0-17.5	3-4-5 qu* = 2.5 tsf Water at 17.0' while drilling wc = 20.0%
			@ 18.5' - 20.0', some fine to coarse sand	18/18"	SS-7 18.5-20.0	3-4-5 qu* = 1.5 tsf wc = 16.5%

Hole No. L-635

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 2 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3-1/4" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482724.7, E 395140.3	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-635	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 11; UNDISTURBED 1
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 8-21-91; COMPLETED 8-21-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 594.8
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Jeff L. Snyder

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 of weathering, etc., if significant) g
			Gray silty clay, little fine to coarse sand, trace gravel, very stiff, medium plasticity, moist CL	18/18"	SS-8 21.0-22.5	4-6-9 qu* = 2.5 tsf wc = 19.9%
				18/18"	SS-9 23.5-25.0	5-7-9 qu* = 2.5 tsf wc = 19.2%
	25			18/18"	SS-10 26.0-27.5	4-6-9 qu* = 3.25 tsf wc = 19.3%
			@ 28.5' - 30.0', hard, damp	18/18"	SS-11 28.5-30.0	7-9-13 qu* = 4.5 tsf wc = 15.4%
564.8	30		End of boring at 30.0'			No water encountered immediately after drilling. Water at 8.5' after 24 hours. Hole caved to 20.6'

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - West Reach | HOLE NO. L-635

Hole No. L-636

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482344.2, E 395133.9	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-636	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 11; UNDISTURBED 1
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 8-27-91; COMPLETED 8-27-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 599.9
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Jeffrey L. Snyder

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 of weathering, etc., if significant) g
599.3	0.6		Topsoil - 7"			
			Dark gray silty clay, some fine to coarse sand, stiff medium plasticity, damp, contains root fragments, fill CL	8 / 18"	SS- 1 1.0-2.5	6-4-5 No H.P. reading wc = 15.3%
596.9	3.0		Black fine sand, little silt, medium dense, contains ash and slag, dry, fill SM	10/ 18"	SS- 2 3.5-5.0	5-8-8 wc = 15.1%
	5					
593.9	6.0		Brown fine sand, trace silt, very loose, moist, fill SP-SM	16/ 18"	SS-3AB 6.0-7.5	1-2-2 qu* = 0.5 tsf wc = 9.4% (SS-3A) wc =35.5% (SS-3B)
593.0	6.9		Black and dark gray organic silty clay, some fine to coarse sand, soft to medium stiff, high plasticity, moist, contains OH			
591.6	8.3		Brown and dark gray silty clay, some fine to coarse sand, trace gravel, stiff, medium plasticity, moist CL	18/ 18"	SS- 4 8.5-10.0	3-3-4 qu* = 2.0 tsf wc = 19.2%
589.9	10		Brown and gray silty clay, little fine to coarse sand, trace gravel, very stiff, medium plasticity, moist, contains roots CL	18/ 18"	SS- 5 11.0-12.5	3-5-6 qu* = 3.5 tsf wc = 20.2%
			@ 13.5' - 15.0', stiff to very stiff	18/ 18"	SS- 6 13.5-15.0	2-4-5 qu* = 2.0 tsf wc = 21.1%
	15					
583.9	16.0		Gray silty clay, little fine to coarse sand, trace gravel, stiff to very stiff, medium plasticity, moist, contains silt lenses CL	18/ 18"	SS- 7 16.0-17.5	3-3-4 qu* = 2.0 tsf wc = 2.6%
				18/ 18"	SS- 8 18.5-20.0	3-3-7 qu* = 2.5 tsf wc = 22.1%

Hole No. L-636

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 2 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482344.2, E 395133.9	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-636	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 11; UNDISTURBED 1
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 8-27-91; COMPLETED 8-27-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 599.9
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Jeffrey L. Snyder

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 of weathering, etc., if significant) g
			Gray silty clay, little fine to coarse sand, trace gravel, stiff, medium plasticity, moist CL			
			@ 21.0' - 22.5', some fine to coarse sand, moist, contains sand seams	18/18"	SS-9 21.0-22.5	4-4-5 qu* = 1.5 tsf wc =15.9%
				24/24"	3T-1 23.0-25.0 23.0 25.0	wc = 15.9% UC Test: (3T-1) qu = 1.29 tsf LL = 30 γd = 118.6 ts PI = 14
	25					
				18/18"	SS-10 26.0-27.5	3-4-6 qu* = 1.5 tsf wc = 19.9%
			@ 28.5' - 30.0', very stiff	18/18"	SS-11 28.5-30.0	3-4-7 qu* = 2.5 tsf wc = 19.2%
569.9	30		End of boring at 30.0'			No water encountered while drilling. No water encountered immediately after drilling. Water at 11.4' after 24 hours. Hole caved to 23.7'

Hole No. L-637

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482314.3, E 395322.8	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-637	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 8-27-91; COMPLETED 8-27-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 592.6
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Jeffry L. Snyder

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 of weathering, etc., if significant) g
592.4	0.2		Topsoil - 3"			
			Brown and gray silty clay, some fine to coarse sand, little gravel, hard, medium plasticity, damp, fill CL	16/18"	SS- 1 1.0-2.5	12-10-7 qu* = 4.5 tsf wc = 15.1%
589.1	3.5		Brown and gray silty clay, little fine to coarse sand, trace gravel, stiff, medium plasticity, moist, contains roots CL	16/18"	SS- 2 3.5-5.0	2-3-5 qu* = 2.0 tsf wc = 21.3%
	5			18/18"	SS- 3 6.0-7.5	2-4-6 qu* = 1.5 tsf wc = 17.6%
			@ 7.3', sand seam			
584.1	8.5		Gray silty clay, little fine to coarse sand, trace gravel, stiff to very stiff, medium plasticity, moist	16/18"	SS- 4 8.5-10.0	2-4-4 qu* = 1.5 tsf Water at 9.4' while drilling. wc = 19.8%
	10		@ 8.5' - 10.0', iron-stained @ 9.4' - 9.5', silt seam, wet CL			
			@ 11.0' - 12.5', contains silt lenses	18/18"	SS- 5 11.0-12.5	3-5-5 qu* = 1.5 tsf wc = 20.8%
	15			18/18"	SS- 6 13.5-15.0	2-4-4 qu* = 2.5 tsf wc = 19.1%
			@ 16.0' - 20.0', some fine to coarse sand			
				18/18"	SS- 7 16.0-17.5	4-5-7 qu* = 2.5 tsf wc = 15.9%
			@ 18.5' - 20.0', little gravel			
				18/18"	SS- 8 18.5-20.0	4-5-6 qu* = 1.5 - 2.0 tsf wc = 17.9%

Hole No. L-637

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 2 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482314.3, E 395322.8	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-637	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 8-27-91; COMPLETED 8-27-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 592.6
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Jeff L. Snyder

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 of weathering, etc., if significant) g
			Gray silty clay, some fine to coarse sand, little gravel, stiff, medium plasticity, moist, contains silt lenses CL	18/18"	SS-9 21.0-22.5	3-6-7 qu* = 1.5 tsf wc = 17.3%
569.1	23.5		Gray silt, trace fine sand, trace clay, dense, very low plasticity, moist to wet ML	18/18"	SS-10 23.5-25.0	5-14-17 wc = 15.9% Water at 23.5' while drilling
	25		@ 23.5' - 27.5', contains clay seams	18/18"	SS-11 26.0-27.5	7-12-24 wc = 14.6%
			@ 28.5' - 30.0', wet	18/18"	SS-12 28.5-30.0	12-19-24 wc = 17.5%
562.6	30		End of boring at 30.0'			Water at 26.2' immediately after drilling. Water at 10.4' after 24 hours. Hole caved to 15.3'

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - West Reach | HOLE NO. L-637

Hole No. L-638

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT ~~3-1/4"~~ I.D. HSA
2. LOCATION (Coordinates or Station) N 1483258.9, E 383643.2	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-638	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED 0
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 8-17-91; COMPLETED 8-17-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 601.4
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	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 of weathering, etc., if significant) g
601.1	0.3		Topsoil - 4"			
			Brown, gray and dark gray silty clay, little fine to coarse sand, trace gravel, hard, medium plasticity, damp, contains organic material, fill CL	12/18"	SS-1 1.0-2.5	5-4-5 qu* = 4.5+ tsf wc = 11.9%
				13/18"	SS-2 3.5-5.0	4-8-9 qu* = 4.5+ tsf wc = 13.7%
	5					
				14/18"	SS-3 6.0-7.5	4-7-8 qu* = 4.5+ tsf wc = 14.2%
				14/18"	SS-4 8.5-10.0	4-7-8 qu* = 4.5+ tsf wc = 15.4%
	10					
				15/18"	SS-5 11.0-12.5	4-8-8 qu* = 4.5+ tsf wc = 14.7%
588.4	13.0		Brown and gray silty clay, little fine to coarse sand, trace gravel, hard, medium plasticity, damp CL	18/18"	SS-6 13.5-15.0	8-7-9 qu* = 4.5+ tsf wc = 16.9%
	15					wc = 20.3 (3T-1) Q Test: (3T-1) c = 0.48 tsf, Ø = 7.6° Gravel = 2% Sand = 1% LL = 27 Fines = 97% PI = 12
~~585.4~~	16.0		Gray silty clay, trace fine to coarse sand, trace gravel, stiff, medium plasticity, moist CL	15/18"	SS-7 16.0-17.5	3-3-4 qu* = 1.25 tsf wc = 17.7%
				18/18"	SS-8 18.5-20.0	3-3-4 qu* = 1.25 tsf wc = 17.7 %

Hole No. L-638

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 2 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3-1/4" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482340.1, E 395385.2	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-638	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED 0
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 8-17-91; COMPLETED 8-17-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 601.4
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	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 of weathering, etc., if significant) g
			Gray silty clay, trace fine to coarse sand, trace gravel, stiff, medium plasticity, moist CL	18/18"	SS-9 21.0-22.5	2-3-5 qu* = 1.75 tsf wc =20.0%
			@ 23.5' - 30.0', very stiff	18/18"	SS-10 23.5-25.0	2-3-5 qu* = 2.75 tsf wc = 20.1%
	25			18/18"	SS-11 26.0-27.5	3-4-6 qu* = 2.25 tsf wc =18.4%
				18/18"	SS-12 28.5-30.0	3-4-6 qu* = 2.0 tsf wc = 19.7%
571.4	30		End of boring at 30.0'			No water encountered while drilling. No water encountered immediately after drilling. No water encountered after 24 hours. Hole caved to 28.0' A boring was drilled offset to obtain Shelby tube 3T-1 from 18.0'-20.0'. Recovery 22/24".

Hole No. L-639

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3-1/4" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482335.7, E 395485.5	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-639	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED 2
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 8-17-91; COMPLETED 8-17-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 599.8
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Jeff L. Doyle

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 of weathering, etc., if significant) g
599.4	0.4		Topsoil - 5"			
			Brown gray and dark gray silty clay, little fine to coarse sand, trace gravel, hard, medium plasticity, damp contains organic material, fill CL	16/18"	SS-1 1.0-2.5	7-8-10 qu* = 4.5 tsf wc = 10.4%
				16/18"	SS-2 3.5-5.0	6-7-9 qu* = 4.5 tsf wc = 14.3%
	5			10/18"	SS-3 6.0-7.5	5-7-8 qu* = 4.5 tsf wc = 15.4%
			@ 8.5', poor recovery due to limestone fragments	0/18"	SS-4 8.5-10.0	6-8-9 No recovery from 8.5' - 10.0'
	10			16/18"	SS-5 11.0-12.5	4-9-10 qu* = 4.5 tsf wc = 17.1%
				18/18"	SS-6 13.5-15.0	5-5-6 qu* = 4.25 tsf wc = 18.6%
	15					
583.8	16.0		Gray silty clay, little fine to coarse sand, trace gravel, stiff to very stiff, medium plasticity, moist CL	18/18"	SS-7 16.0-17.5	1-3-4 qu* = 2.25 tsf wc = 16.3%
				18/18"	SS-8 18.5-20.0	3-3-5 qu* = 1.4 tsf wc = 18.4%

Hole No. L-639

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 2 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3-1/4" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482335.7, E 395485.5	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-639	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED 2
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 8-17-91; COMPLETED 8-17-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 599.8
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Jeff L. Snyder

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 of weathering, etc., if significant) g
			Gray silty clay, little fine to coarse sand, trace gravel, stiff to very stiff, medium plasticity, moist CL	18/18"	SS-9 21.0-22.5	2-4-5 qu* = 3.0 tsf wc = 14.4%
576.8	23.0		Gray silty clay, trace fine to medium sand, stiff to very stiff, medium plasticity, moist CL	18/18"	SS-10 23.5-25.0	2-4-7 qu* = 1.7 tsf wc = 19.6%
	25			18/18"	SS-11 24.0-27.5	4-5-7 qu* = 1.5-3.5 tsf wc = 19.4% (3T-1,2) Q Test: (eT-1,2) c = 1.77 tsf, Ø = 0° γd = 113.1 pcf LL = 31 PI = 17
				18/18"	SS-12 28.5-30.0	3-5-6 qu* = 1.9 tsf wc = 19.9%
569.8	30.0		End of boring at 30.0'			No water encountered while drilling. No water encountered immediately after drilling. Water at 25.1' after 24 hours. Hole caved to 25.2' A boring was drilled offset 5.0' to obtain Shelby tubes 3T-1 and 3T-2 at 26.0'-30.0' 3T-1 Recovery = 24/24" 3T-2 Recovery = 24/24"

Hole No. L-640

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3-1/4" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482325.4, E 395589.0	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-640	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED 0
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 8-18-91; COMPLETED 8-18-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 599.4
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Jeffrey L. Snyder

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 of weathering, etc., if significant) g
599.1	0.3		Topsoil - 4"			
			Brown gray and dark gray silty clay, little fine to coarse sand, trace gravel, hard, medium plasticity, damp, contains organic material, fill CL	10/18"	SS-1 1.0-2.5	3-4-4 qu* = 4.5 tsf wc = 13.7%
				13/18"	SS-2 3.5-5.0	5-9-9 qu* = 4.5 tsf wc = 12.9%
	5					
				16/18"	SS-3 6.0-7.5	4-8-9 qu* = 4.5 tsf wc = 15.2%
				10/18"	SS-4 8.5-10.0	3-7-9 qu* = 4.5 tsf wc = 15.7%
	10					
			@ 11.0'-13.0', stiff to very stiff, moist	14/18"	SS-5 11.0-12.5	5-4-5 qu* = 2.0 tsf wc = 20.3%
586.4	13.0		Brown and gray silty clay, little fine to coarse sand, very stiff, medium plasticity, damp, contains roots CL	15/18"	SS-6 13.5-15.0	4-5-5 qu* = 4.0 tsf wc = 19.5%
	15					
583.9	15.5		Gray silty clay, little fine to coarse sand, trace gravel, very stiff, medium plasticity, moist CL	18/18"	SS-7 16.0-17.5	4-3-5 qu* = 2.25 tsf wc = 17.4%
				18/18"	SS-8 18.5-20.0	4-5-7 qu* = 2.25 tsf wc = 17.9%

Hole No. L-640

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 2 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3-1/4" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482325.4, E 395589.0	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-640	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED 0
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 8-18-91; COMPLETED 8-18-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 599.4
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Jeffrey L. Snyder

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 of weathering, etc., if significant) g
			Gray silty clay, trace fine to coarse sand, trace gravel, stiff, medium plasticity, moist CL	18/18"	SS-9 21.0-22.5	4-4-5 qu* = 1.5 tsf wc = 21.5%
			@ 23.5' - 30.0', little fine to coarse sand	18/18"	SS-10 23.5-25.0	2-3-6 qu* = 1.25 tsf wc = 16.6%
	25					
				18/18"	SS-11 26.0-27.5	4-5-6 qu* = 1.75 tsf wc = 19.1%
			@ 28.5' - 30.0', very stiff	18/18"	SS-12 28.5-30.0	3-5-7 qu* = 3.5 tsf wc = 18.6%
569.4	30		End of boring at 30.0'			No water encountered while drilling. No water encountered immediately after drilling. Water at 20.9' after 24 hours. Hole caved to 21.0'

Hole No. L-641

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482584.9, E 395628.1	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-641	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED -
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 8-26-91; COMPLETED 8-26-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 600.1
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Jeff L. Snyder

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 of weathering, etc., if significant) g
599.8	0.3		Topsoil - 3"			
			Brown silty clay, some fine to coarse sand, trace gravel, hard, medium plasticity, fill CL	4 / 18"	SS- 1 1.0-2.5	5-6-10 qu* = 4.5 tsf wc = 10.7%
596.6	3.5		Gray clayey silt "and" fine to coarse sand, trace gravel, hard, low plasticity, damp, fill CL-ML	14/ 18"	SS- 2 3.5-5.0	6-11-12 qu* = 4.5 tsf wc = 11.1%
	5			12/ 18"	SS- 3 6.0-7.5	4-4-5 qu* = 4.5 tsf wc = 14.3%
			@ 8.5' - 11.0', dark gray, contains coal and root fragments	13/ 18"	SS- 4 8.5-10.0	3-4-6 qu* = 4.5 tsf wc = 23.3%
	10					
589.1	11.0		Brown and gray silty clay, little fine to coarse sand, trace gravel, very stiff, medium plasticity, damp to moist, contains roots CL	8 / 18"	SS- 5 11.0-12.5	2-2-3 qu* = 3.0 tsf wc = 19.8%
			@ 13.5' - 15.0', iron-stained	16/ 18"	SS- 6 13.5-15.0	2-5-6 qu* = 3.0 tsf wc = 20.1%
	15					
584.6	15.5		Gray silt "and" fine to coarse sand, trace clay, trace gravel, medium dense, very low plasticity, moist ML	16/ 18"	SS- 7AB 16.0-17.5	4-5-5 qu* = 2.5 tsf (SS-7B) wc = 14.8% (SS-7A) wc = 19.3% (SS-7B)
583.1	17.0		Gray silty clay, little fine to coarse sand, trace gravel, very stiff, medium plasticity, moist CL			
			@ 18.5' - 20.0', stiff	18/ 18"	SS- 8 18.5-20.0	3-3-6 qu* = 1.5 tsf wc = 19.3%

Hole No. L-641

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 2 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482584.9, E 395628.1	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-641	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 10; UNDISTURBED -
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 8-26-91; COMPLETED 8-26-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 600.1
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Jeffrey L. Snyder

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 of weathering, etc., if significant) g
			Gray silty clay, little fine to coarse sand, trace gravel, stiff to very stiff, medium plasticity, moist CL			
			@ 21.0' - 22.5', contains silt lenses	18/18"	SS-9 21.0-22.5	3-3-6 qu* = 2.0 tsf wc = 20.7%
			@ 23.5' - 27.5', some fine to coarse sand	18/18"	SS-10 23.5-25.0	3-5-7 qu* = 2.0 tsf wc = 17.7%
	25			18/18"	SS-11 26.0-27.5	3-5-8 qu* = 2.0 tsf wc = 18.1%
			@ 28.5' - 30.0', very stiff	18/18"	SS-12 28.5-30.0	3-5-7 qu* = 3.5 tsf wc = 23.3%
570.1	30		End of boring at 30.0'			No water encountered while drilling. No water encountered immediately after drilling. Water at 24.5' after 24 hours. Hole caved to 26.3'.

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - West Reach | HOLE NO. L-641

Hole No. L-642

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3-1/4" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482308.4, E 395690.0	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-642	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED 0
5. NAME OF DRILLER William Wallace	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 8-18-91; COMPLETED 8-18-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 599.8
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Jeffry L. Snyder

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 of weathering, etc., if significant) g
599.5	0.3		Topsoil - 4"			
			Brown, gray and dark gray silty clay, little fine to coarse sand, trace gravel, hard, medium plasticity, damp, contains organic material, fill CL	12/18"	SS-1 1.0-2.5	5-5-7 qu* = 4.5+ tsf wc = 12.3%
				10/18"	SS-2 3.5-5.0	5-7-7 qu* = 4.5+ tsf wc = 15.0%
	5					
				13/18"	SS-3 6.0-7.5	2-5-8 qu* = 4.5+ tsf wc = 20.7%
				15/18"	SS-4 8.5-10.0	4-6-9 qu* = 4.5+ tsf wc = 15.7%
	10					
				13/18"	SS-5 11.0-12.5	6-8-9 qu* = 4.5+ tsf wc = 17.1%
586.8	13.0		Brown and gray silty clay, little fine to coarse sand, hard, medium plasticity, damp, contains roots CL	18/18"	SS-6 13.5-15.0	4-5-7 qu* = 4.5+ tsf wc = 17.6%
584.8	15		Gray silty clay, trace fine to coarse sand, very stiff, medium plasticity, moist CL	18/18"	SS-7 16.0-17.5	2-3-5 qu* = 2.75 tsf wc = 17.6%
581.8	18.0		Gray clayey silt, trace fine sand, very stiff, low plasticity, damp to moist CL-ML	18/18"	SS-8 18.5-20.0	5-13-13 qu* = 4.0 tsf

Hole No. L-642

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 2 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3-1/4" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482308.4, E 395690.0	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-642	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED 0
5. NAME OF DRILLER William Wallace	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 8-18-91; COMPLETED 8-18-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 599.8
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Jeff L. Snyder

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 of weathering, etc., if significant) g
579.3	20.5		Gray clayey silt, trace fine sand, very stiff, damp to moist CL-ML			
			Gray silty clay, some fine to coarse sand, trace gravel, stiff to very stiff, medium plasticity, moist CL	18/18"	SS- 9 21.0-22.5	2-4-5 qu* = 2.5 tsf wc = 14.5%
				18/18"	SS- 10 23.5-25.0	2-3-4 qu* = 1.75 wc = 16.0%
	25					
			@ 26.0' - 30.0', little fine to coarse sand	18/18"	SS- 11 26.0-27.5	3-3-5 qu* = 2.0 tsf wc = 18.6%
				18/18"	SS- 12 28.5-30.0	4-5-6 qu* = 1.25 tsf wc = 20.7%
569.8	30		End of boring at 30.0'			No water encountered while drilling. No water encountered immediately after drilling. No water encountered after 24 hours. Hole caved to 28.0'

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - West Reach | HOLE NO. L-642

Hole No. L-643

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT	Little Calumet River Levees - West Reach
2. LOCATION (Coordinates or Station)	N 1482298.5, E 395761.3
3. DRILLING AGENCY	Dodson-Lindblom Associates, Inc.
4. HOLE NO. (As shown on drawing title and file number)	L-643
5. NAME OF DRILLER	William Wallace
6. DIRECTION OF HOLE	☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	30.0
8. DEPTH DRILLED INTO ROCK	0.0
9. TOTAL DEPTH OF HOLE	30.0
10. SIZE AND TYPE OF BIT	3-1/4" I.D. HSA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	NGVD
12. MANUFACTURER'S DESIGNATION OF DRILL	CME 850 ATV
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 12 / UNDISTURBED 2
14. TOTAL NUMBER CORE BOXES	0
15. ELEVATION GROUND WATER	See remarks
16. DATE HOLE	STARTED 8-18-91 / COMPLETED 8-18-91
17. ELEVATION TOP OF HOLE	600.0
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	Jeff L. Snyder

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 of weathering, etc., if significant) g
599.6	0.4		Topsoil - 5"			
			Brown and gray silty clay, little fine to coarse sand, trace gravel, hard, medium plasticity, damp, contains organic material, fill CL	16/18"	SS- 1 1.0-2.5	4-4-4 qu* = 4.5+ tsf wc = 14.4%
			@ 3.5', brown and gray	13/18"	SS- 2 3.5-5.0	3-4-4 qu* = 4.5+ tsf wc = 17.8%
	5			16/18"	SS- 3 6.0-7.5	2-4-4 qu* = 4.0 tsf wc = 16.8%
591.5	8.5		Dark brown silty clay, little fine to coarse sand, hard, medium plasticity, moist, contains roots, fill CL	15/18"	SS- 4 8.5-10.0	2-3-4 qu* = 4.25 tsf wc = 18.9%
	10					
589.0	11.0		Brown and gray silty clay, trace to little fine to coarse sand, hard, medium plasticity, moist CL	16/18"	SS- 5 11.0-12.5	6-6-7 qu* = 4.5+ tsf wc = 14.3%
			@ 11.6' - 11.9', gray silty sand seam	18/18"	SS- 6 13.5-15.0	4-5-7 qu* = 4.5+ tsf wc = 74.4%
	15					
584.0	16.0		Brown silty clay, "and" fine to coarse sand, stiff, medium plasticity, moist CL	18/18"	SS- 7 16.0-17.5	2-4-4 qu* = 1.2 tsf wc = 11.6%
582.0	18.0		Gray clayey silt, little fine sand, stiff to very stiff medium plasticity, moist CL-ML	18/18"	SS- 8 18.5-20.0	3-6-6 qu* = 1.25 tsf wc = 19.6% (3T-2) UC test: (3T-2)

Hole No. L-643

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 2 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3-1/4" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482298.5, E 395761.3	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-643	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED 2
5. NAME OF DRILLER William Wallace	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 8-18-91; COMPLETED 8-18-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 600.0
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Jeffrey L. Snyder

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 of weathering, etc., if significant) g
			Gray clayey silt, little fine sand, stiff to very stiff, medium plasticity, moist CL-ML			qu = 0.99 tsf γd = 111.8 pcf LL = 22 PI = 5
				18/18"	SS-9AB 21.0-22.5	4-4-6 qu* = 2.0 tsf (SS-9A) qu* = 2.5 tsf (SS-9B) wc = 19.0% (SS-9A) wc = 19.4% (SS-9B)
578.3	21.7		Gray silty clay, some fine to coarse sand, trace gravel, very stiff to hard, medium plasticity, moist CL			
				18/18"	SS-10 23.5-25.0	2-5-5 qu* = 4.0 tsf wc = 17.0%
575.0	25					
574.0	26.0		Gray silty clay, trace fine to coarse sand, trace gravel, stiff to very stiff, medium plasticity, moist CL	18/18"	SS-11 26.0-27.5	2-4-6 qu* = 1.25 tsf wc = 20.8%
				18/18"	SS-12 28.5-30.0	3-4-6 qu* = 2.4 tsf wc = 19.1%
570.0	30		End of boring at 30.0'			No water encountered while drilling. No water encountered immediately after drilling. No water encountered after 24 hours. Hole caved to 28.8' A boring was drilled offset 5.0' to obtain Shelby tubes 3T-1 and 3T-2. 3T-1 Depth: 4.0'-6.0' Recovery = 24/24" 3T-2 Depth: 18.0'-20.0' Recovery = 24/24"

Hole No. L-644

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 3 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3-1/4" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482286.4, E 395876.5	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-644	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED -
5. NAME OF DRILLER William Wallace	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 8-18-91; COMPLETED 8-18-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 601.3
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Jeffrey L. Snyder

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 of weathering, etc., if significant) g
600.9	0.4		Topsoil - 4"			
			Brown and gray clayey silt, little fine to coarse sand, hard, low plasticity, damp, contains organic material, fill CL-ML	14/18"	SS-1 1.0-2.5	4-4-5 qu* = 4.0 tsf wc = 16.4%
597.8	3.5		Brown and gray silty clay, some fine to coarse sand, stiff to very stiff, medium plasticity, moist, contains roots and shells, slightly organic, fill CL	16/18"	SS-2 3.5-5.0	2-3-3 qu* = 4.4 tsf wc = 19.1%
	5					
			@ 7.0' - 7.2', silty sand seam	14/18"	SS-3 6.0-7.5	2-3-4 qu* = 1.5 - 2.5 tsf wc = 22.2%
593.3	8.0		Dark brown organic silty clay, little fine to medium sand, very stiff, medium plasticity, moist, contains roots, possible fill OL	15/18"	SS-4AB 8.5-10.0	2-3-4 qu* = 2.25 tsf (SS-4A) qu* = 2.75 tsf (SS-4B) wc = 22.0%
592.0	9.3		Brown and gray silty clay, little fine to coarse sand, trace gravel, very stiff, medium plasticity, moist, possible fill CL			
	10			16/18"	SS-5 11.0-12.5	2-3-4 qu* = 2.25 tsf wc = 18.4%
588.3	13.0		Brown silty clay, "and" fine to coarse sand, trace gravel, stiff, medium plasticity, moist, possible fill CL	15/18"	SS-6 13.5-15.0	3-3-3 qu* = 1.5 tsf wc = 17.2%
	15					
585.8	15.5		Brown and gray silty clay, little fine to coarse sand, trace gravel, very stiff, medium plasticity, moist CL	18/18"	SS-7 16.0-17.5	2-4-5 qu* = 2.75 tsf
583.3	18.0		Gray silty clay, trace fine to coarse sand, stiff, medium plasticity, moist CL	18/18"	SS-8 18.5-20.0	2-3-4 qu* = 2.0 tsf wc = 18.1%

Hole No. L-644

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 2 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3-1/4" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482286.4, E 395876.5	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-644	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED -
5. NAME OF DRILLER William Wallace	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 8-18-91; COMPLETED 8-18-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Jeffrey L. Snyder

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 of weathering, etc., if significant) g
			Gray silty clay, trace fine to coarse sand, stiff, medium plasticity, moist CL	18/18"	SS- 9 21.0-22.5	2-3-4 qu* = 1.25 tsf wc = 23.0%
577.8	23.5		Gray silty clay, some fine to coarse sand, trace gravel, very stiff, medium plasticity, moist CL	18/18"	SS-10 23.5-25.0	3-4-6 qu* = 3.5 tsf wc = 20.4%
	25			18/18"	SS-11 26.0-27.5	2-4-5 qu* = 2.25 tsf wc = 19.1%
				18/18"	SS-12 28.5-30.0	2-5-7 qu* = 2.5 tsf wc = 20.7%
571.3	30		End of boring at 30.0'			No water encountered while drilling No water encountered immediately after drilling Water at 20.3' after 24 hours. Hole caved to 23.5'

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - West Reach | HOLE NO. L-644

Hole No. L-645

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3-1/4" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482275.6, E 395982.6	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-645	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED 2
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 8-18-91; COMPLETED 8-18-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 600.1
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Jeffrey L. Snyder

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 of weathering, etc., if significant) g
599.8	0.3		Topsoil - 3"			
			Brown, gray and dark gray silty clay, some fine to coarse sand, trace gravel, hard, medium plasticity, damp, contains organic material, fill CL	15/18"	SS- 1 1.0-2.5	4-4-5 qu* = 4.5+ tsf wc = 11.8%
				14/18"	SS- 2 3.5-5,0	3-4-5 qu* = 4.5+ tsf wc = 15.8%
	5					
				15/18"	SS- 3 6.0-7.5	6-7-9 qu* = 4.5+ tsf wc = 17.3%
				14/18"	SS- 4 8.5-10.0	4-6-10 qu* = 4.5+ tsf wc = 17.3%
	10					
589.6	10.5		Brown and gray silty clay, little fine to coarse sand, hard, medium plasticity, moist CL	14/18"	SS- 5 11.0-12.5	5-9-12 qu* = 4.5+ tsf wc = 16.4%
				18/18"	SS- 6 13.5-15.0	4-8-10 qu* = 4.5+ tsf wc = 17.5%
	15					
584.6	15.5		Gray silty clay, trace fine to coarse sand, trace gravel, very stiff, medium plasticity, moist CL	18/18"	SS- 7 16.0-17.5	4-5-6 qu* = 3.25 tsf wc = 16.9%
			@ 18.5' - 20.0', stiff @ 19.1', silt lense	18/18"	SS- 8 18.5-20.0	5-5-5 qu* = 1.75 tsf wc= 21.1%

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - WestReach | HOLE NO. L-645

Hole No. L-645

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 2 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3-1/4" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482275.6, E 395982.6	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-645	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED 0
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 8-18-91; COMPLETED 8-18-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 600.1
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Jeffrey L. Snyder

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 of weathering, etc., if significant) g
579.6	20.5		Gray silty clay CL			
			Gray clayey silt, trace fine sand, hard, medium plasticity, moist CL-ML	18/18"	SS-9AB 21.0-22.5	5-7-7 qu* = 4.25 tsf (SS-9A) qu* = 3.25 tsf (SS-9B) wc = 18.7% (SS-9A) wc = 16.6% (SS-9B) Gravel=0% Sand = 0% Fines = 100%
578.3	21.8		Gray silty clay, some fine to coarse sand, trace gravel, stiff to very stiff, medium plasticity, damp CL			
				18/18"	SS-10 23.5-25.0	3-4-5 qu* = 2.25 tsf wc = 17.4%
	25					
			@ 26.0' - 30.0', little fine to coarse sand	18/18"	SS-11 26.0-27.5	3-4-5 qu* = 1.1 tsf wc = 18.0%
				18/18"	SS-12 28.5-30.0	3-3-4 qu* = 1.7 tsf wc = 18.4%
590.1	30		End of boring at 30.0'			No water encountered while drilling No water encountered immediately after drilling No water encountered after 24 hours. Hole caved to 28.0' A boring was drilled offset 5.0' to obtain shelby tubes 3T-1 and 3T-2 at 11.0'-15.0' 3T-1 Recovery = 24/24" 3T-2 Recovery = 22/24"

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - West Reach | HOLE NO. L-645

Hole No. L-646

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3½" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482551.3, E 395961.2	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-646	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED -
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 8-26-91; COMPLETED 8-26-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 600.6
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Jeffry L. Snyder

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 of weathering, etc., if significant) g
600.4	0.2		Topsoil - 2"			
			Brown silty clay, some fine to coarse sand, trace gravel hard, medium plasticity, damp, fill CL	14/18"	SS-1 1.0-2.5	6-7-8 qu* = 4.5+ tsf wc = 11.3%
			@ 3.5' - 4.1', gray, "and" fine to coarse sand	16/18"	SS-2AB 3.5-5.0	7-9-6 qu* = 4.5+ tsf (SS-2A) wc=11.7% (SS-2A) =7.2% (SS-2B)
596.5	4.1		Brown fine to coarse sand, little gravel, trace clay, medium dense, damp, fill SP			
	5			13/18"	SS-3AB 6.0-7.5	4-5-7 qu* = 3.75 tsf (SS-3B) wc = 8.2% (SS-3A) wc =12.9% (SS-3B)
593.6	7.0		Brown silty clay, some fine to coarse sand, trace gravel very stiff, medium plasticity, damp to moist, fill CL			
			Dark brown fine sand, little silt, trace clay, medium dense, damp, contains wood fragments and cinders, fill SM	14/18"	SS-4 8.5-10.0	6-8-10 wc = 5.4% Gravel=18% Sand=69% Fines=13%
	10					
590.1	10.5		Brown and gray silty clay, "and" fine to coarse sand, little gravel, very stiff, moist CL	10/18"	SS-5 11.0-12.5	3-1-2 qu* = 2.5 tsf wc = 15.1%
			@ 13.5' - 15.0', contains silt lenses	12/18"	SS-6 13.5-15.0	2-4-5 qu* = 2.5 tsf wc = 19.3%
	15					
584.6	16.0		Gray silty clay, little fine to coarse sand, trace gravel, stiff, medium plasticity, moist CL	18/18"	SS-7 16.0-17.5	3-4-5 qu* = 1.5 tsf wc = 21.0%
			@ 18.5' - 20.0', medium stiff to stiff, contains silt seams	18/18"	SS-8 18.5-20.0	3-3-5 qu* = 0.5 - 1.5 tsf wc = 18.6%

Hole No. L-646

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 2 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482551.3, E 395961.2	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-646	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED –
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 8-26-91; COMPLETED 8-26-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 600.6
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Jeff L. Sayles

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 of weathering, etc., if significant) g
			Gray silty clay, little fine to coarse sand, trace gravel, medium stiff to stiff, medium plasticity, moist CL @ 21.0' - 22.5', some fine to coarse sand	16/18"	SS-9 21.0-22.5	4-6-7 qu* = 1.5 tsf wc = 15.9%
577.1	23.5		Gray clayey silt, some fine to coarse sand, little gravel, very stiff, low plasticity, damp CL-ML	18/18"	SS-10 23.5-25.0	5-6-9 qu* = 4.0 tsf wc = 13.8%
	25					
574.6	26.0		Gray silty clay, little fine to coarse sand, trace gravel, stiff to very stiff, medium plasticity, moist CL	18/18"	SS-11 26.0-27.5	4-6-9 qu* = 2.0 tsf wc = 18.2%
				18/18"	SS-12 28.5-30.0	3-4-8 qu* = 1.5 - 2.5 tsf wc = 20.1%
570.6	30		End of boring at 30.0'			No water encountered while drilling. No water encountered immediately after drilling. Water at 15.8' after 24 hours. Hole caved to 18.2'.

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - West Reach | HOLE NO. L-646

Hole No. L-647

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3-1/4" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482265.0, E 396074.7	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-647	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED 0
5. NAME OF DRILLER William Wallace	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 8-18-91; COMPLETED 8-18-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 600.1
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Jeffrey L. Snyder

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 of weathering, etc., if significant) g
599.8	0.3		Topsoil - 3"			
			Brown, gray and dark gray silty clay, very fine to coarse sand, trace gravel, hard, medium plasticity, damp, contains roots, fill CL	14/18"	SS-1 1.0-2.5	6-6-7 qu* = 4.5 tsf wc = 12.3%
				14/18"	SS-2 3.5-5.0	7-5-7 qu* = 4.5+ tsf wc = 17.0%
	5			12/18"	SS-3 6.0-7.5	6-7-9 qu* = 4.5+ tsf wc = 17.8%
				10/18"	SS-4 8.5-10.0	3-5-7 qu* = 4.5+ tsf wc = 18.9%
	10			14/18"	SS-5 11.0-12.5	3-5-8 qu* = 4.5+ tsf wc = 18.0%
587.1	13.0		Brown and gray silty clay, little fine to coarse sand, trace gravel, hard, medium plasticity, damp, contains roots CL	16/18"	SS-6 13.5-15.0	2-5-8 qu* = 4.5+ tsf wc = 16.5%
	15					
584.6	15.5		Gray silty clay, little fine to coarse sand, trace gravel very stiff, medium plasticity, moist CL	18/18"	SS-7 16.0-17.5	2-3-5 qu* = 2.5 tsf wc = 18.4%
			@ 18.5' - 19.1', some fine to coarse sand	18/18"	SS-8AB 18.5-20.0	1-4-6 qu* = 2.25 tsf (SS-8A) qu* = 2.0 tsf (SS-8B) wc = 16.0% (SS-8A) wc = 18.5% (SS-8B)
581.0	19.1		Gray clayey silt, trace fine to coarse sand, stiff, low plasticity, moist CL-ML			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - WestReach HOLE NO. L-647

Hole No. L-647

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 2 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3-1/4" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482265.0, E 396074.7	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-647	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED 0
5. NAME OF DRILLER William Wallace	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 8-18-91; COMPLETED 8-18-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 600.1
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Jeffrey B. Doyle

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 of weathering, etc., if significant) g
			Gray clayey silt, trace fine to coarse sand, stiff, low plasticity, moist CL-ML			
579.1	21.0		Gray silty clay, little fine to coarse sand, trace gravel stiff to very stiff, medium plasticity, moist CL	18/18"	SS-9 21.0-22.5	4-4-6 qu* = 3.0 tsf wc = 17.5%
			@ 23.5' - 25.0', some fine to coarse sand	18/18"	SS-10 23.5-25.0	3-3-5 qu* = 1.75 tsf wc = 17.7%
	25			18/18"	SS-11 26.0-27.5	3-3-4 qu* = 1.0-1.5 tsf wc = 18.7%
				18/18"	SS-12 28.5-30.0	3-4-6 qu* = 2.5 tsf wc = 17.5%
570.1	30		End of boring at 30.0'			No water encountered while drilling No water encountered immediately after drilling No water encountered after 24 hours. Hole caved to 27.6'

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - West Reach | HOLE NO. L-647

Hole No. L-648

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3-1/4" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482258.0, E 396176.51	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-648	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED 0
5. NAME OF DRILLER William Wallace	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 8-19-91; COMPLETED 8-19-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 600.5
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Jeffrey L. Smith

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 of weathering, etc., if significant) g
600.2	0.3		Topsoil - 3"			
			Brown gray and dark gray silty clay, some fine to coarse sand, trace gravel, hard, medium plasticity, damp, contains organic material, fill CL	15/18"	SS- 1 1.0-2.5	5-5-5 qu* = 4.5+ tsf wc = 13.9%
				15/18"	SS- 2 3.5-5.0	6-6-6 qu* = 4.5+ tsf wc = 14.1%
	5			14/18"	SS- 3 6.0-7.5	4-5-5 qu* = 4.5+ tsf wc = 17.5%
			@ 9.5', dark brown, very stiff, organic	15/18"	SS- 4 8.5-10.0	3-3-4 qu* = 2.5-3.25 tsf wc = 25.7%
	10					
590.0	10.5		Brown and gray silty clay, trace fine to coarse sand, trace gravel, stiff to very stiff, medium plasticity, moist, contains organic material CL	14/18"	SS- 5 11.0-12.5	2-3-4 qu* = 1.25 tsf wc = 22.3% wc = 22.0% (3T-1) UC test (3T-1) qu = 2.4 tsf Gravel= 0% γd=105.9 pcf Sand = 6% LL = 41 Fine =94% PI = 23
				14/18"	SS- 6 13.5-15.0	2-4-6 qu* = 3.25 tsf wc = 19.9%
	15					
585.0	15.5		Gray silty clay, trace fine to coarse sand, trace gravel, stiff, medium plasticity, moist CL	18/18"	SS- 7 16.0-17.5	2-4-5 qu* = 1.25 tsf wc = 18.6%
				18/18"	SS- 8 18.5-20.0	2-4-5 qu* = 1.25 tsf wc = 18.9%

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - West Reach HOLE NO. L-648

Hole No. L-648

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 2 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3-1/4" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482258.0, E 396176.51	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-648	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED 0
5. NAME OF DRILLER William Wallace	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 8-19-91; COMPLETED 8-19-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 600.5
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Jeff L. Snyder

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 of weathering, etc., if significant) g
			Gray silty clay, trace fine to coarse sand, trace gravel stiff, medium plasticity, moist CL	18/18"	SS-9 21.0-22.5	4-5-7 qu* = 1.5 tsf wc = 16.9%
				18/18"	SS-10 23.5-25.0	4-13-10 qu* = 1.75 tsf wc = 16.5% (SS-10A) wc = 18.3% (SS-10B)
576.2	24.3		Gray silt, trace fine sand, medium dense, moist ML			
	25					
575.0	25.5		Gray silty clay, some fine to coarse sand, trace gravel, very stiff to hard, medium plasticity, moist CL	18/18"	SS-11 26.0-27.5	4-6-6 qu* = 3.25 tsf wc = 14.3%
				18/18"	SS-12 28.5-30.0	4-5-5 qu* = 4.0 tsf wc = 19.2%
570.5	30		End of boring at 30.0'			No water encountered while drilling No water encountered immediately after drilling No water encountered after 24 hours. Hole caved to 27.0' A boring was drilled offset to obtain Shelby tube 3T-1 at 11.0' - 13.0'. Recovery = 18/24"

Hole No. L-649

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3-1/4" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482272.11, E 396288.09	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-649	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED 0
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 8-19-91; COMPLETED 8-19-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 601.2
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Jeff L. Smyk

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 of weathering, etc., if significant) g
600.9	0.3		Topsoil - 3"			
			Brown, gray and dark gray silty clay, some fine to coarse sand, trace gravel, hard, medium plasticity, damp contains roots and limestone fragments, slightly organic, damp CL	12/18"	SS-1 1.0-2.5	6-6-4 qu* = 4.5+ tsf wc = 7.2%
				13/18"	SS-2 3.5-5.0	4-5-6 qu* = 4.5+ tsf wc = 12.7%
	5					
				15/18"	SS-3 6.0-7.5	3-4-5 qu* = 4.4 tsf wc = 19.8%
			@ 8.5'-10.5', stiff	14/18"	SS-4 8.5-10.0	2-4-6 No H.P. reading wc = 23.4%
	10					
590.7	10.5		Brown and gray silty clay, little fine to coarse sand, trace gravel, very stiff to hard, medium plasticity, moist, contains roots CL	18/18"	SS-5 11.0-12.5	4-6-6 qu* = 2.5 tsf wc = 19.0%
				18/18"	SS-6 13.5-15.0	4-6-7 qu* = 4.5+ tsf wc = 18.7%
	15					
585.7	15.5		Gray silty clay, trace to little fine to coarse sand, trace gravel, very stiff, medium plasticity, moist CL	18/18"	SS-7 16.0-17.5	4-6-6 qu* = 2.5 tsf wc = 18.7%
582.5	18.7		Brown fine to coarse sand, little silt, trace gravel, medium dense, wet SW-SM	18/18"	SS-8AB	4-7-9 qu* = 2.25 tsf (SS-8A) qu* = 1.25 tsf (SS-8B) Water at 18.7' while drilling
582.0	19.2		Gray, silty clay CL			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - WestReach | HOLE NO. L-649

Hole No. L-649

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 2 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3-1/4" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482272.1, E 396288.09	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-649	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED 0
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 8-19-91; COMPLETED 8-19-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 601.2
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Jeffry L. Dooley

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 of weathering, etc., if significant) g
			Gray silty clay, trace to little fine to coarse sand, trace gravel, stiff to very stiff, medium plasticity, moist CL			wc = 19.8% (SS-8A) wc = 17.3% (SS-8B) wc = 20.1% (SS-8C)
				18/18"	SS-9 21.0-22.5	4-5-6 qu* = 2.75 tsf wc = 18.7%
				18/18"	SS-10 23.5-25.0	5-5-7 qu* = 2.5 tsf wc = 18.2%
	25					
				18/18"	SS-11 26.0-27.5	6-6-6 qu* = 2.25 tsf wc = 18.2%
				18/18"	SS-12 28.5-30.0	4-5-6 qu* = 1.75 tsf wc = 15.6%
571.2	30		End of boring at 30.0'			No water encountered immediately after drilling Water at 23.1' after 24 hours. Hole caved to 24.5'

Hole No. L-650

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3-1/4" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482289.59, E 396376.38	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-650	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED 0
5. NAME OF DRILLER William Wallace	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 8-19-91; COMPLETED 8-19-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 599.5
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Jeffrey L. Smyle

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 of weathering, etc., if significant) g
599.2	0.3		Topsoil - 3"			
			Brown silty clay, little fine to coarse sand, trace gravel, hard, medium plasticity, damp, contains organic material, fill CL	14/18"	SS- 1 1.0-2.5	12-11-8 qu* = 4.5+ tsf wc = 10.6%
				14/18"	SS- 2 3.5-5.0	4-6-8 qu* = 4.5+ tsf wc = 15.0%
	5			13/18"	SS- 3 6.0-7.5	2-3-6 qu* = 4.5 tsf wc = 12.1%
				10/18"	SS- 4 8.5-10.0	3-7-9 qu* = 4.5+ tsf wc = 19.5%
	10					
588.5	11.0		Brown and gray silty clay, little fine to coarse sand, trace gravel, very stiff to hard, medium plasticity, damp, contains roots CL	16/18"	SS- 5 11.0-12.5	6-8-10 qu* = 4.5+ tsf wc = 16.6%
				18/18"	SS- 6 13.5-15.0	6-6-8 qu* = 2.8 tsf wc = 18.9%
	15					
583.5	16.0		Gray silty clay, trace fine to coarse sand, trace gravel, stiff, medium plasticity, moist CL	18/18"	SS- 7 16.0-17.5	4-5-6 qu* = 1.7 tsf wc = 19.1% UC Test (3T-1): qu = 3.01 tsf γ_d = 114.0 pcf LL = 27 PI = 12
			@ 18.5' - 20.0', contains silt seams	18/18"	SS- 8 18.5-20.0	4-4-4 qu* = 1.1 tsf wc = 18.7%

Hole No. L-650

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 2 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3-1/4" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482289.59, E 396376.38	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-650	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED 0
5. NAME OF DRILLER William Wallace	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 8-19-91; COMPLETED 8-19-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 599.5
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Jeffrey L. Snyder

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 of weathering, etc., if significant) g
			Gray silty clay, trace fine to coarse sand, trace gravel stiff, medium plasticity, moist CL			
578.5	21.0		Gray silty clay, some fine to coarse sand, trace gravel hard, medium plasticity, damp CL	18/18"	SS- 9 21.0-22.5	4-6-10 qu* = 4.5+ tsf wc = 16.2%
576.0	23.5		Gray silty clay, some fine to coarse sand, trace gravel stiff, medium plasticity, moist CL	17/18"	SS- 10 23.5-25.0	2-5-6 qu* = 1.5 tsf wc = 15.3%
	25		@ 27.0', sand seam	18/18"	SS- 11 26.0-27.5	3-5-6 qu* = 1.5 tsf wc = 16.6%
				18/18"	SS-12 28.5-30.0	6-6-8 qu* = 1.5 tsf wc = 15.6%
569.5	30		End of boring at 30.0'			No water encountered while drilling No water encountered immediately after drilling No water encountered after 24 hours. Hole caved to 28.0' A boring was drilled offset 5.0' to obtain Shelby tube 3T-1 at 16.0'-18.0' Recovery = 23/24"

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - West Reach | HOLE NO. L-650

Hole No. L-651

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3-1/4" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482353.8, E 396432.04	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-651	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED 0
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 8-19-91; COMPLETED 8-19-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 597.4
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Jeff L. Snyder

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 of weathering, etc., if significant) g
597.4			Dark brown clayey silt, some fine to coarse sand, low plasticity, damp, contains organic material, fill CL-ML			No topsoil
				13/18"	SS-1 1.0-2.5	4-4-5 No H.P. reading wc = 18.4%
593.9	3.5		Black, brown and gray silty clay, some fine to coarse sand, trace gravel, soft, medium plasticity, moist, contains organic material, fill CL	13/18"	SS-2 3.5-5.0	0-0-5 qu* = 0.25 tsf wc = 35.4%
	5					
591.4	6.0		Brown fine sand, trace silt, loose to very loose, wet, contains silty clay lenses, fill SP	18/18"	SS-3 6.0-7.5	2-2-2 Water at 6.0' while drilling wc = 21.2%
				18/18"	SS-4 8.5-10.0	2-2-3 wc = 25.0%
	10					
				18/18"	SS-5 11.0-12.5	0-1-4 wc = 24.6%
				18/18"	SS-6 13.5-15.0	3-2-3 Sand heaved 2.0' into hollow stem augers wc = 22.5%
	15					
581.4	16.0		Gray silty clay, little fine to coarse sand, trace gravel, stiff, medium plasticity, moist CL	18/18"	SS-7 16.0-17.5	3-5-8 qu* = 1.75 tsf wc = 17.0%
				18/18"	SS-8 18.5-20.0	4-6-10 qu* = 2.0 tsf wc = 18.3%

Hole No. L-651

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 2 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3-1/4" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482353.8, E 396432.04	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-65I	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED 0
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 8-19-91; COMPLETED 8-19-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 597.4
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Jeffry L. Snyder

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 of weathering, etc., if significant) g
			Gray silty clay, little to some fine to coarse sand, trace gravel, stiff to very stiff, medium plasticity, moist CL	18/18"	SS-9 21.0' 22.5	5-8-10 qu* = 3.0 tsf wc = 17.5%
				18/18"	SS-10 23.5-25.0	5-8-12 qu* = 2.75 tsf wc = 19.1%
	25			18/18"	SS-11 26.0-27.5	5-6-8 qu* = 1.75 tsf wc = 19.2%
				18/18"	SS-12 28.5-30.0	4-6-8 qu* = 1.75 tsf wc = 18.9%
567.4	30		End of boring at 30.0'			Water at 8.6' immediately after drilling Water at 7.5' after 24 hours. Hole caved to 9.1'

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - West Reach | HOLE NO. L-651

Hole No. L-652

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3-1/4" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482417.03, E 396436.16	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-652	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN — DISTURBED 12 — UNDISTURBED 1
5. NAME OF DRILLER William Wallace	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE — STARTED 8-20-91 — COMPLETED 8-20-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 597.9
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Jeff R. Snyder

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 of weathering, etc., if significant) g
597.9			Brown fine sand, loose, damp, contains silty clay seams and roots, fill SP			No topsoil
				10/18"	SS-1 1.0-2.5	2-3-2 wc = 14.8%
				12/18"	SS-2 3.5-5.0	2-3-2 wc = 15.6%
	5					
591.9	6.0		Dark gray and brown silty clay, little fine to coarse sand, trace gravel, very stiff, medium plasticity, moist, contains roots, fill CL	16/18"	SS-3 6.0-7.5	2-3-5 qu* = 3.0 tsf wc = 23.4%
589.4	8.5		Brown fine sand, trace silt, medium dense, moist, fill SP	14/18"	SS-4 8.5-10.0	4-9-14 wc = 19.2%
	10					
586.9	11.0		Gray and brown silty clay, trace fine to coarse sand, trace gravel, stiff, medium plasticity, moist CL @ 11.3' and 11.9', sand seams	17/18"	SS-5 11.0-12.5	3-3-5 1.75 tsf wc = 20.2%
584.4	13.5		Grayish brown silty clay, trace fine sand, very stiff, medium plasticity, moist CL	18/18"	SS-6 13.5-15.0	2-4-6 qu* = 3.0 tsf Water at 13.5' while drilling wc = 19.6%
	15					
581.9	16.0		Gray silty clay, trace fine to coarse sand, medium stiff to stiff, medium plasticity, moist CL	18/18"	SS-7 16.0-17.5	3-3-5 qu* = 1.25 tsf wc = 18.5%
				18/18"	SS-8 18.5-20.0	3-3-5 qu* = 0.75 tsf wc = 18.7%

Hole No. L-652

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 2 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3-1/4" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482417.03, E 396436.16	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-652	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED 1
5. NAME OF DRILLER William Wallace	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 8-20-91; COMPLETED 8-20-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 597.9
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Jeffrey L. Snyder

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 of weathering, etc., if significant) g
			Gray silty clay, trace fine to coarse sand, medium stiff medium plasticity, moist CL			
576.9	21.0		Gray silty clay, some fine to coarse sand, trace gravel stiff to very stiff, medium plasticity, moist CL	18/18"	SS-9 21.0-22.5	3-5-8 qu* = 2.5 tsf wc = 14.2%
				18/18"	SS-10 23.5-25.0	4-6-12 qu* = 2.25 tsf wc = 18.0%
	25		@ 26.0' - 31.5', little fine to coarse sand	18/18"	SS-11 26.0-27.5	3-5-8 qu* = 2.5 tsf wc = 19.3%
				24/24	3T-1 28.0-30.0	qu* = 2.0-2.5 tsf wc = 19.6% UC Test (3T-1): qu = 2.12 tsf γd = 111.1 pcf LL = 32 PI = 15
	30			18/18	SS-12 30.0-31.5	4-6-8 qu* = 1.75 tsf wc = 19.6%
566.4	31.5		End of boring at 31.5'			Water at 13.5' immediately after drilling Water at 8.3' after 24 hours. Hole caved to 13.8'

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - West Reach | HOLE NO. L-652

Hole No. L-654

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 1 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3-¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482624.35, E 396385.43	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-654	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 11; UNDISTURBED 1
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE [XX] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 8-27-91; COMPLETED 8-27-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 600.2
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Jeffrey L. Snyder

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 of weathering, etc., if significant) g
599.9	0.3		Topsoil - 4"			
			Gray clayey silt, "and" fine to coarse sand, little gravel, hard, low plasticity, damp, fill CL-ML	14/18"	SS- 1 1.0-2.5	5-5-5 qu* = 4.5+ tsf wc = 11.4%
				14/18"	SS- 2 3.5-5.0	7-8-9 qu* = 4.5+ tsf wc = 12.8%
	5.0					
594.2	6.0		Dark gray silty clay, some fine to coarse sand, little gravel, very stiff, medium plasticity, damp to moist, contains sand seams, fill CL	14/18"	SS- 3 6.0-7.5	3-4-5 qu* = 3.0 tsf wc = 17.6%
591.7	8.5		Black organic silty clay, little fine to coarse sand, trace gravel, very stiff, high plasticity, damp to moist OH	15/18"	SS- 4 8.5-10.0	3-4-5 qu* = 2.5 tsf wc = 21.9 %
589.2	11.0		Brown and gray silty clay, little fine to coarse sand, trace gravel, very stiff, medium plasticity, damp to moist, contains sand seams CL	16/18"	SS- 5 11.0-12.5	3-4-5 qu* = 3.0 tsf wc = 18.4 %
586.7	13.5		Brown silty clay, little fine to coarse sand, trace gravel, very stiff, medium plasticity, moist, iron-stained CL	16/18"	SS- 6 13.5-15.0	3-4-6 qu* = 3.5 tsf wc = 20.3%
	15.0					
584.2	16.0		Gray silty clay, little fine to coarse sand, trace gravel, stiff to very stiff, medium plasticity, moist CL	18/18"	SS- 7 16.0-17.5	3-3-6 qu* = 1.5-2.5 tsf wc = 19.0%
				23/24"	3T-1 18.0-20.0	qu* = 1.75 - 2.0 tsf wc = 18.7% UC Test (3T-1): qu = 142 tsf γd = 114.1 pcf LL = 29 PI = 13

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - West Reach HOLE NO. L-654

Hole No. L-654

DRILLING LOG	DIVISION North Central	INSTALLATION Chicago District	SHEET 2 OF 2 SHEETS

1. PROJECT Little Calumet River Levees - West Reach	10. SIZE AND TYPE OF BIT 3-¼" I.D. HSA
2. LOCATION (Coordinates or Station) N 1482624.35, E 396385.43	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD
3. DRILLING AGENCY Dodson-Lindblom Associates, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL CME 850 ATV
4. HOLE NO. (As shown on drawing title and file number) L-654	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 11; UNDISTURBED 1
5. NAME OF DRILLER John Benson	14. TOTAL NUMBER CORE BOXES 0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER See remarks
	16. DATE HOLE: STARTED 8-27-91; COMPLETED 8-27-91
7. THICKNESS OF OVERBURDEN 30.0	17. ELEVATION TOP OF HOLE 600.2
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 30.0	19. SIGNATURE OF INSPECTOR Jeffry L. Snyder

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 of weathering, etc., if significant) g
			Gray silty clay, little fine to coarse sand, trace gravel, stiff, medium plasticity, moist, contains silt lenses CL	18/18"	SS- 8 21.0-22.5	4-4-6 qu* = 1.5 tsf wc = 19.2% water at 21.0' while drilling
			@ 23.5'-25.0', very stiff	18/18"	SS- 9 23.5-25.0	4-4-6 qu* = 2.5 tsf wc = 18.3%
575.2	25.0					
			@ 26.0'-27.5', some fine to coarse sand, contains silt seams	18/18"	SS-10 26.0-27.5	3-4-5 qu* = 1.75 tsf wc = 15.5%
				18/18"	SS-11 28.5-30.0	4-4-6 qu* = 1.5 tsf wc = 19.3%
570.2	30.0		End of boring at 30.0'.			No water encountered immediately after drilling. Water at 10.3 after 24 hours. Hole caved to 13.9'.

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Little Calumet River Levees - West Reach | HOLE NO. L-654

HOLE NO. C-1

DRILLING LOG

DIVISION	North Central
INSTALLATION	Chicago District
SHEET	1 OF 2 SHEETS
1. PROJECT	Little Calumet River, IN
JOB NUMBER	200604307
2. LOCATION (Coordinates or Station)	Sta. 1920 - N1481433.4450; E390575.1897
3. DRILLING AGENCY	Subsurface Exploration, Inc.
4. HOLE NO. (As shown on drawing title and file number)	C-1
5. NAME OF DRILLER	Mark Baker
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	N/A
8. DEPTH DRILLED INTO ROCK	N/A
9. TOTAL DEPTH OF HOLE	35.0
10. SIZE AND TYPE OF BIT	4 in. PA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	NGVD 29; NAD 17 (IN St. Plane)
12. MANUFACTURER'S DESIGNATION OF DRILL	Diedrich D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 14; UNDISTURBED
14. TOTAL NUMBER CORE BOXES	N/A
15. ELEVATION GROUND WATER	586.8
16. DATE HOLE	STARTED 8-10-06; COMPLETED 8-10-06
17. ELEVATION TOP OF HOLE	601.80
18. TOTAL CORE RECOVERY FOR BORING	N/A %
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
			Clayey silt - brown - loose, moist (ML)	42	S-1 0 - 2.0	2-2-3-4 WC=17.1%
598.8	3.0					
598.3	3.5		Silty fine sand - brown- loose - moist (SP-SM)	50	S-2 2.5 - 4.5	3-4-6-8 WC=5.9%
			Clayey silt - brown - medium dense - moist (ML)	50	S-3 5.0 - 7.0	5-5-6-8 WC=14.8%
				58	S-4 7.5 - 9.5	4-4-4-6 WC=14.8%
591.8	10.0					
			Medium sand - gray - medium dense - moist (SP)	42	S-5 10.0 - 12.0	4-1-7-10 WC=4.2%
589.3	12.5					
			Sandy silt, little clay - dark brown to black - loose - saturated (SM)	58	S-6 12.5 - 14.5	2-1-1-1 WC=35.8%
586.8	15.0					Water at 15 ft. WD
			Organic silty clay - black - medium dense - moist (OH)	54	S-7 15.0 - 17.0	2-2-4-7 WC=77.3% LL=70%, PL=39%, PI=31%
583.8	18.0					
			Silty clay, trace fine sand - gray - stiff to very stiff (CL)	67	S-8 17.5 - 19.5	7-7-10-13 WC=13.5% Qp=1.5

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE 601.8

Hole No. C-1

PROJECT: Little Calumet River, IN

INSTALLATION: Chicago District

SHEET 2 OF 2 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 - stiff to very stiff (CL)	75	S-9 20.0 - 22.0	5-8-11-12 Qp=2.0 tsf WC=17.1%
			Silt fraction increases with depth.			
				58	S-10 22.5 - 24.5	3-7-8-11 Qp=2.0 tsf WC=18.1%
				83	S-11 25.0 - 27.0	8-9-14 Qp=2.0 tsf
				83	S-12 27.5 - 29.0	8-13-21 Qp=2.75 tsf
				83	S-13 30.0 - 31.5	10-16-25 Qp=2.5 tsf
				75	S-14 33.0 - 35.0	7-9-15-26 Qp=3.0 tsf
566.8	35.0		End of Boring Borehole backfilled with soil cuttings and bentonite chips upon completion.			

DRILLING LOG

DIVISION	North Central
INSTALLATION	Chicago District
SHEET	1 OF 2 SHEETS
1. PROJECT	Little Calumet River, IN
JOB NUMBER	200604307
2. LOCATION (Coordinates or Station)	Sta. 1917 - N1481300.7694; E390988.8319
3. DRILLING AGENCY	Subsurface Exploration, Inc.
4. HOLE NO. (As shown on drawing title and file number)	C-2
5. NAME OF DRILLER	Mark Baker
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	N/A
8. DEPTH DRILLED INTO ROCK	N/A
9. TOTAL DEPTH OF HOLE	33.5
10. SIZE AND TYPE OF BIT	4 in. PA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	NGVD 29; NAD 17 (IN St. Plane)
12. MANUFACTURER'S DESIGNATION OF DRILL	Diedrich D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 14; UNDISTURBED
14. TOTAL NUMBER CORE BOXES	N/A
15. ELEVATION GROUND WATER	569.3
16. DATE HOLE	STARTED 8-10-06; COMPLETED 8-10-06
17. ELEVATION TOP OF HOLE	602.30
18. TOTAL CORE RECOVERY FOR BORING	N/A %
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
			Clayey silt - brown - medium dense - moist (ML-CL)	42	S-1 0 - 2.0	4-6-6-6 WC=17.5%
				50	S-2 2.5 - 4.5	4-5-5-7 WC=16.4%
				50	S-3 5.0 - 7.0	3-4-5-6 WC=17.3%
594.8	7.5		Fine sand, trace silt - yellow brown - medium dense - moist (SP)	83	S-4 7.5 - 9.5	3-4-4-6 WC=7.4%
				100	S-5 10.0 - 12.0	4-7-8-9 WC=19.0
590.3	12.0		Clayey silt - brown to brownish gray - medium dense - moist (ML-CL)	75	S-6 12.5 - 14.5	4-6-6-9 WC=21.2%
587.3	15.0		Silty clay, trace fine sand and fine gravel - gray - very stiff (CL)	83	S-7 15.0 - 17.0	4-6-9-10 Qp=3.7 tsf WC=19.1%
585.3	17.0		Silty clay, trace sand - gray - very stiff to stiff (CL)	67	S-8 17.5 - 19.0	8-10-15 WC=18.9%

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE 602.3

Hole No. C-2

PROJECT: Little Calumet River, IN

INSTALLATION: Chicago District

SHEET 2 OF 2 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 - gray - very stiff to stiff (CL)	83	S-9 20.0 - 22.0	4-6-6-13 Qp=2.0 tsf WC=20.0%
				79	S-10 22.5 - 24.5	6-7-9-11 Qp=1.5 tsf WC=20.4%
				55	S-11 25.0 - 26.5	9-12-15 Qp=1.75 tsf
			Common veins of gray silt			
				55	S-12 17.5 - 29.0	7-9-14 Qp=1.5 tsf
				55	S-13 30.0 - 31.5	7-15-20
569.3	33.0				S-14 33.0 - 33.5	Water at 33 ft. WS 103/6"
568.8	33.5		Clayey silt - gray - extremely dense - moist (ML)	66		
			End of Boring Borehole backfilled with soil cuttings and bentonite chips upon completion.			

HOLE NO. C-3

DRILLING LOG

DIVISION	North Central
INSTALLATION	Chicago District
SHEET	1 OF 1 SHEETS
1. PROJECT	Little Calumet River, IN
JOB NUMBER	200604307
2. LOCATION (Coordinates or Station)	Sta. 1762 - N1481347.3906; E390656.0176
3. DRILLING AGENCY	Subsurface Exploration, Inc.
4. HOLE NO. (As shown on drawing title and file number)	C-3
5. NAME OF DRILLER	Chris Franks
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	N/A
8. DEPTH DRILLED INTO ROCK	N/A
9. TOTAL DEPTH OF HOLE	15.0
10. SIZE AND TYPE OF BIT	4 in. PA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	NGVD 29; NAD 17 (IN St. Plane)
12. MANUFACTURER'S DESIGNATION OF DRILL	CME-45
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 6; UNDISTURBED
14. TOTAL NUMBER CORE BOXES	N/A
15. ELEVATION GROUND WATER	Dry Hole
16. DATE HOLE	STARTED 8-4-06; COMPLETED 8-4-06
17. ELEVATION TOP OF HOLE	594.00
18. TOTAL CORE RECOVERY FOR BORING	N/A %
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
593.0	1.0		Fill: Organic clayey silt, trace roots and sand - black - loose - moist (OL)	50	S-1 0 - 2.0	2-2-3-3
			Fine to medium sand - brown - medium dense - moist (SP)	50	S-2 2.5 - 4.5	3-3-4-6
589.0	5.0		Silty clay, trace fine sand - dark brown - very stiff (CL)	63	S-3 5.0 - 7.0	3-4-7-9 Qp=2.5 tsf
			Grayish brown below 7.5 ft.	83	S-4 7.5 - 9.5	10-10-11-12
			Gray below 10 ft.	75	S-5 10.0 - 12.0	4-6-7-7 Qp=2.0 tsf
				63	S-6 13.0 - 15.0	7-9-10-10
579.0	15.0		End of Boring Borehole backfilled with soil cuttings and bentonite chips upon completion.			

HOLE NO. C-4

DRILLING LOG

DIVISION	North Central
INSTALLATION	Chicago District
SHEET	1 OF 2 SHEETS
1. PROJECT	Little Calumet River, IN
JOB NUMBER	200604307
2. LOCATION (Coordinates or Station)	Sta. 252 - N1481531.0272; E391652.0145
3. DRILLING AGENCY	Subsurface Exploration, Inc.
4. HOLE NO. (As shown on drawing title and file number)	C-4
5. NAME OF DRILLER	Chris Franks
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	N/A
8. DEPTH DRILLED INTO ROCK	N/A
9. TOTAL DEPTH OF HOLE	35.0
10. SIZE AND TYPE OF BIT	4 in. PA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	NGVD 29; NAD 17 (IN St. Plane)
12. MANUFACTURER'S DESIGNATION OF DRILL	CME-45
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 14; UNDISTURBED
14. TOTAL NUMBER CORE BOXES	N/A
15. ELEVATION GROUND WATER	588.1
16. DATE HOLE	STARTED 8-2-06; COMPLETED 8-2-06
17. ELEVATION TOP OF HOLE	595.10
18. TOTAL CORE RECOVERY FOR BORING	N/A %
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: Organic silt loam - dark brown - medium dense - moist (OL) Roots noted throughout.	42	S-1 0 - 2.0	4-4-5-5 WC=18.0
593.1	2.0		Clayey fine sand - dark brown - medium dense to loose, moist (SC)			
				67	S-2 2.5 - 4.0	5-4-8 WC=29.7
				55	S-3 6.0 - 6.5	5-3-3 WC=20.8
						Water at 7 ft. WS
587.1	8.0		Organic clay, trace fine sand, silt and roots - black to dark brown - loose - moist (OH)	54	S-4 7.5 - 9.5	WOH-1-2-2 WC=53.0% LL=64%, PL=46%, PI=18%
585.1	10.0		Silty clay, trace fine sand - gray - stiff (CL)	63	S-5 10.0 - 12.0	2-3-4-4 Qp=1.0 to 1.5 tsf WC=25.9%
				63	S-6 12.5 - 14.5	3-3-5-6 Qp=1.5 tsf WC=17.9%
				83	S-7 15.0 - 17.0	3-4-6-7 Qp=1.5 tsf WC=18.8%
				100	S-8 17.5 - 19.5	4-6-8-10 Qp=1.5 tsf WC=19.6

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE 595.1

Hole No. C-4

PROJECT: Little Calumet River, IN

INSTALLATION: Chicago District

SHEET 2 OF 2 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 - stiff (CL)	100	S-9 20.0 - 22.0	5-5-8-13 Qp=1.5 tsf WC=18.0%
				67	S-10 22.5 - 24.5	8-11-17-17 WC=17.7%
571.1	24.0		Clayey silt - gray - dense to medium dense - moist (ML)			
				71	S-11 25.0 - 27.0	11-17-20-20
				67	S-12 27.5 - 29.5	14-15-17-20
564.1	31.0		Silty clay, trace fine sand and fine gravel - gray - very stiff (CL)	75	S-13 30.0 - 32.0	7-8-10-10
				75	S-14 33.0 - 35.0	9-11-13-15 Qp=2.0 tsf
560.1	35.0		End of Boring Borehole backfilled with soil cuttings and bentonite chips upon completion.			

HOLE NO. C-5

DRILLING LOG

DIVISION	North Central
INSTALLATION	Chicago District
SHEET	1 OF 2 SHEETS
1. PROJECT	Little Calumet River, IN
JOB NUMBER	200604307
2. LOCATION (Coordinates or Station)	Sta. 251 - N1481548.4699; E391831.7350
3. DRILLING AGENCY	Subsurface Exploration, Inc.
4. HOLE NO. (As shown on drawing title and file number)	C-5
5. NAME OF DRILLER	Chris Franks
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	N/A
8. DEPTH DRILLED INTO ROCK	N/A
9. TOTAL DEPTH OF HOLE	34.0
10. SIZE AND TYPE OF BIT	4 in. PA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	NGVD 29; NAD 17 (IN St. Plane)
12. MANUFACTURER'S DESIGNATION OF DRILL	CME-45
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 14; UNDISTURBED
14. TOTAL NUMBER CORE BOXES	N/A
15. ELEVATION GROUND WATER	585.3
16. DATE HOLE	STARTED 8-2-06; COMPLETED 8-2-06
17. ELEVATION TOP OF HOLE	595.30
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	

ELEVATION (ft) a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Fill: Silty clay, trace fine sand and fine gravel - dark brown - very stiff to medium (CL)	58	S-1 0 - 2.0	3-3-4-4- Qp=2.5 tsf WC=16.4%
				54	S-2 2.5 - 4.5	4-4-3-4 Qp=<1.0 tsf WC=23.6%
591.3	4.0		Silty clay, trace fine sand - yellow brown to brown - stiff - moist (CL)	63	S-3 5.0 - 7.0	4-4-6-7 Qp=1.25 tsf WC=21.7%
				63	S-4 7.5 - 9.5	7-7-6-6 WC=24.9%
585.3	10.0		Silty clay, trace fine sand - gray - very stiff (CL)			Water at 10 ft. WD
				71	S-5 10.0 - 12.0	6-7-10-13 Qp=2.0 tsf WC=18.7%
				75	S-6 12.5 - 14.5	8-9-10-10 Qp=2.0 tsf WC=18.2%
				100	S-7 15.0 - 17.0	7-7-10-12 Qp=2.0 tsf WC=18.3%
				100	S-8 17.5 - 19.5	10-11-14-13 WC=17.2%

DRILLING LOG (Cont Sheet) ELEVATION TOP OF HOLE 595.3 **Hole No. C-5**

PROJECT: Little Calumet River, IN | INSTALLATION: Chicago District | SHEET 2 OF 2 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 - very stiff (CL)	100	S-9 20.0 - 22.0	5-6-8-9 WC=19.4%
				100	S-10 22.5 - 24.5	7-8-9-10 WC=19.3%
569.3	26.0		Clayey silt - gray - dense to very dense - saturated (ML-CL)	67	S-11 25.0 - 27.0	8-17-23-24
			Sample 12 was saturated.	63	S-12 27.5 - 29.5	16-24-27-25
			More clay noted below 30 ft.	54	S-13 30.0 - 32.0	20-27-30-34
561.3	34.0			50	S-14 33.0 - 34.0	15-50
			End of Boring Borehole backfilled with soil cuttings and bentonite chips upon completion.			

DRILLING LOG

DIVISION	North Central
INSTALLATION	Chicago District
SHEET	1 OF 2 SHEETS
1. PROJECT	Little Calumet River, IN
JOB NUMBER	200604307
2. LOCATION (Coordinates or Station)	Sta. 250 - N1481545.5228; E392035.6909
3. DRILLING AGENCY	Subsurface Exploration, Inc.
4. HOLE NO. (As shown on drawing title and file number)	C-6
5. NAME OF DRILLER	Chris Franks
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	N/A
8. DEPTH DRILLED INTO ROCK	N/A
9. TOTAL DEPTH OF HOLE	34.5
10. SIZE AND TYPE OF BIT	4 in. PA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	NGVD 29; NAD 17 (IN St. Plane)
12. MANUFACTURER'S DESIGNATION OF DRILL	CME-45
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 14; UNDISTURBED
14. TOTAL NUMBER CORE BOXES	N/A
15. ELEVATION GROUND WATER	583.3
16. DATE HOLE	STARTED 8-3-06; COMPLETED 8-3-06
17. ELEVATION TOP OF HOLE	595.80
18. TOTAL CORE RECOVERY FOR BORING	N/A %
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, trace fine sand and roots - dark brown and gray - desiccated (CL)	33	S-1 0 - 2.0	3-2-3-3 WC=19.8%
593.3	2.5					
			Fill: Silty clay, trace fine sand and roots - dark brown and brown - stiff (CL)	42	S-2 2.5 - 4.5	4-4-4-4 Qp=<1.0 tsf WC=27.4%
590.8	5.0					
			Silt, trace clay - gray - medium dense - moist (ML)	58	S-3 5.0 - 7.0	4-5-6-6 WC=21.4%
				54	S-4 7.5 - 9.5	7-7-6-8
				62	S-5 10.0 - 12.0	4-4-7-8 WC=21.5%
583.3	12.5					Water at 12.5 ft. WS
			Clayey silt - yellow brown - medium dense - saturated (CL-ML)	83	S-6 12.5 - 14.5	4-5-8-6 WC=18.7% LL=21%, PL=15%, PI=6% Grain size: Fine Gravel=0.3%, Coarse Sand=0.2%, Fine Sand=0.2%, Silt=83.6%, Clay=15.7%
581.3	14.5					
			Clayey silt - dark gray - medium dense - moist (ML-CL)	83	S-7 15.0 - 17.0	5-7-10-14 Qp=3.0 tsf WC=16.9%
				58	S-8 17.5 - 19.5	6-8-11-11 WC=21.8%

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE 595.8

Hole No. C-6

PROJECT: Little Calumet River, IN

INSTALLATION: Chicago District

SHEET 2 OF 2 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
574.8	21.0		Clayey silt - dark gray - medium dense - moist (ML-CL)	54	S-9 10.0 - 22.0	5-6-8-11 WC=19.6%
			Silty clay, trace fine sand - gray - stiff (CL)	67	S-10 22.5 - 24.5	8-10-11-11 Qp=1.5 tsf WC=20.5%
569.8	26.0		Clayey silt - gray - medium dense to dense moist (ML)	50	S-11 25.0 - 27.0	11-15-15-18' WC=16.9%
				33	S-12 27.5 - 29.5	6-6-10-14
				33	S-13 30.0 - 32.0	13-16-21-24
				33	S-14 32.5 - 34.5	17-21-21-24
561.3	34.5		End of Boring Borehole backfilled with soil cuttings and bentonite chips upon completion.			

HOLE NO. C-7

DRILLING LOG

DIVISION	North Central
INSTALLATION	Chicago District
SHEET	1 OF 2 SHEETS
1. PROJECT	Little Calumet River, IN
JOB NUMBER	200604307
2. LOCATION (Coordinates or Station)	Sta. 261 - N1481524.6084; E392545.5872
3. DRILLING AGENCY	Subsurface Exploration, Inc.
4. HOLE NO. (As shown on drawing title and file number)	C-7
5. NAME OF DRILLER	Chris Franks
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	N/A
8. DEPTH DRILLED INTO ROCK	N/A
9. TOTAL DEPTH OF HOLE	34.0
10. SIZE AND TYPE OF BIT	4 in. PA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	NGVD 29; NAD 17 (IN St. Plane)
12. MANUFACTURER'S DESIGNATION OF DRILL	CME-45
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 14; UNDISTURBED
14. TOTAL NUMBER CORE BOXES	N/A
15. ELEVATION GROUND WATER	Dry Hole
16. DATE HOLE	STARTED 8-3-06; COMPLETED 8-3-06
17. ELEVATION TOP OF HOLE	591.80
18. TOTAL CORE RECOVERY FOR BORING	N/A %
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, trace fine sand - yellow brown to gray - hard to stiff (CL)	44	S-1 0 - 2.0	2-3-4-4 Qp=4.0 tsf WC=17.5%
				42	S-2 2.5 - 4.5	5-5-4-5 Qp=1.5 tsf WC=21.7
586.8	5.0		Clayey silt - yellow brown - medium dense - moist (CL)	54	S-3 5.0 - 7.0	3-5-6-8 WC=20.2%
583.8	8.0		Silt, some clay - gray - medium dense - moist (ML)	58	S-4 7.5 - 9.5	8-11-11-11 WC=20.0%
				63	S-5 10.0 - 12.0	5-5-7-9 WC=16.9% Grain size: Fine Gravel=1.1%, Coarse Sand=1.1%, Medium Sand=4%, Fine Sand=7%, Silt=54.5%, Clay=32.3%
578.8	13.0		Silty clay, trace, fine sand and fine gravel - gray - stiff to hard (CL)	63	S-6 12.5 - 14.5	6-8-10-10 Qp=1.5 tsf WC=18.1%
				75	S-7 15.0 - 17.0	5-6-9-11 Qp=3.0 tsf WC=19.8%
				83	S-8 17.5 - 19.5	6-6-8-9 Qp=2.0 tsf WC=18.9%

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE 591.8

Hole No. C-7

PROJECT: Little Calumet River, IN

INSTALLATION: Chicago District

SHEET 2 OF 2 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 and fine gravel - gray - stiff to hard (CL)	100	S-9 10.0 - 22.0	9-1-13-15 Qp=1.5 tsf WC=16.6%
				50	S-10 22.5 - 24.5	28-35-43 Qp=4.5 tsf WC=18.1%
566.3	25.5		Silt - gray - very dense to extremely dense - moist (ML)	55	S-11 25.0 - 26.5	23-30-33
				55	S-12 27.0 - 28.5	28-35-43
				40	S-13 30.0 - 31.25	15-19-50/3"
				33	S-14 33.0 - 34.0	42-73
557.8	34.0		End of Boring Borehole backfilled with soil cuttings and bentonite chips upon completion.			

HOLE NO. C-8

DRILLING LOG

DIVISION	North Central
INSTALLATION	Chicago District
SHEET	1 OF 2 SHEETS
1. PROJECT	Little Calumet River, IN
JOB NUMBER	200604307
10. SIZE AND TYPE OF BIT	4 in. PA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	NGVD 29; NAD 17 (IN St. Plane)
2. LOCATION (Coordinates or Station)	Sta. 1570 - N1481662.2693; E392545.5872
12. MANUFACTURER'S DESIGNATION OF DRILL	CME-45
3. DRILLING AGENCY	Subsurface Exploration, Inc.
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 15; UNDISTURBED
4. HOLE NO. (As shown on drawing title and file number)	C-8
14. TOTAL NUMBER CORE BOXES	N/A
5. NAME OF DRILLER	Chris Franks
15. ELEVATION GROUND WATER	584.7
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.
16. DATE HOLE	STARTED 8-4-06; COMPLETED 8-4-06
17. ELEVATION TOP OF HOLE	599.70
7. THICKNESS OF OVERBURDEN	N/A
18. TOTAL CORE RECOVERY FOR BORING	N/A %
8. DEPTH DRILLED INTO ROCK	N/A
19. SIGNATURE OF INSPECTOR	J.B. Jones
9. TOTAL DEPTH OF HOLE	34.0

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 sand - yellow, brown and gray - stiff (CL)	50	S-1 0 - 2.0	2-3-4-4 Qp=1.5 tsf WC=17.1% Sediment depth in drainage way adjacent to boring C-9 ranged from 2.0-2.5 feet as measured using a tile probe push rod.
597.2	2.5					
596.7	3.0		Fill: Silty clay, - black and gray - medium dense (OL-CL)			
			Organic clayey silt - black - medium dense - moist (OL)	50	S-2 2.5 - 4.5	6-7-7-7 WC=17.1%
				63	S-3 5.0 - 7.0	5-5-6-5 Qp=4.0 tsf WC=22.4% - Sample 3 WC=29.5% - Sample 3A
593.7	6.0		Silty clay, trace fine sand - black - hard (CL-OL)			
592.2	7.5		Clayey silt, trace fine sand - gray - medium dense - moist (ML-CL)	100	S-4 7.5 - 9.5	6-6-6-6 Qp=1.5 tsf WC=20.1% LL=38%, PL=16%, PI=22% Grain size: Fine Gravel=0.4%, Coarse Sand=0.7%, Medium Sand=3.9%, Fine Sand=11.9%, Silt=44.4%, Clay=38.7%
				25	S-5 10.0 - 12.0	4-5-5-6 WC=19.7%
586.7	13.0		Silt, some clay - gray - medium dense - moist (ML)	54	S-6 12.5 - 14.5	5-5-9-7 WC=20.3%
						Water at 15 ft. WS
				83	S-7 15.0 - 17.0	3-4-5-5 WC=31.0%
582.9	16.8		Silty clay, trace fine sand and fine gravel - brownish gray to gray - stiff - (CL)			
				100	S-8 17.5 - 19.5	4-5-6-7 Qp=1.5 tsf WC=23.5%

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE 599.7

Hole No. C-8

PROJECT: Little Calumet River, IN

INSTALLATION: Chicago District

SHEET 2 OF 2 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 and fine gravel - brownish gray to gray - stiff - (CL)	71	S-9 20.0 - 22.0	4-5-7-7 WC=26.3%
				67	S-10 22.5 - 24.5	5-5-6-5
				75	S-11 25.0 - 27.0	4-6-10-11 Qp=1.75 tsf
				50	S-12 27.5 - 29.5	6-7-9-9 Qp=1.5 tsf
568.7	31.0			83	S-13 20.0 - 31.5	16-19-50
			Silt - gray - extremely dense - moist (ML)			
565.7	34.0			67	S-14 33.0 - 34.0	50-50/3"
			End of Boring Borehole backfilled with soil cuttings and bentonite chips upon completion. Water at 5 ft. within 30 minutes of boring completion.			

HOLE NO. C-9

DRILLING LOG

DIVISION	North Central
INSTALLATION	Chicago District
SHEET	1 OF 2 SHEETS
1. PROJECT	Little Calumet River, IN
JOB NUMBER	200604307
2. LOCATION (Coordinates or Station)	N1481762.463; E392585.647
3. DRILLING AGENCY	Subsurface Exploration, Inc.
4. HOLE NO. (As shown on drawing title and file number)	C-9
5. NAME OF DRILLER	Chris Franks
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	N/A
8. DEPTH DRILLED INTO ROCK	N/A
9. TOTAL DEPTH OF HOLE	34.5
10. SIZE AND TYPE OF BIT	4 in. PA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	NGVD 29; NAD 17 (IN St. Plane)
12. MANUFACTURER'S DESIGNATION OF DRILL	CME-45
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 14; UNDISTURBED
14. TOTAL NUMBER CORE BOXES	N/A
15. ELEVATION GROUND WATER	588.5
16. DATE HOLE	STARTED 8-4-06; COMPLETED 8-4-06
17. ELEVATION TOP OF HOLE	593.50
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	D. Jones

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
593.0	0.5		Silty clay, organic, - black - stiff (CL)			
			Silty clay - brownish gray - stiff to very stiff (CL)	42	S-1 0 - 2.0	2-5-4-4 Qp=1.75 tsf WC=18% Sediment depth in drainage way adjacent to boring C-9 ranged from 2.0-2.5 feet as measured using a tile probe push rod.
				33	S-2 2.5 - 4.5	5-16-11-11 Qp=2.0 tsf WC=20.7%
588.5	5.0					Water at 5 ft. WS
			Silty clay, trace fine sand - gray - very stiff (CL)	63	S-3 5.0 - 7.0	2-3-5-5 Qp=3.0 tsf WC=21.5%
585.5	8.0		Clayey silt - gray brown mottled - medium dense - moist (ML)	83	S-4 7.5 - 9.5	8-7-10-15 WC=18.7%
583.5	10.0		Clayey silt - gray - medium dense - wet (ML)	58	S-5 10.0 - 12.0	7-9-11-13 WC=17.6%
				50	S-6 12.5 - 14.5	6-8-10-8 WC=17.6%
578.0	15.5		Silty clay, trace fine sand - gray - stiff (CL)	63	S-7 15.0 - 17.0	3-3-5-5 Qp=1.0 tsf WC=24.3%
				75%	S-8 17.5 - 19.5	4-5-6-6 Qp=1.5 tsf WC=19.3%

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE 593.5

Hole No. C-9

PROJECT: Little Calumet River, IN

INSTALLATION: Chicago District

SHEET 2 OF 2 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 - stiff (CL)	83	S-9 20.0 - 22.0	4-4-7-8 Qp=1.0 tsf WC=19.8%
				75	S-10 22.5 - 24.5	5-8-11-12 Qp=1.5 tsf WC=20.6%
567.5	26.0			63	S-11 25.0 - 27.0	16-11-12-18
567.3	26.3		3 in. silt vein noted			
			Silty clay, trace fine sand - gray - very stiff (CL)			
			Veins of gray silt continue with depth.	58	S-12 27.5 - 29.5	11-15-23-21 Qp=2.0 tsf
				58	S-13 30.0 - 32.0	8-8-15-18 Qp=3.0 tsf
560.0	33.5		Silt - gray - very dense - moist (ML)	83	S-14 33.0 - 34.5	16-25-50
559.0	34.5		End of Boring Borehole backfilled with soil cuttings and bentonite chips upon completion.			

DRILLING LOG

DIVISION	North Central
INSTALLATION	Chicago District
SHEET	1 OF 2 SHEETS
1. PROJECT	Little Calumet River, IN
JOB NUMBER	200604307
2. LOCATION (Coordinates or Station)	Sta. 1935 - N1482506.3646; E395402.3691
3. DRILLING AGENCY	Subsurface Exploration, Inc.
4. HOLE NO. (As shown on drawing title and file number)	C-10
5. NAME OF DRILLER	Mark Baker
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	N/A
8. DEPTH DRILLED INTO ROCK	N/A
9. TOTAL DEPTH OF HOLE	34.0
10. SIZE AND TYPE OF BIT	4 in. PA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	NGVD 29; NAD 17 (IN St. Plane)
12. MANUFACTURER'S DESIGNATION OF DRILL	Diedrich D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 14; UNDISTURBED
14. TOTAL NUMBER CORE BOXES	N/A
15. ELEVATION GROUND WATER	588.7
16. DATE HOLE	STARTED 8-11-06; COMPLETED 8-11-06
17. ELEVATION TOP OF HOLE	591.70
18. TOTAL CORE RECOVERY FOR BORING	N/A %
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
			Organic clayey silt - brown and black - loose - moist to wet (OL)	50	S-1 0 - 2.0	2-2-2-2 WC=36.6%
				50	S-2 2.5 - 4.5	Water at 3 ft. WD WOH-WOH-1-1 WC=49.8%
587.2	4.5		Silty clay, trace fine sand - brownish gray - medium to very stiff (CL)			
				50	S-3 5.0 - 7.0	WOH-1-3-3 Qp=<1.0 tsf WC=19.2%
				46	S-4 7.5 - 9.5	4-5-8-12 Qp=1.5 tsf WC=16.4%
				72	S-5 10.0 - 11.5	6-7-11 Qp=2.0 tsf WC=18.9%
579.7	12.0		Clayey silt - gray - medium dense to dense - moist (ML)			
				56	S-6 12.5 - 14.0	5-6-9 WC=19.3%
				67	S-7 15.0 - 16.5	4-8-10 WC=20.1%
				73	S-8 17.5 - 19.0	7-11-15 Qp=2.5 tsf WC=19.8%

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 591.7 | **Hole No. C-10**

PROJECT: Little Calumet River, IN | INSTALLATION: Chicago District | SHEET 2 OF 2 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 - gray - medium dense to dense - moist (ML)	73	S-9 20.0 - 21.5	8-15-23 Qp=2.5 tsf WC=20.4%LL=31%, PL=16%, PI=15%
				78	S-10 22.5 - 24.0	5-9-14 Qp=1.75 tsf WC=19.5%
				100	S-11 25.0 - 25.5	25/6"
564.7	27.0					
			Silty clay, trace fine sand - gray - very stiff (CL)	56	S-12 27.5 - 29.0	7-10-17 Qp=3.75 tsf
562.7	29.0					
			Silt, some clay - gray - medium dense to very dense - moist (ML)			
				61	S-13 30.0 - 31.5	7-14-23
				67	S-14 33.0 - 34.0	20-35
557.7	34.0					
			End of Boring Borehole backfilled with soil cuttings and bentonite chips upon completion.			

Hole No. LCR-1-95

DRILLING LOG

DIVISION	North Central
INSTALLATION	Detroit
SHEET	2 OF 2 SHEETS
1. PROJECT	Little Calumet River, Indiana - P653.J0
2. LOCATION (Coordinates or Station)	N 1482666.6 E 394237.3
3. DRILLING AGENCY	Patrick Drilling
4. HOLE NO. (As shown on drawing title and file number)	LCR-1-95
5. NAME OF DRILLER	Ted Zwolinski
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED 0.0 DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	30.0
8. DEPTH DRILLED INTO ROCK	0.0
9. TOTAL DEPTH OF HOLE	30.0
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-45 ATV
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 11 / UNDISTURBED 1
14. TOTAL NUMBER CORE BOXES	N/A
15. ELEVATION GROUND WATER	
16. DATE HOLE	STARTED OCT 25 95 / COMPLETED OCT 25 95
17. ELEVATION TOP OF HOLE	603.6
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
			Stiff gray silty CLAY to clayey silt, trace fine sand, low plasticity, moist to wet CL/ML	1/18"	SS-9 21.0 22.5	4/7/10 qu=2.0*tsf
				18/18"	SS-10 23.5 25.0	13/8/9 qu=2.0*tsf
				18/18"	SS-11 26.0 27.5	3/6/9 qu=2.0*tsf
			Trace coarse to fine sand, trace fine gravel	18/18"	SS-12 28.5 30.0	5/6/11 qu=2.5*tsf
573.6	30.0		End of Boring at 30.0'.			Borehole tremie grouted shut using five bags Portland Type II cement.

Hole No. LCR-2-95

DRILLING LOG

DIVISION: North Central

INSTALLATION: Detroit

SHEET 1 OF 2 SHEETS

1. PROJECT: Little Calumet River, Indiana - P653.J0
2. LOCATION (Coordinates or Station): N 1482791.1 E 394556.7
3. DRILLING AGENCY: Patrick Drilling
4. HOLE NO. (As shown on drawing title and file number): LCR-2-95
5. NAME OF DRILLER: Ted Zwolinski
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED 0.0 DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: 40.0
8. DEPTH DRILLED INTO ROCK: 0.0
9. TOTAL DEPTH OF HOLE: 40.0
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-45 ATV
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 15; UNDISTURBED 1
14. TOTAL NUMBER CORE BOXES: N/A
15. ELEVATION GROUND WATER:
16. DATE HOLE: STARTED OCT 24 95; COMPLETED OCT 25 95
17. ELEVATION TOP OF HOLE: 602.7
18. TOTAL CORE RECOVERY FOR BORING: N/A %
19. SIGNATURE OF INSPECTOR: [signature]

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
			Hard to very stiff gray and brown silty CLAY, little coarse to fine sand, trace organics, trace fine gravel, medium to low plasticity, dry to moist -FILL- CL			2-inch split-spoon samples were obtained using a 140-lb. hammer falling 30 inches.
				16/18"	SS-1 1.0 2.5	9/11/10 qu=4.5*tsf
				13/18"	SS-2 3.5 5.0	4/6/10 qu=4.5*tsf
				13/18"	SS-3 6.0 7.5	5/10/11 qu=4.5*tsf
				12/18"	SS-4 8.5 10.0	9/7/8 qu=4.5*tsf
				16/18"	SS-5A/B 11.0 12.5	6/6/6 SS-5A: qu=3.25*tsf SS-5B: qu=2.2*tsf
591.0	11.7		Very stiff to stiff dark gray and brown silty CLAY, little coarse to fine sand, trace organics, trace coarse to fine gravel, medium to high plasticity, wet CL			
				18/18"	SS-6 13.5 15.0	4/4/4 qu=1.75*tsf
				18/18"	SS-7 16.0 17.5	4/7/12 qu=2.5*tsf
				18/18"	SS-8 18.5 20.0	2/7/7 qu=2.25*tsf
582.2	20.5					

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

PROJECT: Little Calumet River, Indiana - P653.J0 HOLE NO. LCR-2-95

Hole No. LCR-2-95

DRILLING LOG

DIVISION: North Central

INSTALLATION: Detroit

SHEET 2 OF 2 SHEETS

1. PROJECT	Little Calumet River, Indiana - P653.J0
2. LOCATION (Coordinates or Station)	N 1482791.1 E 394556.7
3. DRILLING AGENCY	Patrick Drilling
4. HOLE NO. (As shown on drawing title and file number)	LCR-2-95
5. NAME OF DRILLER	Ted Zwolinski
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED 0.0 DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	40.0
8. DEPTH DRILLED INTO ROCK	0.0
9. TOTAL DEPTH OF HOLE	40.0
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-45 ATV
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 15; UNDISTURBED 1
14. TOTAL NUMBER CORE BOXES	N/A
15. ELEVATION GROUND WATER	
16. DATE HOLE	STARTED OCT 24 95; COMPLETED OCT 25 95
17. ELEVATION TOP OF HOLE	602.7
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	[signature]

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
			Stiff dark gray silty CLAY to clayey silt, trace coarse to fine sand, low to medium plasticity, moist to wet CL/ML	18/18"	SS-9 21.0 22.5	5/7/14 qu=1.25*tsf
				18/18"	SS-10 23.5 25.0	6/7/11 qu=2.0*tsf
				18/18"	SS-11 26.0 27.5	6/8/13 qu=2.5*tsf
			Trace coarse to fine gravel, moist	18/18"	SS-12 28.5 30.0	6/9/12 qu=2.5*tsf
				20/24"	3T-13 31.0 33.0	PUSH qu=4.0*tsf
			Very stiff to hard Trace pyrite	18/18"	SS-14 33.5 35.0	6/10/13 qu=4.25*tsf
			Hard gray silty CLAY to clayey silt, little fine sand, low plasticity, moist	13/18"	SS-15 36.0 37.5	24/26/31 qu=4.5*tsf
				13/18"	SS-16 38.5 40.0	21/20/22 qu=4.5*tsf Borehole backfilled using seven bags of Portland Type II cement and 75 gallons of water placed by tremie method.
562.7	40.0		End of Boring at 40.0'.			

Hole No. LCR-3-95

DRILLING LOG

DIVISION: North Central

INSTALLATION: Detroit

SHEET 1 OF 2 SHEETS

1. PROJECT: Little Calumet River, Indiana - P653.J0
2. LOCATION (Coordinates or Station): N 1482767.8 E 394877.3
3. DRILLING AGENCY: Patrick Drilling
4. HOLE NO. (As shown on drawing title and file number): LCR-3-95
5. NAME OF DRILLER: Ted Zwolinski
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED 0.0 DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: 30.0
8. DEPTH DRILLED INTO ROCK: 0.0
9. TOTAL DEPTH OF HOLE: 30.0
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-45 ATV
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 11; UNDISTURBED 1
14. TOTAL NUMBER CORE BOXES: N/A
15. ELEVATION GROUND WATER: 584.9
16. DATE HOLE: STARTED OCT 24 95; COMPLETED OCT 24 95
17. ELEVATION TOP OF HOLE: 601.9
18. TOTAL CORE RECOVERY FOR BORING: N/A %
19. SIGNATURE OF INSPECTOR: Patrick Uhle

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
			Very stiff gray and brown silty CLAY, little to some coarse to fine sand, trace coarse to fine gravel, medium plasticity, moist to wet -FILL- CL			2-inch split-spoon samples were obtained using a 140-lb hammer falling 30 inches.
				16/18"	SS-1 1.0 2.5	5/7/6 qu=3.75*tsf
				15/18"	SS-2 3.5 5.0	8/5/7 qu=3.5*tsf
				15/18"	SS-3 6.0 7.5	qu=3.5*tsf
				20/24"	3T-4 8.5 10.5	Pushed 3" diameter Shelby tube qu=1.75*tsf
592.4	9.5		Stiff to very stiff dark gray and brown mottled silty CLAY, little to trace coarse to fine sand, trace organics, medium to high plasticity, wet CL			
				18/18"	SS-5 11.0 12.5	3/4/4 qu=2.25*tsf
				17/18"	SS-6 13.5 15.0	3/3/4 qu=2.0*tsf
				18/18"	SS-7 16.0 17.5	4/5/6 qu=2.0*tsf
			Trace fine GRAVEL in samples SS-6 and SS-7			
583.9	18.0		Very stiff to stiff gray silty CLAY, little coarse to fine sand, trace coarse to fine gravel, medium plasticity, wet CL	18/18"	SS-8 18.5 20.0	5/6/8 qu=2.5*tsf
581.9	20.0					

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

PROJECT: Little Calumet River, Indiana - P653.J0 HOLE NO. LCR-3-95

Hole No. LCR-3-95

DRILLING LOG

DIVISION	North Central
INSTALLATION	Detroit
SHEET	2 OF 2 SHEETS
1. PROJECT	Little Calumet River, Indiana - P653.J0
2. LOCATION (Coordinates or Station)	N 1482767.8 E 394877.3
3. DRILLING AGENCY	Patrick Drilling
4. HOLE NO. (As shown on drawing title and file number)	LCR-3-95
5. NAME OF DRILLER	Ted Zwolinski
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED 0.0 DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	30.0
8. DEPTH DRILLED INTO ROCK	0.0
9. TOTAL DEPTH OF HOLE	30.0
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-45 ATV
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 11 / UNDISTURBED 1
14. TOTAL NUMBER CORE BOXES	N/A
15. ELEVATION GROUND WATER	584.9
16. DATE HOLE	STARTED OCT 24 95 / COMPLETED OCT 24 95
17. ELEVATION TOP OF HOLE	601.9
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
			Very stiff to stiff gray silty CLAY, little coarse to fine sand, trace coarse to fine gravel, medium plasticity, wet CL			
			Layer of gray coarse to fine SAND, little silt from 21.2' to 21.9'	14/18"	SS-9A/B 21.0 22.5	8/8/5 qu=1.75*tsf
				18/18"	SS-10 23.5 25.0	7/7/5 qu=2.0*tsf
				18/18"	SS-11 26.0 27.5	5/8/10 qu=2.5*tsf
				18/18"	SS-12 28.5 30.0	5/9/8 qu=2.75*tsf
571.9	30.0		End of Boring at 30.0'.			Borehole tremie grouted shut with 70 gallons of cement Volclay grout

Hole No. LCR-4-95

DRILLING LOG

DIVISION	North Central
INSTALLATION	Detroit
SHEET	1 OF 3 SHEETS
1. PROJECT	Little Calumet River (P653.J0)
2. LOCATION (Coordinates or Station)	N 1482619.5 E 395476.9
3. DRILLING AGENCY	Patrick Drilling
4. HOLE NO. (As shown on drawing title and file number)	LCR-4-95
5. NAME OF DRILLER	Jerry Copak
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED 0.0 DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	50.0
8. DEPTH DRILLED INTO ROCK	0.0
9. TOTAL DEPTH OF HOLE	50.0
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 75 ATV
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 16 / UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	N/A
15. ELEVATION GROUND WATER	575.2
16. DATE HOLE	STARTED JUN 14 95 / COMPLETED JUN 15 95
17. ELEVATION TOP OF HOLE	599.9
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
			Drilled blind to 11.0' without sampling. Cuttings were gray silty CLAY. -FILL-			2-inch split-spoon samples were obtained using a 140-lb. hammer falling 30 inches.
588.9	11.0		Stiff, gray silty CLAY, trace coarse to fine sand, medium plasticity, moist to wet CL	18/18"	SS-1 11.0 12.5	2/2/4 qu=2.0*tsf
				18/18"	SS-2 13.5 15.0	3/3/4 qu=2.0*tsf Light brown color at 13.6'
				14/18"	SS-3 16.0 17.5	1/2/3 qu=1.5*tsf Trace fine gravel at 16.5'
582.1	17.8		Loose, gray SILT, trace coarse to fine sand, moist ML	14/18"	SS-4A/B 18.5 20.0	3/4/3 SS-4A: LL=NP WC=20%
580.4	19.5					

DRILLING LOG

DIVISION: North Central

INSTALLATION: Detroit

SHEET 2 OF 3 SHEETS

1. PROJECT: Little Calumet River (P653.J0)
2. LOCATION (Coordinates or Station): N 1482619.5 E 395476.9
3. DRILLING AGENCY: Patrick Drilling
4. HOLE NO. (As shown on drawing title and file number): LCR-4-95
5. NAME OF DRILLER: Jerry Copak
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED 0.0 DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: 50.0
8. DEPTH DRILLED INTO ROCK: 0.0
9. TOTAL DEPTH OF HOLE: 50.0
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 75 ATV
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 16; UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES: N/A
15. ELEVATION GROUND WATER: 575.2
16. DATE HOLE: STARTED JUN 14 95; COMPLETED JUN 15 95
17. ELEVATION TOP OF HOLE: 599.9
18. TOTAL CORE RECOVERY FOR BORING: N/A %
19. SIGNATURE OF INSPECTOR: [signature]

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
			Very stiff, gray silty CLAY, trace to little coarse to fine sand, low plasticity, moist CL			
				18/18"	SS-5 21.0 22.5	3/5/7 qu=2.0*tsf
				16/18"	SS-6 23.5 25.0	2/4/6 qu=2.25*tsf
				18/18"	SS-7 26.0 27.5	2/4/5 qu=2.0*tsf
				18/18"	SS-8 28.5 30.0	2/3/5 qu=2.25*tsf
				12/18"	SS-9 31.0 32.5	2/5/7 qu=2.5*tsf
				15/18"	SS-10 33.5 35.0	4/6/11 qu=3.0*tsf
			Very stiff to hard at 36.0'	18/18"	SS-11 36.0 37.5	9/13/22 qu=4.5*tsf
561.9	38.0		Medium dense to very dense, gray clayey SILT, little coarse to fine sand, saturated ML	18/18"	SS-12 38.5 40.0	17/35/41

DRILLING LOG

DIVISION	North Central
INSTALLATION	Detroit
SHEET	3 OF 3 SHEETS
1. PROJECT	Little Calumet River (P653.J0)
2. LOCATION (Coordinates or Station)	N 1482619.5 E 395476.9
3. DRILLING AGENCY	Patrick Drilling
4. HOLE NO. (As shown on drawing title and file number)	LCR-4-95
5. NAME OF DRILLER	Jerry Copak
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED 0.0 DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	50.0
8. DEPTH DRILLED INTO ROCK	0.0
9. TOTAL DEPTH OF HOLE	50.0
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 75 ATV
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 16 / UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	N/A
15. ELEVATION GROUND WATER	575.2
16. DATE HOLE	STARTED JUN 14 95 / COMPLETED JUN 15 95
17. ELEVATION TOP OF HOLE	599.9
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
			Medium dense to very dense, gray clayey SILT, little coarse to fine sand, saturated ML			
				18/18"	SS-13A/B 41.0 42.5	11/8/19 SS-13B: qu=3.0*tsf
557.9	42.0		Very stiff, gray silty CLAY, trace coarse to fine sand, low plasticity, moist CL			
556.9	43.0		Dense, gray clayey SILT, trace coarse to fine sand, saturated ML	18/18"	SS-14 43.5 45.0	13/16/20
554.4	45.5		Very stiff, black and gray silty CLAY, trace coarse to fine sand, low plasticity, moist CL	18/18"	SS-15 46.0 47.5	8/12/16 qu=2.25*tsf
				18/18"	SS-16 48.5 50.0	6/9/15 qu=2.5*tsf Borehole was tremie grouted shut using 100 gallons of cement bentonite grout.
549.9	50.0		End of boring at 50.0'.			

Hole No. LCR4A-95

DRILLING LOG

DIVISION	North Central
INSTALLATION	Detroit
SHEET	1 OF 1 SHEETS
1. PROJECT	Little Calumet River (P653.J0)
2. LOCATION (Coordinates or Station)	N 1482574.7 E 395463.5
3. DRILLING AGENCY	Patrick Drilling
4. HOLE NO. (As shown on drawing title and file number)	LCR4A-95
5. NAME OF DRILLER	Manuel Rosario
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED 0.0 DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	5.0
8. DEPTH DRILLED INTO ROCK	0.0
9. TOTAL DEPTH OF HOLE	5.0
10. SIZE AND TYPE OF BIT	2" O.D. Bucket Auger
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	MSL
12. MANUFACTURER'S DESIGNATION OF DRILL	Hand Auger
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 4 / UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	N/A
15. ELEVATION GROUND WATER	590.0
16. DATE HOLE	STARTED JUN 16 95 / COMPLETED JUN 16 95
17. ELEVATION TOP OF HOLE	590.5
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
			Soft, brown, gray and black silty CLAY, trace coarse to fine sand, little organics, high plasticity, wet CH		HA-1 0.0 1.0	2" O.D. bucket auger was used to obtain samples Water at 0.5'
589.5	1.0		Soft, brown and gray silty CLAY, trace coarse to fine sand, trace organics, high plasticity, wet CH		HA-2 1.0 2.0	
					HA-3 2.0 3.5	
					HA-4 3.5 5.0	
586.3	4.2		Brown and gray silty coarse to fine SAND, some clay, little coarse to fine gravel, saturated SM			
585.5	5.0		End of boring at 5.0'.			Hand auger boring was backfilled with cuttings immediately after drilling.

Hole No. LCR-5-95

DRILLING LOG

DIVISION	North Central
INSTALLATION	Detroit
SHEET	1 OF 2 SHEETS
1. PROJECT	Little Calumet River (P653.J0)
2. LOCATION (Coordinates or Station)	N 1482591.9 E 395598.9
3. DRILLING AGENCY	Patrick Drilling
4. HOLE NO. (As shown on drawing title and file number)	LCR-5-95
5. NAME OF DRILLER	Jerry Copak
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED 0.0 DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	40.0
8. DEPTH DRILLED INTO ROCK	0.0
9. TOTAL DEPTH OF HOLE	40.0
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 75 ATV
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 11 / UNDISTURBED 1
14. TOTAL NUMBER CORE BOXES	N/A
15. ELEVATION GROUND WATER	
16. DATE HOLE	STARTED JUN 15 95 / COMPLETED JUN 15 95
17. ELEVATION TOP OF HOLE	599.8
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
			Drilled blind to 11.0' without sampling. Cuttings were gray silty CLAY. -FILL-			2-inch split-spoon samples were obtained using a 140-lb. hammer falling 30 inches
588.8	11.0		Stiff to very stiff, gray silty CLAY, trace coarse to fine sand, medium to low plasticity, moist to wet CL	16/18"	SS-1 11.0 12.5	4/4/5 qu=3.0*tsf
				18/18"	SS-2 13.5 15.0	3/6/10 qu=3.0*tsf
				18/18"	SS-3 16.0 17.5	3/6/8 qu=2.0*tsf
				18/18"	SS-4 18.5 20.0	3/3/6 qu=1.5*tsf

Hole No. LCR-5-95

DRILLING LOG

DIVISION	North Central
INSTALLATION	Detroit
SHEET	2 OF 2 SHEETS
1. PROJECT	Little Calumet River (P653.J0)
2. LOCATION (Coordinates or Station)	N 1482591.9 E 395598.9
3. DRILLING AGENCY	Patrick Drilling
4. HOLE NO. (As shown on drawing title and file number)	LCR-5-95
5. NAME OF DRILLER	Jerry Copak
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED 0.0 DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	40.0
8. DEPTH DRILLED INTO ROCK	0.0
9. TOTAL DEPTH OF HOLE	40.0
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 75 ATV
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 11 / UNDISTURBED 1
14. TOTAL NUMBER CORE BOXES	N/A
15. ELEVATION GROUND WATER	
16. DATE HOLE	STARTED JUN 15 95 / COMPLETED JUN 15 95
17. ELEVATION TOP OF HOLE	599.8
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
			Stiff to very stiff gray silty CLAY, trace coarse to fine sand, low to medium plasticity, moist CL	18/18"	SS-5 21.0 22.5	2/3/4 qu=2.5*tsf
				20/24"	3T-6 23.0 25.0	PUSH qu=2.5*tsf
				18"18"	SS-7 26.0 27.5	5/10/13 qu=2.75*tsf
				18/18"	SS-8 28.5 30.0	3/6/10 qu=3.0*tsf
				18/18"	SS-9 31.0 32.5	3/5/6 qu=2.75*tsf LL=30 PL=18 WC=19% Dry density = 114 pcf
				18/18"	SS-10 33.5 35.0	4/9/13 qu=3.5*tsf
			Hard at 36.0'.	18/18"	SS-11 36.0 37.5	5/7/11 qu=4.25*tsf
561.8	38.0		Medium dense, gray clayey SILT, trace coarse to fine sand, moist ML	18/18"	SS-12 38.5 40.0	10/11/14 Borehole was tremie grouted shut using 90 gallons of cement bentonite grout
559.8	40.0		End of boring at 40.0'.			

Hole No. LCR5A-95

DRILLING LOG

DIVISION: North Central

INSTALLATION: Detroit

SHEET 1 OF 1 SHEETS

1. PROJECT: Little Calumet River (P653.J0)
2. LOCATION (Coordinates or Station): N 1482558.2 E 395594.7
3. DRILLING AGENCY: Patrick Drilling
4. HOLE NO. (As shown on drawing title and file number): LCR5A-95
5. NAME OF DRILLER: Manuel Rosario
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED 0.0 DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: 5.0
8. DEPTH DRILLED INTO ROCK: 0.0
9. TOTAL DEPTH OF HOLE: 5.0
10. SIZE AND TYPE OF BIT: 2" O.D. Bucket Auger
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
12. MANUFACTURER'S DESIGNATION OF DRILL: Hand Auger
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 4; UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES: N/A
15. ELEVATION GROUND WATER: 589.8
16. DATE HOLE: STARTED JUN 16 95; COMPLETED JUN 16 95
17. ELEVATION TOP OF HOLE: 590.3
18. TOTAL CORE RECOVERY FOR BORING: N/A %
19. SIGNATURE OF INSPECTOR: [signature]

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
			Soft, brown silty CLAY, trace coarse to fine sand, little organics, high plasticity, wet CH		HA-1 0.0 1.0	2" O.D. bucket auger was used to obtain samples Water at 0.5'
					HA-2 1.0 2.0	LL=59 PI=17 WC=79%
588.3	2.0		Soft to medium stiff, brown and black silty CLAY, little coarse to fine sand, little organics, high plasticity, wet CH		HA-3 2.0 3.5	
586.8	3.5		Brown and gray coarse to fine SAND, little silt, trace clay, trace coarse to fine gravel, saturated SM		HA-4 3.5 5.0	Sand=79% Gravel=2% Silt/Clay=18% WC=53%
585.3	5.0		End of boring at 5.0'.			Hand auger boring was backfilled with cuttings immediately after drilling

DRILLING LOG

DIVISION	North Central
INSTALLATION	Detroit
SHEET	1 OF 3 SHEETS
1. PROJECT	Little Calumet River (P653.J0)
2. LOCATION (Coordinates or Station)	N 1482558.5 E 395796.9
3. DRILLING AGENCY	Patrick Drilling
4. HOLE NO. (As shown on drawing title and file number)	LCR-6-95
5. NAME OF DRILLER	Jerry Copak
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED 0.0 DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	50.0
8. DEPTH DRILLED INTO ROCK	0.0
9. TOTAL DEPTH OF HOLE	50.0
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 75 ATV
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 16 / UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	N/A
15. ELEVATION GROUND WATER	
16. DATE HOLE	STARTED JUN 15 95 / COMPLETED JUN 15 95
17. ELEVATION TOP OF HOLE	599.9
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	Patrick Clark

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
			Drilled blind to 11.0' without sampling. Cuttings were gray silty CLAY. -FILL-			2-inch split-spoon samples were obtained using a 140lb. hammer falling 30 inches
588.9	11.0		Stiff, gray silty CLAY, trace coarse to fine sand, medium plasticity, moist CL	17/18"	SS-1 11.0 12.5	3/2/3 qu=1.75*tsf
586.9	13.0		Loose, gray clayey SILT, trace coarse to fine sand, wet ML	18/18"	SS-2 A/B 13.5 15.0	3/3/5
585.9	14.0		Stiff to very stiff, gray silty CLAY, trace coarse to fine sand, low to medium plasticity, moist to wet CL			
				18/18"	SS-3 16.0 17.5	2/3/4 qu=2.25*tsf
			Trace fine gravel at 19.1'	18/18"	SS-4 18.5 20.0	2/3/6 qu=1.5*tsf

Hole No. LCR-6-95

DRILLING LOG

DIVISION	North Central
INSTALLATION	Detroit
SHEET	2 OF 3 SHEETS
1. PROJECT	Little Calumet River (P653.J0)
2. LOCATION (Coordinates or Station)	N 1482558.5 E 395796.9
3. DRILLING AGENCY	Patrick Drilling
4. HOLE NO. (As shown on drawing title and file number)	LCR-6-95
5. NAME OF DRILLER	Jerry Copak
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED 0.0 DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	50.0
8. DEPTH DRILLED INTO ROCK	0.0
9. TOTAL DEPTH OF HOLE	50.0
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 75 ATV
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 16 / UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	N/A
15. ELEVATION GROUND WATER	
16. DATE HOLE	STARTED JUN 15 95 / COMPLETED JUN 15 95
17. ELEVATION TOP OF HOLE	599.9
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	Patrick Copak

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
			Stiff to very stiff, gray silty CLAY, trace coarse to fine sand, low to medium plasticity, moist to wet CL			
				18/18"	SS-5 21.0 22.5	2/3/5 qu=2.5*tsf
				18/18"	SS-6 23.5 25.0	3/3/7 qu=1.75*tsf
				18/18"	SS-7 26.0 27.5	2/3/5 qu=2.25*tsf
				18/18"	SS-8 28.5 30.0	2/5/6 qu=2.75*tsf
				18/18"	SS-9 31.0 32.5	2/4/6 qu=3.0*tsf
				18/18"	SS-10 33.5 35.0	3/8/22 qu=3.0*tsf
564.4	35.5		Dense, gray clayey SILT, trace coarse to fine sand, moist ML			
				18/18"	SS-11 36.0 37.5	17/18/20
				18/18"	SS-12 38.5 40.0	22/20/17

DRILLING LOG

DIVISION	North Central
INSTALLATION	Detroit
SHEET	3 OF 3 SHEETS
1. PROJECT	Little Calumet River (P653.J0)
2. LOCATION (Coordinates or Station)	N 1482558.5 E 395796.9
3. DRILLING AGENCY	Patrick Drilling
4. HOLE NO. (As shown on drawing title and file number)	LCR-6-95
5. NAME OF DRILLER	Jerry Copak
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED 0.0 DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	50.0
8. DEPTH DRILLED INTO ROCK	0.0
9. TOTAL DEPTH OF HOLE	50.0
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 75 ATV
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 16 / UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	N/A
15. ELEVATION GROUND WATER	
16. DATE HOLE	STARTED JUN 15 95 / COMPLETED JUN 15 95
17. ELEVATION TOP OF HOLE	599.9
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
			Dense, gray, clayey SILT, trace coarse to fine sand, moist ML			
				18/18"	SS-13 41.0 42.5	19/23/23
				18/18"	SS-14 43.5 45.0	21/16/16
554.4	45.5					
			Hard, gray silty CLAY, trace coarse to fine sand, low plasticity, moist CL	18/18"	SS-15 46.0 47.5	7/12/14 qu=4.5*tsf
				18/18"	SS-16 48.5 50.0	4/8/10 qu=4.25*tsf Borehole was tremie grouted shut using 100 gallons of cement bentonite grout.
549.9	50.0					
			End of boring at 50.0'.			

DRILLING LOG

DIVISION	North Central
INSTALLATION	Detroit
SHEET	1 OF 2 SHEETS
1. PROJECT	Little Calumet River, Indiana - P653.J0
2. LOCATION (Coordinates or Station)	N 1482551.2 E 395667.0
3. DRILLING AGENCY	Patrick Drilling
4. HOLE NO. (As shown on drawing title and file number)	LCR6A-96
5. NAME OF DRILLER	Ted Zwolinski
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED 0.0 DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	32.0
8. DEPTH DRILLED INTO ROCK	0.0
9. TOTAL DEPTH OF HOLE	32.0
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 45 ATV
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 12 / UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	N/A
15. ELEVATION GROUND WATER	582.8
16. DATE HOLE	STARTED FEB 5 96 / COMPLETED FEB 5 96
17. ELEVATION TOP OF HOLE	589.8
18. TOTAL CORE RECOVERY FOR BORING	88.1 %
19. SIGNATURE OF INSPECTOR	Patrick [illegible]

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
			Medium stiff dark gray silty CLAY, trace coarse to fine sand, high plasticity, wet CH			2.0" split-spoon samples were obtained using a 140 lb. hammer falling 30 inches.
				0/18"	AU-1 1.0 2.5	2/1/1 No recovery in split-spoon. Obtained auger sample.
586.8	3.0		Soft brown and gray silty CLAY, trace coarse to fine sand, medium to low plasticity, moist CL			Borehole offset 5' west to obtain 3" thin-walled tube sample;
				14/18"	SS-2 3.5 5.0	3T-1: 3.0' - 5.0' 3/2/2 qu=0.75*tsf
				18/18"	SS-3 6.0 7.5	2/4/6 qu=2.5*tsf
581.8	8.0		Stiff gray silty CLAY, trace coarse to fine sand, trace fine gravel, medium to low plasticity, moist CL			
				18/18"	SS-4 8.5 10.0	3/4/7 qu=1.5*tsf
				18/18"	SS-5 11.0 12.5	4/5/7 qu=1.5*tsf
				18/18"	SS-6 13.5 15.0	6/7/10 qu=2.0*tsf
				18/18"	SS-7 16.0 17.5	4/6/10 qu=2.5*tsf
				18/18"	SS-8 18.5 20.0	8/9/11 qu=2.5*tsf

DRILLING LOG

DIVISION: North Central

INSTALLATION: Detroit

SHEET 2 OF 2 SHEETS

1. PROJECT: Little Calumet River, Indiana - P653.J0
2. LOCATION (Coordinates or Station): N 1482551.2 E 395667.0
3. DRILLING AGENCY: Patrick Drilling
4. HOLE NO. (As shown on drawing title and file number): LCR6A-96
5. NAME OF DRILLER: Ted Zwolinski
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED 0.0 DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: 32.0
8. DEPTH DRILLED INTO ROCK: 0.0
9. TOTAL DEPTH OF HOLE: 32.0
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 45 ATV
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES: N/A
15. ELEVATION GROUND WATER: 582.8
16. DATE HOLE: STARTED FEB 5 96; COMPLETED FEB 5 96
17. ELEVATION TOP OF HOLE: 589.8
18. TOTAL CORE RECOVERY FOR BORING: 88.1 %
19. SIGNATURE OF INSPECTOR: [signature]

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
			Stiff gray silty CLAY, trace coarse to fine sand, trace fine gravel, medium to low plasticity, moist CL			
				18/18"	SS-9 21.0 22.5	11/15/17 qu=3.0*tsf
566.8	23.0		Medium dense to dense gray clayey SILT, trace to little fine sand, moist ML			
				18/18"	SS-10A/B 23.5 25.0	6/10/15 SS-10B: qu=2.5*tsf
565.8	24.0		Stiff gray silty CLAY, trace to little coarse to fine sand, low plasticity, moist CL			
564.3	25.5		Dense gray clayey SILT, trace to little fine sand, moist ML			Slow drilling
				18/18"	SS-11 26.0 27.5	15/28/25
				0/4"	3T-12 28.5 30.0	Pushed tube 4" to refusal. Drilled out and drove spoon.
				18/18"	SS-13 30.5 32.0	18/27/28
557.8	32.0		End of Boring at 32.0'.			Borehole backfilled to surface with 10 50lb. bags of bentonite chips.

Hole No. OPL-1-95

DRILLING LOG

DIVISION	North Central
INSTALLATION	Detroit
SHEET	1 OF 1 SHEETS
1. PROJECT	Little Calumet River (P653.J0)
2. LOCATION (Coordinates or Station)	N 1482615.8 E 396082.9
3. DRILLING AGENCY	Patrick Marine
4. HOLE NO. (As shown on drawing title and file number)	OPL-1-95
5. NAME OF DRILLER	Jerry Copak
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED 0.0 DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	1.0
8. DEPTH DRILLED INTO ROCK	0.0
9. TOTAL DEPTH OF HOLE	6.0
10. SIZE AND TYPE OF BIT	Petersen Grab Sampler
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	MSL
12. MANUFACTURER'S DESIGNATION OF DRILL	Petersen Grab Sampler
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 1 / UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	N/A
15. ELEVATION GROUND WATER	590.0
16. DATE HOLE	STARTED JUN 19 95 / COMPLETED JUN 19 95
17. ELEVATION TOP OF HOLE	590.0
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
			Optimist Lake water depth = 5.0'			Samples were obtained by dropping a mini Petersen grab sampler from a boat.
			Top of sediment			
585.0	5.0		Brown and black silty CLAY, little coarse to fine sand, medium plasticity, wet CL		PS-1 5.0 6.0	Three quart jars of sample were obtained.
584.0	6.0		End of boring at 6.0'.			

Hole No. OPL-2-95

DRILLING LOG

DIVISION	North Central
INSTALLATION	Detroit
SHEET	1 OF 1 SHEETS
1. PROJECT	Little Calumet River (P653.J0)
2. LOCATION (Coordinates or Station)	N 1482600.4 E 396017.3
3. DRILLING AGENCY	Patrick Marine
4. HOLE NO. (As shown on drawing title and file number)	OPL-2-95
5. NAME OF DRILLER	Jerry Copak
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED 0.0 DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	1.0
8. DEPTH DRILLED INTO ROCK	0.0
9. TOTAL DEPTH OF HOLE	11.0
10. SIZE AND TYPE OF BIT	Petersen Grab Sampler
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	MSL
12. MANUFACTURER'S DESIGNATION OF DRILL	Petersen Grab Sampler
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 1 / UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	N/A
15. ELEVATION GROUND WATER	590.0
16. DATE HOLE	STARTED JUN 19 95 / COMPLETED JUN 19 95
17. ELEVATION TOP OF HOLE	590.0
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
			Optimist Lake water depth = 10.0'.			Samples were obtained by dropping a mini Petersen grab sampler from a boat.
580.0	10.0		Top of sediment			
			Brown and black silty CLAY, little coarse to fine sand, medium plasticity, wet CL		PS-1 10.0 11.0	Three quart jars of sample were obtained.
579.0	11.0		End of boring at 11.0'.			

Hole No. OPL-3-95

DRILLING LOG

DIVISION	North Central
INSTALLATION	Detroit
SHEET	1 OF 1 SHEETS
1. PROJECT	Little Calumet River (P653.J0)
2. LOCATION (Coordinates or Station)	N 1482591.9 E 395958.4
3. DRILLING AGENCY	Patrick Marine
4. HOLE NO. (As shown on drawing title and file number)	OPL-3-95
5. NAME OF DRILLER	Jerry Copak
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED 0.0 DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	1.0
8. DEPTH DRILLED INTO ROCK	0.0
9. TOTAL DEPTH OF HOLE	18.0
10. SIZE AND TYPE OF BIT	Petersen Grab Sampler
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	MSL
12. MANUFACTURER'S DESIGNATION OF DRILL	Petersen Grab Sampler
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 1; UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	N/A
15. ELEVATION GROUND WATER	590.0
16. DATE HOLE	STARTED JUN 19 95; COMPLETED JUN 19 95
17. ELEVATION TOP OF HOLE	590.0
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	Patrick Vale

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
			Optimist Lake water depth = 17.0'.			Samples were obtained by dropping a mini Petersen grab sampler from a boat.
573.0	17.0		Top of sediment			
			Brown and black silty CLAY, little coarse to fine sand, high plasticity, saturated CH		PS-1 17.0 18.0	Three quart jars of sample were obtained.
572.0	18.0		End of boring at 18.0'			

Hole No. OPL-4-95

DRILLING LOG

DIVISION	North Central
INSTALLATION	Detroit
SHEET	1 OF 1 SHEETS
1. PROJECT	Little Calumet River (P653.J0)
2. LOCATION (Coordinates or Station)	N 1482587.6 E 395895.0
3. DRILLING AGENCY	Patrick Marine
4. HOLE NO. (As shown on drawing title and file number)	OPL-4-95
5. NAME OF DRILLER	Jerry Copak
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED 0.0 DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	1.0
8. DEPTH DRILLED INTO ROCK	0.0
9. TOTAL DEPTH OF HOLE	23.0
10. SIZE AND TYPE OF BIT	Petersen Grab Sampler
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	MSL
12. MANUFACTURER'S DESIGNATION OF DRILL	Petersen Grab Sampler
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 1 / UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	N/A
15. ELEVATION GROUND WATER	590.0
16. DATE HOLE	STARTED JUN 19 95 / COMPLETED JUN 19 95
17. ELEVATION TOP OF HOLE	590.0
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
			Optimist Lake water depth = 22.0'.			Samples were obtained by dropping a mini Petersen grab sampler from a boat.
568.0	22.0		Top of Sediment			
567.0	23.0		Brown and black silty CLAY, little coarse to fine sand, high plasticity, wet CH		PS-1 22.0 23.0	Three quart jars of sample were obtained.
			End of boring at 23.0'.			

Hole No. OPL-5-95

DRILLING LOG

DIVISION	North Central
INSTALLATION	Detroit
SHEET	1 OF 1 SHEETS
1. PROJECT	Little Calumet River (P653.J0)
2. LOCATION (Coordinates or Station)	N 1482591.7 E 395830.7
3. DRILLING AGENCY	Patrick Marine
4. HOLE NO. (As shown on drawing title and file number)	OPL-5-95
5. NAME OF DRILLER	Jerry Copak
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED 0.0 DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	1.0
8. DEPTH DRILLED INTO ROCK	0.0
9. TOTAL DEPTH OF HOLE	23.0
10. SIZE AND TYPE OF BIT	Petersen Grab Sampler
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	MSL
12. MANUFACTURER'S DESIGNATION OF DRILL	Petersen Grab Sampler
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 3 / UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	N/A
15. ELEVATION GROUND WATER	590.0
16. DATE HOLE	STARTED JUN 19 95 / COMPLETED JUN 19 95
17. ELEVATION TOP OF HOLE	590.0
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
			Optimist Lake water depth = 22.0'.			Samples were obtained by dropping a mini Petersen grab sampler from a boat.
568.0	22.0		Top of Sediment			
567.0	23.0		Brown and black silty CLAY, little coarse to fine sand, high plasticity, wet CH		PS-1 22.0 23.0	Three quart jars of sample were obtained.
			End of boring at 23.0'.			

Hole No. OPL-6-95

DRILLING LOG

DIVISION	North Central
INSTALLATION	Detroit
SHEET	1 OF 1 SHEETS
1. PROJECT	Little Calumet River (P653.J0)
2. LOCATION (Coordinates or Station)	N 1482581.3 E 395770.4
3. DRILLING AGENCY	Patrick Marine
4. HOLE NO. (As shown on drawing title and file number)	OPL-6-95
5. NAME OF DRILLER	Jerry Copak
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED 0.0 DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	1.0
8. DEPTH DRILLED INTO ROCK	0.0
9. TOTAL DEPTH OF HOLE	18.0
10. SIZE AND TYPE OF BIT	Petersen Grab Sampler
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	MSL
12. MANUFACTURER'S DESIGNATION OF DRILL	Petersen Grab Sampler
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 1 / UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	N/A
15. ELEVATION GROUND WATER	590.0
16. DATE HOLE	STARTED JUN 19 95 / COMPLETED JUN 19 95
17. ELEVATION TOP OF HOLE	590.0
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	Patrick Marine

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
			Optimist Lake water depth = 17.0'			Samples were obtained by dropping a mini Petersen grab sampler from a boat.
573.0	17.0		Top of Sediment			
572.0	18.0		Brown and black silty CLAY, little coarse to fine sand, high plasticity, wet CH		PS-1 17.0 18.0	Three quart jars of sample were obtained.
			End of boring at 18.0'.			

Hole No. OPL-7-95

DRILLING LOG

DIVISION	North Central
INSTALLATION	Detroit
SHEET	1 OF 1 SHEETS
1. PROJECT	Little Calumet River (P653.J0)
2. LOCATION (Coordinates or Station)	N 1482618.0 E 395705.5
3. DRILLING AGENCY	Patrick Marine
4. HOLE NO. (As shown on drawing title and file number)	OPL-7-95
5. NAME OF DRILLER	Jerry Copak
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED 0.0 DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	1.0
8. DEPTH DRILLED INTO ROCK	0.0
9. TOTAL DEPTH OF HOLE	25.0
10. SIZE AND TYPE OF BIT	Petersen Grab Sampler
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	MSL
12. MANUFACTURER'S DESIGNATION OF DRILL	Petersen Grab Sampler
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 1 / UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	N/A
15. ELEVATION GROUND WATER	590.0
16. DATE HOLE	STARTED JUN 19 95 / COMPLETED JUN 19 95
17. ELEVATION TOP OF HOLE	590.0
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	[signature]

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
			Optimist Lake water depth = 24.0'.			Samples were obtained by dropping a mini Petersen grab sampler from a boat.
566.0	24.0		Top of Sediment			
565.0	25.0		Brown and black silty CLAY, little coarse to fine sand, high plasticity, wet CH		PS-1 24.0 25.0	Three quart jars of sample were obtained.
			End of boring at 25.0'.			

Hole No. RD-1-95

DRILLING LOG

DIVISION	North Central
INSTALLATION	Detroit
SHEET	1 OF 1 SHEETS
1. PROJECT	Little Calumet River, Indiana (P653.J0)
2. LOCATION (Coordinates or Station)	N 1482516.8 E 395777.4
3. DRILLING AGENCY	Patrick Drilling
4. HOLE NO. (As shown on drawing title and file number)	RD-1-95
5. NAME OF DRILLER	Jerry Copak
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED 0.0 DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	1.0
8. DEPTH DRILLED INTO ROCK	0.0
9. TOTAL DEPTH OF HOLE	2.1
10. SIZE AND TYPE OF BIT	2" O.D. Bucket Auger
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	MSL
12. MANUFACTURER'S DESIGNATION OF DRILL	Hand Auger
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 1 / UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	N/A
15. ELEVATION GROUND WATER	590.3
16. DATE HOLE	STARTED JUN 16 19 / COMPLETED JUN 16 95
17. ELEVATION TOP OF HOLE	590.3
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	Paul Ulte

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
590.1	0.2		Riverward depression water depth = .2' Top of sediment.			Samples were taken using a 2" O.D. bucket auger.
			Brown and black silty CLAY, little coarse to fine sand, trace organics, high plasticity, wet CH		HA-1 0.2 1.2	Four 8 oz. jars of sample were obtained
588.2	2.1		Bottom of sediment at 2.1'.			Thickness of sediment estimated by manually pushing a 3/4-inch soil probe.

Hole No. RD-2-95

DRILLING LOG

DIVISION	North Central
INSTALLATION	Detroit
SHEET	1 OF 1 SHEETS
1. PROJECT	Little Calumet River, Indiana (P653.J0)
2. LOCATION (Coordinates or Station)	N 1482508.6 E 395885.0
3. DRILLING AGENCY	Patrick Drilling
4. HOLE NO. (As shown on drawing title and file number)	RD-2-95
5. NAME OF DRILLER	Jerry Copak
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED 0.0 DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	1.0
8. DEPTH DRILLED INTO ROCK	0.0
9. TOTAL DEPTH OF HOLE	2.4
10. SIZE AND TYPE OF BIT	2" O.D. Bucket Auger
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	MSL
12. MANUFACTURER'S DESIGNATION OF DRILL	Hand Auger
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 1 / UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	N/A
15. ELEVATION GROUND WATER	590.3
16. DATE HOLE	STARTED JUN 16 95 / COMPLETED JUN 16 95
17. ELEVATION TOP OF HOLE	590.3
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	Patrick Hale

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
589.8	0.5		Riverward depression water depth = 0.5' Top of sediment			Samples were taken using a 2" O.D. bucket auger.
			Brown and black silty CLAY, little coarse to fine sand, trace organics, high plasticity, wet CH		HA-1 0.5 1.5	Four 8 oz. jars of sample were obtained
587.9	2.4		Bottom of sediment at 2.4'			Thickness of sediment estimated by manually pushing a 3/4-inch soil probe.

Hole No. RD-3-95

DRILLING LOG

DIVISION: North Central

INSTALLATION: Detroit

SHEET 1 OF 1 SHEETS

1. PROJECT: Little Calumet River, Indiana (P653.J0)
2. LOCATION (Coordinates or Station): N 1482516.8 E 395777.4
3. DRILLING AGENCY: Patrick Drilling
4. HOLE NO. (As shown on drawing title and file number): RD-3-95
5. NAME OF DRILLER: Jerry Copak
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED 0.0 DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: 1.0
8. DEPTH DRILLED INTO ROCK: 0.0
9. TOTAL DEPTH OF HOLE: 3.1
10. SIZE AND TYPE OF BIT: 2" O.D. bucket auger
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
12. MANUFACTURER'S DESIGNATION OF DRILL: Hand auger
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 1; UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES: N/A
15. ELEVATION GROUND WATER: 590.3
16. DATE HOLE: STARTED JUN 16 95; COMPLETED JUN 16 95
17. ELEVATION TOP OF HOLE: 590.3
18. TOTAL CORE RECOVERY FOR BORING: N/A %
19. SIGNATURE OF INSPECTOR: Paul Ulle

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
589.8	0.5		Riverward depression water depth = 0.5' Top of sediment			Samples were obtained using a 2-inch O.D. bucket auger.
			Brown and black silty CLAY, little coarse to fine sand, trace organics, high plasticity, wet CH		HA-1 0.5 2.0	Four 8 oz. jars of sample were obtained
587.2	3.1		Bottom of sediment at 3.1'.			Thickness of sediment estimated by manually pushing a 3/4-inch soil probe

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DIVISION 01 - GENERAL REQUIREMENTS

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GENERAL PROVISIONS

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SECTION 01 10 00.00 03

GENERAL 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 in the text by basic designation only.

U.S. ARMY CORPS OF ENGINEERS (USACE)

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

1.2 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 on 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.

1.3 RESPONSIBLITY 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.

1.4 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 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Construction Schedule; G, CS

Condition of Existing Structures and Roads

Coordination with Others; G, CS

Drug Free Workplace

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

SD-11 Closeout Submittals

As-Built Drawings; G, CS

Construction Documentation Report; G, DG

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 AS-BUILT DRAWINGS

a. 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. 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 over 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"). All shop drawings which require submittal of CADD files are indicated in the submittal register located at the end of this section.

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 prints.

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.

b. 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. 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.

c. 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 consist of one set of completed final as-built drawings in

Microstation .DGN format and Adobe Portable Document Format .pdf on CD-ROM, one (1) set of full-scale prints, one (1) set of half-scale prints, and the approved working as-built drawings. Both full-scale and half-scale prints shall be plotted from the CD-ROM, to ensure the electronic files provided to the Chicago District are complete and accurate. When final revisions have been completed, the As-Built block shall be included on each drawing. An electronic file of the As-Built block shall be included with the Corps-provided digital contract drawings.

d. CD-ROM content and format. The CD-ROM shall be labeled with the following information: Project Name, Date CD was created, Contract Number, and Contractors Name. The CD-ROM shall use the same directory structure and file names as provided in the contract set by the government. In addition to the drawings, the contractor shall provide a list of drawings in either a Microsoft Word or ASCII text file, containing the electronic file names and sheet titles.

e. All paper prints and reproducible drawings shall become the property of the Government upon final approval. A withholding of $62,370.00 USD (sixty two thousand three hundred and seventy US dollars), representing the Government’s expense to prepare Final As-Built Drawings (including full-scale and half-scale prints, and CD-ROM), will 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 full-scale and half-scale prints, and CD-ROM) are accepted by the Government. If an acceptable As-Built Drawing submittal is not provided within 60 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.

f. 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 CONSTRUCTION DOCUMENTATION REPORT (CDR)

A Project Foundation Report will be developed by the Government for the construction project. In order to prepare this report, various documents shall be compiled and provided to the Government by the Contractor in the form of a Construction Documentation Report.

1.7.1 Compilation of the CDR

In order to prepare the CDR, the following documents shall be compiled at the completion of construction and provided to the Government by the Contractor on Compact Discs (CDs). To the greatest extent possible, the CDR should use references to avoid the duplication of drawings or data. If a document is a submittal that required approval, only the final approved document shall be compiled in the CDR:

a. A brief summary prepared by the Contractor that describes any modifications to the original contract plans and specifications and provides details of unexpected problems that occurred during construction, including the actions taken to correct the problems. If modifications or problems did not occur during construction, then the summary should just note that there were no modifications or problems.
b. Borrow site test report(s)
c. Dewatering records

d. Cofferdam records
e. Wick drain lengths installed and settlement gauge readings
f. Field and laboratory compaction test results
g. Concrete mix proportions
h. Concrete strength test results
i. Pile driving equipment
j. Pile driving records
k. Quality Control Plan
l. Daily Construction Quality Control Management Reports and Checklists

1.7.2 Additional Requirements

Within 30 days of completion of the physical construction, the Contractor shall submit all documents requested for the CDR in Adobe Portable Document Format (*.pdf) on labeled CD-ROMs. All documents that fall into the same category, as referenced above, should be placed on the same CD. If multiple CDs are needed to complete the compilation, then each 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. Also, the Contractor shall save the *.pdf files with the name of the document, as referenced above, in the filename (abbreviations are allowed), as well as the date. The Contractor shall submit two (2) copies of CDs for Government approval. Upon Government approval, the Contractor shall submit four (4) copies of the CDs and possibly one or more hard copies. If hard copies are requested, they should indicate what type of document is included and that it is binder 1 of 2, 2 of 2, etc. A sum of $5,000 will be retained until final approval of the CDR.

1.8 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.

1.9 CONDITION OF EXISTING STRUCTURES AND ROADS

Prior to commencement of operations by the contractor at the site, a detailed survey will be made 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 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.

1.11 MINIMUM AMOUNT OF INSURANCE REQUIRED

In accordance with FAR CLAUSE entitled INSURANCE - WORK IN A GOVERNMENT INSTALLATION, the following minimum insurance coverages 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 coverages 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 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 coverages during the time period of the contractor's work.

b. Should the coverages 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 or better, 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.

1.12 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
22	20	21	7	4	3	3

AUG	SEP	OCT	NOV	DEC 1-15	DEC 16-31
5	3	5	7	4	12

Upon acknowledgement of Notice to Proceed (NTP) and continuing throughout the contract, the Contractor shall 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)".

1.13 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 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.

1.14.1 GENERAL CONSTRUCTION REQUIREMENTS

Some of the utility owners and rail road provided general construction requirements for working around their utility and rail-road lines. These requirements are provided in Attachment 1. The attachment contains the list of requirements submitted by BP Pipelines at the time of submittal. It was provided to the other utility owners for review and comment. There were no objections to the contents and no additional requirements were requested to be added.

The construction requirements may not be all inclusive and are subject to change. The attachment does not negate the Contractors reasonability to coordinate with all impacted utility and rail-road owners.

1.15 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.

1.16 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:

INDIANA
INDIANA UTILITY CHECK
1-800-382-5544

1.17 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.

1.18 BORROW/DISPOSAL SITES AND QUARRIES

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 before any material is brought to the site, and such approval shall 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 shall 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:

Federal Laws, Regulations, and Executive Orders

Name	Agency
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	Indiana Department of Natural Resources, Division of Historic Preservation (IN)
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

Indiana State Statutes

Construction Within a Floodway (Permit)	Indiana Department of Natural Natural Resources, Division of Water
Section 401, Clean Water Act (Waiver of Permit)	Indiana Department of Environmental Management
Section 402,	Indiana Department of Environmental

Clean Water Act Management
(NPDES Permit)

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 shall 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.

1.19 TAX EXEMPTION

INDIANA SALES AND USE TAX

a. This contract is a construction contract which contains separate amounts applicable to the performance of the services and the furnishing of the materials as defined in State of Indiana, Department of Revenue Information Bulletin No. 60, dated Dec 2002. Notwithstanding any other provisions of this contract, the contract price does not include any amount for Indiana Sales and Use Tax on materials to be incorporated by the Contractor or Subcontractor into the structure or improvement to real estate. The Contractor or Subcontractor should provide his supplier with a State of Indiana General Exemption Certificate for Construction Contractors (Form ST-134) with respect to such property.

b. For the purpose of complying with the requirements of State of Indiana, Department of Revenue Information Bulletin No. 60, dated Dec 2002, the Contractor, pursuant to the requirements of the solicitation shall furnish prior to contract award a breakdown separating pricing (1) materials to be incorporated into the structure or improvement to real estate, (2) services and other obligations of the construction contract, and (3) the total contract price. This breakdown is for the sole purpose of complying with the requirements of State of Indiana, Department of Revenue Information Bulletin No. 60, dated Dec 2002 with regard to separate pricing of services and materials and has no other contractual significance.

c. Any subcontracts awarded hereunder shall also contain separate amounts applicable to the performance of services and the furnishing of the materials.

1.20 BARRICADES AND WARNING SIGNS

The Contractor shall provide and maintain barricades, danger and warning signs and suitable and efficient lights at all points of entry to the section or sections of roadway which are to be closed to public travel during construction operations under the contract. The Contractor shall also furnish flagmen and watchmen to warn and direct traffic or to prevent travel on any portion of roadways during the periods in which operations under the contract are performed as may be required to ensure safety and prevent accidents. All facilities furnished by the contractor under this paragraph shall be as prescribed by local highway authorities and shall be subject to approval by the Contracting Officer. Traffic control shall be in accordance with the Indiana Manual on Uniform Traffic Control Devices. A copy of the plan shall be submitted to the Contracting Officer for approval. Separate payment shall not be made for any costs incurred by the contractor in compliance with the provisions of this paragraph but all

costs therefore shall be considered as a subsidiary obligation of the Contractor and are included in the contract price for other contract items as applicable.

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 a 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 Contractor Performance Evaluations

It is the Corps' standard operating procedure that the Contracting Officer evaluate the contractor's performance and prepare a performance report

using the web-based application CCASS (Construction Contractor Appraisal Support System) for construction contracts of $100,000 or more. After an evaluation (interim or final) is written up by the Corps, the contractor has a 30 day period to access, review and comment on the evaluation. Accessing and using the CCASS requires having specific software, called PKI certification, installed on the user's computer. The certification, a Department of Defense requirement, was implemented to provide security in electronic transactions. The certification software could cost approximately $100 - $115 per certificate per year and is purchased from an External Certificate Authorities (ECA) vendor. Current information about the PKI certification process and for contacting vendors can be found on the web site: http://www.cpars.navy.mil/. If the Contractor wishes to participate in the performance evaluation process, access to CCASS and PKI certification is the sole responsibility of the Contractor.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

-- End of Section --

Little Calumet River Stage 5-2 Utility Corridor Specs

Part 1 – General
1.1 Overview
1.2 Construction Sequencing
1.3 Additional Specifications to BP Guidelines (Part 2)

Part 2 – BP General Guidelines for Construction around Pipelines

1.1 <u>Overview</u>

1.1.1 The Utility Corridor is composed of 16 pipelines from eight companies along a NIPSCO right-of-way (ROW), passing through the corridor is 2 rail-lines owned by Norfolk-Southern Railroad with a 10" Fiber-optic conduit beneath it. Certain Pipelines are located along the Railroad ROW in addition to being located along the NIPSCO Utility Corridor. Pipeline Companies are listed below along with managers for the Utility Corridor.

1.1.1.a. Except as noted below, the Part 2 – BP General Guidelines for Construction around Pipelines is the guiding document for all Pipeline companies in the area known as Utility Corridor.

1.1.2 Contact Info

1.1.2.a. Regular Contact Info

ConocoPhillips Pipeline	Hanten	Gary	Gary.L.Hanten@conocophillips.com	219-397-6666 ext 307
Explorer Pipeline	Nwakoby	Patrick	pnwakoby@expl.com	918-493-5172
STV Inc (Buckeye Partners)	Schory	Steven	schorysc@stvinc.com	610-385-8497
Buckeye Partners, L.P.	Samala	Don	DSamala@buckeye.com	610-904-4000
Marathon Petroleum	Woodsmall	David	DLWoodsmall@MarathonPetroleum.com	219-477-4001
BP Pipeline	Wright	Emma	wrige3@bp.com	630-836-6416
Wolverine Pipeline Company	Hipshear	Fred	Fhipshear@wplco.com	269-3232491 ext 24
NIPSCO	Pasyk	Mark	mlpasyk@nisource.com	219-647-4299
BP Pipeline	Graham	Dane	dane.graham@bp.com	630-836-5813

1.2 <u>Construction Sequencing</u>

1.2.1 **Pipeline Companies** (Referred to as companies in section 1.2.1)

1.2.1.a. Companies will provide the contact information for their inspectors, for all work in and around pipelines on Notice to Proceed (NTP).

1.2.1.b. Within 30 days of NTP, Pipeline companies will start work. Companies will have from 30 to 90 days after NTP to complete all exposure, inspection and repair of existing pipelines to include all modifications necessary to maintain pipelines in operating condition. Pipelines will replace fill with impervious clay.

1.2.1.c. Companies will provide monitoring until completion of work around individual pipelines.

1.2.2 **Contractor**

1.2.2.a Contractor must complete removal of existing levee SE of RR and Little Calumet River down to 4 feet above pipes within 30 days of NTP and also provide access to NE of RR and Little Calumet River for pipe line companies within 30 days of NTP

1.2.2.b Contractor is responsible for conducting dewatering for entire site to include the pipeline companies excavations of their individual pipelines. Contractor will maintain dewatering in coordination with pipeline companies until completion of all work requiring dewatering, by both contractor and pipeline companies. All dewatering operations must be conducted in such a manner as not to negatively affect the pipelines in any manner.

1.2.2.c Contractor must stop work in SE and NE area of pipelines from 30 days to 90 days after NTP for SE and NE to allow for the pipeline companies to prepare their pipes. Contractor may proceed with site preparation on the SW and NW area of pipelines (CPPL Lines) while work is being completed on SE and NE pipeline corridor. SW and NW areas of Pipeline will follow same schedule as per above based on contractor NTP.

1.2.2.d Contractor will place impervious fill from top of pipe to underside of concrete bridge in accordance with the Earthwork Section of the Specification. Contractor must ensure a clean joining in material between this fill and the fill material already placed by pipeline companies to top of pipe.

1.2.2.e Contractor will complete sheet pile installation, bridging, concrete cure and impervious clay fill,

1.3 <u>Additions to BP General Construction Guidelines</u>

1.3.1 Plans

1.3.1.a All site specific plans, to include vehicle crossing plans, vehicle usage plans, security plan for exposed pipelines, emergency response plans for damage to pipeline, etc. must be presented to the pipeline companies no later than 30 days prior to work starting.

1.3.1.b All plans must be approved by all companies prior to work starting.

1.3.2 Pipe Exposure

1.3.2.a All pipelines are responsible for exposing and conducting inspection and repair on their pipelines as per Construction sequencing guidance Section 1.2 Construction Sequencing. Contractor is required to complete all coordination with Companies prior to initiating any work.

1.3.2.b Contractor is responsible for all dewatering activities on site in coordination with all pipeline companies as per Construction Sequencing guidance Section 1.2 Construction Sequencing.

1.3.2.c Impervious clay fill must be placed a minimum of 15’ from each side of the sheet pile wall and concrete bridge. For a total of 30’ plus width of sheet pile and concrete bridge at pipeline crossing.

1.3.3 Pile Driving

1.3.3.a Pile driving design by contractor should identify method of pile driving within 25’ of any pipeline. Vibration methodology must have criteria of .5 in/sec not to exceed 2 in/sec.

1.3.4 Pipe Security

1.3.4.a Fencing as designated on the drawings. If the pipes are left exposed during the evening, site lighting is to be provided to reveal all sections of exposed pipe to security personnel.

1.3.4.b On-site security guard must be provided for all hours that any pipe is exposed to ensure security. Coordination with pipelines, local police, and local fire/Hazmat is required in case of a response is needed for any type of incident occurring involving pipelines.

1.3.4.c Security Plan must be approved and implemented prior to start of work.

bp

BP Pipelines (North America), Inc.
28100 Torch Parkway
Suite 600
Warrenville, IL 60555

BP PIPELINES (NORTH AMERICA) INC.
GENERAL CONSTRUCTION REQUIREMENTS

ROW File Reference:

BP Pipelines (North America) Inc. (hereinafter referred to as "BP") is committed to environmental stewardship and maintaining the safety of its employees, contractors and the general public. The pipelines BP operates transport various liquids and gasses at high pressure, and do so very safely each and every day. There are, however, potential hazards associated with construction or excavation work around pipelines. As a result of these potential hazards, and in compliance with the requirements imposed upon BP as an industry regulated by the U.S. Department of Transportation and Office of Pipeline Safety, the following list of general requirements for working on pipeline rights-of-way has been compiled.

General Safety Requirements

- **Indiana One-Call at 1-800-382-5544 must be contacted at least 48 hours (2 working days)* before any construction and/or excavation activities are initiated within the pipeline right of way so that BP may have a representative present to ensure that there are no conflicts with the pipeline. (There is no cost to the third party contractor to use the One-Call Notification service. However, failure to utilize the One-Call service can be quite costly in terms of unnecessary risk for the contractor/excavator, their employees, innocent bystanders, personal property of others and the environment; as well as potential civil penalties and/or fines.)**

- **To have the pipeline physically located and depth verified, please contact BP's local field representative at .**

- **It is the responsibility of the contractor to have the pipeline location added to the construction drawings.**

- **The contractor is responsible for taking all necessary safety precautions and will be held responsible for any damages caused to the pipeline or property as a result of their work.**

**** Michigan and Tennessee require 72 hours (3 working days) prior notice***

Excavation Specific Requirements

- No excavation or construction activity will be permitted in the vicinity of a pipeline until all appropriate communications have been made with BP's field operations and control center personnel.

- There shall be no excavation or backfilling within the pipeline right-of-way for any reason without a representative of BP on site giving permission.

- In some instances, excavation and other construction activities around certain pipelines can be conducted safely only when the pipeline operating pressure has been reduced. Contractors are therefore cautioned that excavation which exposes or significantly reduces the cover over a pipeline may have to be delayed until the reduced operating pressures are achieved.

General Construction Activities

- The contractor shall not be permitted to transport construction materials or equipment longitudinally over the pipeline.

- Where it is necessary for construction equipment (i.e. tractors, backhoes, dump trucks etc.) or equipment transporting construction materials to cross the pipeline to gain access to the job site, a crossing shall be constructed at a 90 degree angle to the pipeline and shall consist of a ramp constructed of stone, which shall provide a minimum of seven feet (7') total cover over the pipeline. The ramps shall extend a minimum of ten feet (10') on either side of the pipeline and shall be approved by BP prior to use. Other means of temporary crossing to protect the pipeline may be considered by BP after evaluation and approval by BP engineering.

- No track type construction equipment shall be permitted to pivot or turn directly over top of the pipeline.

- A scraper or pan type tractor shall not be used for removal of soil within ten feet (10') of the centerline of the pipeline. Rubber tire or small track type equipment is an acceptable alternative.

- A sheepsfoot roller shall not be used for compaction purposes within five feet (5') or directly above the centerline of the pipeline.

- No vibratory rollers shall be used within three feet (3') of the centerline of the pipeline until the compacted cover over the pipeline has reached a depth of three and one-half feet (3 ½').

Parking Lots, Roads, Driveways, Fences and Structures

- No permanent structures may be constructed on the pipeline right of way

- No roads or fences shall run parallel to the pipeline within the pipeline right-of-way. Roads and fences shall cross the pipeline right-of-way at, or as near to, a 90° angle as is feasible. In no instance shall the angle of the crossing be less than 45°.

- There shall be a minimum vertical separation of two feet (2') between the pipeline and any underground structure.

- A minimum of five and one half feet (5.5') of cover is required for all road crossings, and three feet (3') for residential driveways; however, a stress factor calculation will be performed by BP to determine the actual amount of cover required depending on soil conditions and other circumstances.

- Proposals for parking lot construction on the pipeline right of way are discouraged. Asphalt paving may be permitted as an exception under certain conditions with an agreement executed by the property owner and BP. The agreement grants BP the right to excavate within the pavement area for any pipeline maintenance that may be necessary in the future and acknowledges the property owner as the party responsible for the expense of pavement replacement. If a parking lot is permitted by BP, a minimum of four feet (4') of cover will be required. However, BP will evaluate each proposal on an individual basis, and may impose additional requirements.

- A minimum of four feet (4') of cover is required for all drainage ditches.

- No structures (such as manholes or catch basins) shall be located over the pipeline. A minimum horizontal clearance of five feet (5') is required between the structure and the pipeline.

- Concrete pavement is discouraged; and in most instances, will not be allowed.

Landscape and Vegetation

- No trees are allowed on the pipeline right-of-way. BP may permit the installation of limited landscaping and minor shrubbery plantings with a verbal communication. For a major development, landscaping plans must first be submitted in writing to BP for review and approval. Any plantings that restrict efficient aerial inspection or limit access to the easement area will be considered an interference and must be addressed accordingly.

Foreign Line or Utility Crossings

- All foreign lines shall cross the pipeline right-of-way at, or as near to, a 90° angle as is feasible. In no instance shall the angle of the crossing be less than 45°.

- In no instance shall the foreign line be placed parallel to the pipeline within the pipeline right of way.

- The foreign line shall cross under the pipeline with at least two feet (2') of vertical separation unless the pipeline is at a prohibitive depth. If the pipeline is at a prohibitive depth, BP personnel will review and evaluate the proposed crossing location to determine if it will be feasible to allow the foreign line to cross above the pipeline.

- If the foreign line is a telecommunications cable, power cable, or similar in nature, the foreign line shall be placed in a Schedule 40 PVC conduit, or greater, for a linear distance extending ten feet (10') on either side of the centerline of the pipeline. The entire length of carrier pipe shall either be encased in concrete, or shall have a concrete cap placed on top of it.

- If the foreign line is a metallic pipeline, or similar in nature, the foreign line shall be coated with a suitable coating for a distance of at least fifty feet (50') on either side of the centerline of the pipeline. The foreign line owner, operator, or their contractor, shall install cathodic protection bonds and potential test leads to the foreign line at the crossing location and terminate the leads at an above ground location as identified by BP's on-site representative. BP will install the test leads on BP's pipeline.

- Below-ground precautionary flagging (warning tape) shall be placed in the ditch line above the foreign line. The warning tape shall be placed approximately one foot (1') below the final surface grade/elevation. The warning tape shall extend for a linear distance of ten feet (10') on either side of the centerline of the pipeline.

If, in the exercise of the pipeline easement rights, any "Permitted Facility" is damaged, disturbed or otherwise interfered with, BP and/or the pipeline easement owner shall be held harmless from and against any and all claims of whatsoever kind and nature which might be associated with or derived from such damage, disturbance or interference.

The above comments and stipulations are submitted as general construction requirements to avoid conflict with existing easement rights. BP reserves the right to impose further stipulations or requirements specific to each individual easement or situation.

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SECTION 01 22 00.00 10

MEASUREMENT AND PAYMENT

PART 1 GENERAL

NOTE: See Bidding Schedule Notes for further clarification on payment for OPTIONS

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 at the applicable lump sum price for mobilization and demobilization of all the Contractor's plant and equipment to complete the work. Payment constitutes full compensation for all plant, labor, equipment, and incidentals associated with mobilization and demobilization. Mobilization payments will generally not exceed 60% of the total amount of this line item, with the remaining 40% used for demobilization upon completion of the project. See SECTION 01 10 00.00 03 GENERAL PROVISIONS and SECTION 00800 SPECIAL CONTRACT CLAUSES for further information.

1.1.1.2 Unit of Measure

Unit of measure: Lump Sum (LS)

1.1.2 TEMPORARY CONSTRUCTION FACILITIES (Bid Item 0002)

1.1.2.1 Payment

Payment will be made at the contract lump sum price for the temporary construction office, utilities, and construction signs and all associated costs as described in SECTION 01 52 02.00 10 TEMPORARY CONSTRUCTION FACILITIES and SECTION 01 58 00.00 03 PROJECT SIGN AND SAFETY SIGN. Payment constitutes full compensation for all plant, labor, equipment, materials, and incidentals necessary to complete the work. All costs associated with this item will not be paid up front, payments will be made periodically throughout the contract duration based on percentage of work complete.

1.1.2.2 Unit of Measure

Unit of measure: Lump Sum (LS)

1.1.3 MAINTENANCE OF TRAFFIC (Bid Item 0003)

1.1.3.1 Payment

Payment will be made at the contract lump sum price for the maintenance of traffic and any all associated costs as described in SECTION 01 52 02.00 10 TEMPORARY CONSTRUCTION FACILITIES. Payment constitutes full compensation for all plant, labor, equipment, materials, and incidentals necessary to complete the work.

1.1.3.2 Unit of Measure

Unit of measure: Lump Sum (LS)

1.1.4 CLEARING AND GRUBBING (Bid Item 0004)

1.1.4.1 Payment

Payment will be made at the contract lump sum price for clearing and grubbing as described in SECTION 31 11 00, CLEARING AND GRUBBING, and as shown on the drawings, including handling, transporting, and on-site stockpiling. Payment constitutes full compensation for all plant, labor, materials, equipment, tools, and incidentals necessary to complete the work. The refilling of holes resulting from clearing and grubbing operations will not be measured for payment but will be considered as a subsidiary obligation under the above item.

1.1.4.2 Unit of Measure

Unit of measure: Lump Sum (LS)

1.1.5 DEMOLITION AND REMOVAL (Bid Item 0005)

1.1.5.1 Payment

Payment will be made at the contract lump sum price for the demolition of utilities, structures, fencing, pavements and other items within the work limits and their removal from the project site and all associated costs as described in SECTION 02 41 00, SITE DEMOLITION. Payment constitutes full compensation for all plant, labor, equipment, materials, and incidentals necessary to complete the work.

1.1.5.2 Unit of Measure

Unit of measure: Lump Sum (LS)

1.1.6 RIPRAP REVETMENT GRADATION (Bid Item 0017AD, 0023AF, 0024AH, 0026AG, 0027AE, 0028AF, and 0029AG)

1.1.6.1 Payment

Payment will be made at the contract lump sum price for placing riprap as described in SECTION 31 37 16.00 03 RIP-RAP FOR EROSION CONTROL. Payment constitutes full compensation for all labor, materials, equipment, tools, and incidentals necessary to complete the work. Including but not limited

to grading as indicated in the drawings, placement of RipRap, Bedding Stone, and Geotextile Fabric (described in SECTION 31 05 19.13 GEOTEXTILES USED AS FILTERS AND UNDERLAYS).

1.1.6.2 Unit of Measure

Unit of Measure: Lump Sum (LS)

1.1.7 WEST OF INDIANAPOLIS PEDESTRIAN BRIDGE (Bid Item 0013AB)

1.1.7.1 Payment

Payment will be made at the contract lump sum price for the work associated with the prefabricated pedestrian bridge West of Indianapolis Boulevard as described in SECTION 32 34 00, FABRICATED BRIDGES and as shown on drawings. Payment constitutes full compensation for all labor, equipment, materials and incidentals including fabrication, delivery, erection and temporary shoring.

1.1.7.2 Unit of Measure

Unit of measure: Lump Sum (LS)

1.1.8 EAST OF KENNEDY PEDESTRIAN BRIDGE (Bid Item 0035AC)

1.1.8.1 Payment

Payment will be made at the contract lump sum price for the work associated with pedestrian bridge East of Kennedy as described in SECTION 32 34 00, FABRICATED BRIDGES and as shown on drawings. Payment constitutes full compensation for all labor, equipment, materials and incidentals including fabrication, delivery, erection and temporary shoring.

1.1.8.2 Unit of Measure

Unit of measure: Lump Sum (LS)

1.1.9 EAST OF KENNEDY PEDESTRIAN BRIDGE WROUGHT IRON SAFETY RAIL OPTION(Bid Item 0036)

1.1.9.1 Payment

Payment will be made at the contract lump sum price for the cost difference between treated wood safety rails and wrought iron safety rails for work associated with rails for the pedestrian bridge East of Kennedy as described in SECTION 32 34 00, FABRICATED BRIDGES and as shown on drawings. Payment constitutes full compensation for all labor, equipment, materials and incidentals including fabrication, delivery, and erection.

1.1.9.2 Unit of Measure

Unit of measure: Lump Sum (LS)

1.1.10 EAST OF KENNEDY PEDESTRIAN BRIDGE STAMPED AND DYED CONCRETE DECK OPTION (Bid Item 0037)

1.1.10.1 Payment

Payment will be made at the contract lump sum price for work associated

with concrete deck for the pedestrian bridge East of Kennedy as described in SECTION 32 34 00, FABRICATED BRIDGES and as shown on drawings. Payment constitutes full compensation for all labor, equipment, materials and all incidentals.

1.1.10.2 Unit of Measure

Unit of measure: Lump Sum (LS)

1.1.11 WEST OF KENNEDY PEDESTRIAN BRIDGE (Bid Item 0034AD)

1.1.11.1 Payment

Payment will be made at the contract lump sum price for the work associated with pedestrian bridge West of Kennedy as described in SECTION 32 34 00, FABRICATED BRIDGES and as shown on drawings. Payment constitutes full compensation for all labor, equipment, materials and incidentals including fabrication, delivery, erection and temporary shoring.

1.1.11.2 Unit of Measure

Unit of measure: Lump Sum (LS)

1.1.12 SEGMENTAL BLOCK WALL AT WEST OF KENEDY PEDESTRIAN BRIDGE (Bid Item 0034AC)

1.1.12.1 Payment

Payment will be made at the contract lump sum price for the work associated with the segmental block wall as described in SECTION 32 32 23 SEGMENTAL CONCRETE BLOCK RETAINING WALL. Payment constitutes full compensation for all labor, equipment, materials and incidentals including excavation, bedding, backfill, formwork, concrete and reinforcing.

1.1.12.2 Unit of Measure

Unit of measure: Lump Sum (LS)

1.1.13 REMOVAL OF EXISTING DRAINAGE STRUCTURES (Bid Item 0019AB, 0021AB, 0023AE, 0027AD, and 0029AF)

1.1.13.1 Payment

Payment will be made at the contract lump sum price for the work associated with the removal of existing manholes, catchbasins, storm sewers, culvert pipes or other drainage structures indicated on the drawings. Payment constitutes full compensation for all labor, equipment, materials and incidentals including excavation, backfill, removal and disposal.

1.1.13.2 Unit of Measure

Unit of measure: Lump Sum (LS)

1.1.14 GATEWELLS OR GATEWELLS WITH HEADWALLS (Bid Item 0018AA, 0020AA, 0024AC, and 0026AC)

1.1.14.1 Payment

Payment will be made at the contract lump sum price for the work associated

with gatewells with and without headwalls as described in SECTION 33 49 33.00 03 SLUICE GATES AND FLAP GATES, SECTION 03 30 00.00 CONCRETE and SECTION 05 50 00.00 10 MISCELLANEOUS METALS. Payment constitutes full compensation for all labor, equipment, materials and incidentals including excavation, bedding, backfill, miscellaneous metal items, formwork, concrete and reinforcing.

1.1.14.2 Unit of Measure

Unit of measure: Lump Sum (LS)

1.1.15 HEADWALLS (Bid Item 0017AB, 0024AE, 0027AB, 0028AD and 0029AD)

1.1.15.1 Payment

Payment will be made at the contract lump sum price for the work associated with the Headwall Structures as described in SECTION 33 49 33.00 03 SLUICE GATES AND FLAP GATES and SECTION 03 30 00.00 CONCRETE. Payment constitutes full compensation for all labor, equipment, materials and incidentals including excavation, bedding, backfill, formwork, concrete and reinforcing.

1.1.15.2 Unit of Measure

Unit of measure: Lump Sum (LS)

1.1.16 HEAVY DUTY SLUICE GATES, FLAP GATES AND EQUIPMENT (Bid Item 0017AC, 0020AB, 0023AD, 0024AF, and 0024AG, 0026AE, 0026AF, 0027AC, 0028AE, 0029AE, 0040AD and 0040AE)

1.1.16.1 Payment

Payment at the contract lump sum price will be made for heavy-duty sluice gates, flap gates, portable electric operators and equipment as described in SECTION 33 49 33.00 03 SLUICE GATES AND FLAP GATES. Payment constitutes full compensation for all labor, delivery, equipment, materials, and incidentals associated with both sluice and flap gates.

1.1.16.2 Unit of Measure

Unit of Measure: Lump Sum (LS)

1.1.17 PRECAST DRAINAGE STRUCTURES (Bid Items 0017AA, 0019AA, 0020AC, 0024AD, 0026AD, 0027AA, 0028AC, 0029AC, and 0040AC)

1.1.17.1 Payment

Payment will be made at the contract lump sum price for installing the precast drainage structures as described in SECTION 33 40 00.00 STORM-DRAINAGE SYSTEM, and as shown on drawings, including excavation, bedding, backfilling, castings for the construction of the drainage structures, pipes, geotextile (described in SECTION 31 05 19.13 GEOTEXTILES USED AS FILTERS AND UNDERLAYS), connection to drainage piping and providing the manholes, catch basins, concrete collars, end sections, and trashracks. Payment constitutes full compensation for all labor, equipment, materials, and incidentals necessary to complete the work.

1.1.17.2 Unit of Measure

Unit of measure: Lump Sum (LS)

1.1.18 PRELOAD EMBANKMENT (Bid Item 0024AA, 0026AA, 0028AA, and 0029AA)

1.1.18.1 Payment

Payment will be made at the applicable contract lump sum price for the preload embankment as described in SECTION 31 00 00 EARTHWORK. The price shall be full compensation for excavating, loading, hauling, placing fill, granular drain material, filter fabric, and removal of this material, and for furnishing all labor, materials, equipment, tools, and incidentals necessary to complete the work.

1.1.18.2 Unit of Measure

Unit of measure: Lump Sum (LS)

1.1.19 CONTROL STRUCTURE (Bid Item 0014AD)

1.1.19.1 Payment

Payment will be made at the contract lump sum price for the work associated with control structure by Hart Ditch 6N, as shown on drawings. Payment constitutes full compensation for all labor, equipment, materials and incidentals including fabrication, delivery, formwork, excavating, concrete and reinforcing.

1.1.19.2 Unit of Measure

Unit of measure: Lump Sum (LS)

1.1.20 OUTFALL STRUCTURE (Bid Item 0023AA)

1.1.20.1 Payment

Payment will be made at the contract lump sum price for the work associated with outfall structure at Baring Ave I-Wall pump station 5S, as shown on drawings. Payment constitutes full compensation for all labor, equipment, materials and incidentals including fabrication, delivery, formwork, excavating, concrete and reinforcing.

1.1.20.2 Unit of Measure

Unit of measure: Lump Sum (LS)

1.1.21 NORTHCOTE SANDBAG CLOSURE (Bid Item 0031)

1.1.21.1 Payment

Payment will be made at the contract lump sum price for the work associated with closure structure, as shown on drawings. Payment constitutes full compensation for all labor, equipment, materials and incidentals including fabrication, delivery, formwork, excavating, concrete and reinforcing.

1.1.21.2 Unit of Measure

Unit of measure: Lump Sum (LS)

1.1.22 CONCRETE (Bid Item 0015AA, 0021AA, 0022AB, 0030AA, 0040AB, 0041AB, 0042AA and 0043AB)

1.1.22.1 Payment

Payment will be made at the contract lump sum price for delivery, furnish, placement, finish, and cure of concrete as described in SECTION 03 30 00.00 CONCRETE. Payment constitutes full compensation for all plant, labor, materials, equipment, tools, and incidentals necessary to complete the work.

1.1.22.2 Unit of Measure

Unit of measure: Lump Sum (LS)

1.1.23 NORTH RAIL ROAD CLOSURE STRUCTURE AND APPURTENANCES (Bid Item 0038AB) AND SOUTH RAIL ROAD CLOSURE STRUCTURE AND APPURTENANCES (Bid Item 0039AB)

1.1.23.1 Payment

Payment at the contract lump sum price will be made for heavy-duty steel slide gate closure structures. Payment constitutes full compensation for all labor, equipment, materials, and incidentals associated with the construction.

1.1.23.2 Unit of Measure

Unit of Measure: Lump Sum (LS)

1.1.24 PERFORMANCE AND PAYMENT BONDS (Bid Item 0033, 0034AH, 0035AG, 0038AC, 0039AC, 0040AF, 0041AC, 0042AD, and 0043AC)

1.1.24.1 Payment

Payment will be made at the contract lump sum price for the performance and payment bonds that are required as part of this contract. All costs associated with this item shall be included in the lump sum contract price.

1.1.24.2 Unit of Measure

Unit of measure: Lump Sum (LS)

1.1.25 TEMP SECURITY FENCE & GATES (Bid Item 0016AD)

1.1.25.1 Payment

Payment at the contract unit price will be made for installation and removal of fencing, and gates within the fence as described in SECTION 32 31 13 CHAIN LINK FENCES AND GATES and indentified on the drawings. A combination of project safety fencing and chain link fencing shall be used as indentified on the plan and profile sheets. The areas that are primarly impacted are 5S West of Harts Ditch, 6N, and 6S. Payment constitutes full compensation for furnishing, installing, removing, and disposing of all materials used in the security fence and for providing all necessary labor, equipment, and other incidental items necessary to complete the work.

1.1.25.2 Unit of Measure

Unit of measure: Unit of measure: Lump Sum (LS)

1.1.26 REMOVE SEDIMENT, GRADING, AND PLACEMENT OF RIPRAP (Bid Item 0019AC)

1.1.26.1 Payment

Payment will be made at the contract lump sum price for removal and disposal of sediment, grading and placing riprap (at the existing 48" gatewell East of Indianapolis Boulevard) as described in SECTION 31 37 16.00 03 RIP-RAP FOR EROSION CONTROL. Payment constitutes full compensation for all labor, materials, equipment, tools, and incidentals necessary to complete the work. Including but not limited to excavation, grading and placement of riprap.

1.1.26.2 Unit of Measure

Unit of measure: Unit of measure: Lump Sum (LS)

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 BIDDING 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 FRENCH DRAINS (Bid Item 0007)

1.3.1.1 Payment

Payment will be made at the contract unit price for the work associated with French Drains, as shown on drawings. Payment constitute full compensation for all plant, labor, excavation and backfill, and incidentals necessary to complete the work.

1.2.1.1 Measurement

Measurement will be based on the linear foot of french drains installed.

1.2.1.2 Unit of Measure

Unit of measure: Linear foot (LF)

1.2.2 VERTICAL PREFABRICATED WICK DRAINS (Bid Item 0024AB, 0026AB, 0028AB, and 0029AB)

1.2.2.1 Payment

Payment will be made at the contract unit price for the prefabricated vertical drainage wicks associated with the preloading embankment at the gatewell and culvert structures as described in SECTION 33 46 26.19 VERTICAL PREFABRICATED DRAINAGE WICKS. The unit price shall shall be for full compensation for the cost of furnishing the full length of drainage wick material; installing the drainage wick; and furnishing all tools, materials, labor, equipment, and all other costs necessary to complete the required work. No payment will be made for any excess lengths, additional wicks used for contractor convenience, unacceptable drainage wicks, or for

any delays or expenses incurred through changes necessitated by the use of improper or unacceptable material or equipment.

1.2.2.2 Unit of Measure

Unit of measure: Linear Foot (LF)

1.2.3 STRIPPING TOP SOIL (Bid Item 0008AA)

1.2.3.1 Payment

Payment will be made at the contract unit price for stripping as described in SECTION 31 00 00 EARTHWORK, including excavating, loading, hauling, stockpiling, and placing of this material. Payment constitutes full compensation for all labor, materials, equipment, tools, and incidentals necessary to complete the work. No separate payment will be made for stripping outside of the limits indicated to be stripped.

1.2.3.2 Measurement

Stripping will be measured by the cubic yard. The quantity to be measured for payment shall be the actual number of square yards of material stripped to the depth specified within the limits of construction designated on the plans and typical sections, or as directed by the Contracting Officer. The Contractor shall perform original and final surveys for the purpose of measuring quantities for payment. The Contractor shall notify the Contracting Officer's representative sufficiently in advance of the start of the stripping operation and upon completion of the stripping operation to afford sufficient time during which to be present for the surveys. The contractor shall have the surveys performed by an independent licensed surveyor.

1.2.3.3 Unit of Measure

Unit of measure: Cubic Yard (CY)

1.2.4 IMPERVIOUS AND SATISFACTORY FILL (Bid Item 0008AB and 0008AC)

1.2.4.1 Payment

Payment will be made at the contract unit price for fill placed as described in SECTION 31 00 00 EARTHWORK, including excavating, loading, hauling, placing and compacting of this material and excavation for inspection trenches. No separate payment will be made for inspection trenches. Inspection trenches will be incidental to impervious and satisfactory fill operations. Payment constitutes full compensation for furnishing all labor, materials, equipment, tools, and incidentals necessary to complete the work. Inspection trench excavating and backfilling will be incidental to this pay item.

1.2.4.2 Measurement

Impervious and satisfactory fill used for the embankment construction will be measured for payment by the cubic yard, in-place. 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 necessary stripping, excavation, and other preparation of the area has been performed. The Contractor shall notify the Contracting Officer's representative sufficiently in advance of the start of the placing

operation to afford sufficient time during which to be present for the necessary original measurements.

Upon completion of the placement operation, the Contractor will notify the Contracting Officer's representative that final surveys will be 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 impervious or satisfactory fill shall be added to the survey quantity to account for settlement or shrinkage, but shall be incidental to the levee construction. The quantity of impervious and satisfactory fill computed in the aforementioned paragraphs shall constitute the total measurement quantity for payment. No other method or means of determining quantities of placed impervious and satisfactory fill materials will be considered. Inspection trench excavating and backfilling will not be measured for payment.

1.2.4.3 Unit of Measure

Unit of measure: Cubic Yard (CY)

1.2.5 DITCH EXCAVATION (Bid Item 0008AD)

1.2.5.1 Payment

Ditch excavation will be paid for at the contract unit price per cubic yard as described in SECTION 31 00 00 EARTHWORK. Only two ditches are considered for this pay item: 5S-D2 and 6N-D3, all other ditch excavation is considered in spoil bank excavation. 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 new ditch as shown. This shall also include the stockpiling of material from the excavation as necessary.

1.2.5.2 Unit of Measure

Unit of Measure: Cubic Yard (CY)

1.2.6 EXISTING SPOIL BANK EXCAVATION (Bid Item 0008AE)

1.2.6.1 Payment

Payment will be made at the contract unit price for excavation of the existing spoil banks as indicated on the drawings to the top of the inspection trench, (not including the inspection trench excavation) as described in SECTION 31 00 00 EARTHWORK, including excavating, loading, hauling, stockpiling and/or disposal of this material. Payment constitutes full compensation for all labor, materials, equipment, tools, and incidentals necessary to complete the work.

1.2.6.2 Measurement

Excavation will be measured for payment by the cubic yard and shall include the existing spoil bank breach excavations as indicated. Quantities shall be determined by the average end area method every 100 feet, or as directed by the Contracting Officer. The Contractor shall perform original and final surveys for the purpose of measuring quantities for payment. The Contractor shall notify the Contracting Officer's representative sufficiently in advance of the start of the excavtion operation and upon

completion of the excavation operation to afford sufficient time during which to be present for the surveys. The surveys shall be performed by an independent licensed surveyor. Excavation of the borrow material will not be measured for separate payment.

1.2.6.3 Unit of Measure

Unit of measure: Cubic Yard (CY)

1.2.7 SEEDING (Bid Item 0009AA)

1.2.7.1 Payment

Payment will be made at the contract unit price for seeding as described in SECTION 32 92 19.13 TURF, including excavating, loading, hauling, and placing of this material. Payment constitutes full compensation for all labor, materials, equipment, tools, and incidentals necessary to complete the work.

1.2.7.2 Measurement

The seeding will be measured for payment in acres of seed, completed and accepted.

1.2.7.3 Unit of Measuree

Unit of measure: Acre (AC)

1.2.8 TOPSOIL (Bid Item 0009AB)

1.2.8.1 Payment

Payment will be made at the contract unit price for topsoil as described in SECTION 31 00 00 EARTHWORK, including excavating, loading, hauling, and placing of this material. Payment constitutes full compensation for all labor, materials, equipment, tools, and incidentals necessary to complete the work.

1.2.8.2 Measurement

Topsoil will be measured by the cubic yard. The material will be measured in its final position by the average end area method every 100 feet. The Contractor shall perform original and final surveys for the purpose of measuring quantities for payment. The Contractor shall notify the Contracting Officer's representative sufficiently in advance of the start of the topsoil operation and upon completion of the topsoil operation to afford sufficient time during which to be present for the surveys. The surveys shall be performed by an independent licensed surveyor. Topsoil stripping and stockpiling at the borrow site will not be measured for payment and costs associated with the operations shall be considered incidental to the borrow site development.

1.2.8.3 Unit of Measure

Unit of measure: Cubic Yard (CY)

1.2.9 RIPRAP CLASS 2 GRADATION - NORTH BANK AT HART DITCH (Bid Item 0006AA, 0006AB, and 0006AC)

1.2.9.1 Payment

Payment will be made at the contract price for placing riprap as described in SECTION 31 37 16.00 03 RIP-RAP FOR EROSION CONTROL. Payment constitutes full compensation for all labor, materials, equipment, tools, and incidentals necessary to complete the work, including but not limited to grading as indicated in the drawings, placement of RipRap, Bedding Stone, and Geotextile Fabric (described in SECTION 31 05 19.13 GEOTEXTILES USED AS FILTERS AND UNDERLAYS).

1.2.9.2 Unit of Measure

Unit of Measure: Tons (TN)

1.2.10 BITUMINOUS SURFACE and BINDER COURSE (Bid Items 0010AA, and 0011AB)

1.2.10.1 Payment

Payment will be made at the contract unit price per ton for bituminous surface and binder course as described in SECTION 32 10 00.00 BITUMINOUS CONCRETE PAVEMENT. Payment constitutes 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. Prime/tack coat, as necessary, shall be included in surface course payment.

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.

1.2.10.2 Unit of Measure

Unit of Measure: Ton (TN)

1.2.11 LIMESTONE SCREENINGS (Bid Item 0010AB)

1.2.11.1 Payment

Payment will be made at the contract unit price for crushed aggregate and limestone screening as described in SECTION 32 11 23.00 GRADED CRUSHED AGGREGATE BASE COURSE. Payment constitutes full compensation for labor, materials, equipment, tools, and incidentals necessary to complete the work.

1.2.11.2 Measurement

Crushed aggregate and limestone screenings will be measured for payment in cubic yards of trail surface materials, completed and accepted.

1.2.11.3 Unit of Measure

Unit of Measure: Cubic Yards (CY)

1.2.12 GRADED CRUSHED AGGREGATE, CA-53 (Bid Item 0010AC)

1.2.12.1 Payment

Payment will be made at the contract unit price for graded crushed aggregate, CA-53 as described in SECTION 32 11 23.00 GRADED CRUSHED AGGREGATE BASE COURSE. This includes the aggreate used for all levee turna around areas and gravel pad shown adjacent to 6N - 96" Gatewell. Payment constitutes full compensation for labor, materials, equipment, tools, and incidentals necessary to complete the work.

1.2.12.2 Measurement

Graded crushed aggregate will be measured for payment in cubic yards of trail surface materials, completed and accepted.

1.2.12.3 Unit of Measure

Unit of Measure: Cubic Yards (CY)

1.2.13 VEHICLE BARRIERS TYPE I, TYPE II, AND BRIDGE BOLLARDS(Bid Item 0010AD,0010AE, 0013AC, 0034AE, and 0035AD)

1.2.13.1 Payment

Payment at the contract unit price will be made for furnishing and installing fixed and removable bollards as indicated on the drawings.

Vehicle Barrier - Type I is indentified in the bid schedule as a set. A set consist of two fixed bollards and one removable bollards.

Vehicle Barrier - Type II is indentified in the bid schedule per fixed bollard.

Payment constitutes full compensation for all materials and labor associated with site preparation, excavating and backfilling and other incidental items necessary to complete the work.

1.2.13.2 Measurement

Vehicle barriers will be measured for payment by the number of vehicle barriers constructed in place, and accepted.

1.2.13.3 Unit of Measure

Unit of measure: EACH (EA)

1.2.14 PEDESTRIAN BRIDGE CONCRETE ABUTMENTS AND PIERS (Bid Item 0013AA, 0034AA, 0034AB, 0035AA and 0035AB)

Payment at the contract unit price will be made for furnishing and installing concrete abutments and piers as indicated on the drawings and in accordance with Section 03 30 00.00 CONCRETE. Payment constitutes full compensation for all materials and labor associated with site preparation, excavating and backfilling and other incidental items necessary to complete the work.

1.2.15 A-FRAME GATES (Bid Item 0010AF)

1.2.15.1 Payment

Payment will be made at the contract unit price for A-Frame Gates as shown in the drawings. Payment constitutes full compensation for all labor, materials, equipment, tools, and incidentals necessary to complete the work.

1.2.15.2 Unit of Measure

Unit of Measure: Each (EA)

1.2.16 RIPRAP CLASS 2 GRADATION AND RIPRAP REVETMENT GRADATION (Bid Item 0014AA, and 0014AB)

1.2.16.1 Payment

Payment at the contract unit price for riprap material acceptably placed and within the tolerances required as described in SECTION 31 37 16.00 03 RIP RAP FOR EROSION CONTROL will be made. All associated costs for placement of goetextile fabric under the rip rap shall be considered incidental. Payment constitutes full compensation for all labor, materials, equipment, tools, and incidentals necessary to complete the work.

Deductions: All stone permitted by the Contracting Officer to remain outside the tolerances required will be deducted from the quantity to be paid for. Volume of excess stone will be computed, using the average end area of excess above the tolerance line. The excess volume will be deducted from the payment quantity at a rate of 135 pounds per cubic foot regardless of actual weight per cubic foot.

1.2.16.2 Measurement

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

Weighing operations shall be performed offsite, as approved, in the presence of the Contracting Officer, unless waived. Each load shall be accompanied by duplicate copies of delivery tickets certified by the weighmaster. At a minimum each ticket shall contain the following: Date and time, Vehicle number, Gross weight, Vehicle tare weight, Net weight, Material weighed, and Signature of weighmaster. Delivery tickets shall be collected by the Contractor, and one copy thereof furnished to the Contracting Officer at the close of each day's operations.

1.2.16.3 Unit of Measure

Unit of measure: Ton (TN)

1.2.17 GABION MATTRESS (Bid Item 0014AC)

1.2.17.1 Payment

Payment will be made for costs associated with gabion mattress, including the cost of furnishing, assembling, and placing the wire baskets, the stone fill, and all other materials, labor, equipment, tools, supplies, and incidental costs in connection with completing this item of work.

1.2.17.2 Measurement

Gabions meeting the requirements of these specifications and acceptably placed within the limits indicated on the drawings or otherwise established in the field, will be measured for payment by the cubic yard of stone filled gabions in place.

1.2.17.3 Unit of Measuree

Unit of measure: Cubic Yards (CY)

1.2.18 STEEL SHEET PILING (Bid Item 0013AD, 0015AB, 0022AA, 0023AB, 0023AC, 0025AA, 0025AB, 0030AB, 0034AF, 0035AE, 0038AA, 039AA, 0040AA, 0041AA, 0042AB and 0043AA)

1.2.18.1 Payment

Payment at the contract unit price will be made for the installation of steel sheet piling as described in SECTION 35 49 13.10 03 METAL SHEET PILING, including removing and disposing of all materials. Payment constitutes full compensation for all necessary labor, equipment, materials, steel channels and bars, and other incidental items necessary to complete the work.

1.2.18.2 Unit of Measure

Unit of measure: Square Feet (SF)

1.2.19 STEEL H-PILES (Bid Item 0013AE, 0034AG, 0035AF, and 0042AC)

1.2.19.1 Payment

The Contractor shall furnish a price which includes all necessary equipment, tools, material, labor, and supervision required to: deliver, handle, install, and cut off the piles (including test piles); conduct the load tests; and meet the applicable contract requirements. Payment for piles will be on the basis of the lengths of the piles measured from cut off elevations to final tip elevations. No additional payment will be made for: damaged, rejected, or misplaced piles; withdrawn piles other than test piles withdrawn as directed; any portion of a pile remaining above the cut off elevation; backdriving; cutting off piles; splicing; build-ups; or any cut off length of piles.

1.2.19.2 Unit of Measure

The Contracting Officer reserves the right to increase or decrease the aggregate length of piles to be furnished and installed by changing the foundation pile locations or elevations, requiring the installation of additional piles, or requiring omission of piles from the requirements

shown and specified. Whether or not such changes are made, the Contractor will be paid at the contract unit price per foot, multiplied by the total length in feet of acceptable piles actually installed.

Unit of measure: Square Feet (SF)

1.2.20 FENCE REMOVAL (Bid Item 0016AA)

1.2.20.1 Payment

Payment will be made at the contract unit price for removal of existing fence within the work limits as shown on drawings and as described in SECTION 02 41 00, SITE DEMOLITION. Payment constitutes full compensation for all plant, labor, equipment, materials, and incidentals necessary to complete the work.

1.2.20.2 Measurement

Fence removal will be measured for payment in linear feet of fence removed.

1.2.20.3 Unit of Measure

Unit of measure: Linear Foot (LF)

1.2.21 PERMANENT FENCE 5' AND PERMANENT FENCE 8' (Bid Item 0016AB and 0016AC)

1.2.21.1 Payment

Payment at the contract unit price will be made for installation and removal of fencing, and gates within the fence as described in SECTION 32 31 13 CHAIN LINK FENCES AND GATES and indentified on the drawings. The areas impacted are primarly 5S East of Harts Ditch, small areas are also indentified on 6N. All costs associated with manufacturing, furnishing, delivering, excavating, installing, of the permanent chain link fence 5' and 8' tall as shown on drawings including barbed wire, metal posts, tie wires, rails braces, and other misc. parts shall be paid for at the per linear foot of permanent fence under the unit price.

1.2.21.2 Measurement

Measurement will be based on the linear foot of permanent fence installed.

1.2.21.3 Unit of Measure

Unit of measure: Linear Foot (LF)

1.2.22 CONCRETE CURB AND CONCRETE GUTTER (Bid Item 0032)

1.2.22.1 Payment

All cost for all labor, equipment, materials and incidentals including fabrication, delivery, formwork, excavating, concrete and reinforcing shall be paid for at the per linear foot of concrete curb and concrete gutter under the unit price.

1.2.22.2 Measurement

Measurement will be based on the linear foot of concrete curb and concrete

gutter installed.

1.2.22.3 Unit of Measure

Unit of measure: Linear Foot (LF)

1.2.23 REMOVAL OF UNSUITABLE MATERIAL(Bid Item 0012)

1.2.23.1 Payment

All costs associates with the off site disposal of the material piles found on site will be paid for by the contract unit price. This item covers the removal of material for the reconstruction of Parkway Drive.

1.2.23.2 Measurement

Materials being disposed off-site will be measured for payment by the cubic yard as recorded on-site, as approved by the Contracting Officers's Representative.

1.2.23.3 Unit of Measure

Unit of Measure: Cubic Yard (CY)

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

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PROJECT SCHEDULE FOR CALUMET AREA OFFICE

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 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Project Schedule; G,CS

Initial and periodic schedule updates 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, including the design and construction sequences, 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. Make the schedule cost loaded and activity coded. The schedule will provide the 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 Schedule Status 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 the basis for determining contract earnings during each update period and therefore the amount of each progress payment. Lack of an approved schedule update or qualified scheduling personnel 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. Failure of the Contractor to meet the requirements of this

specification will result in the disapproval of the schedule. 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

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, Government Furnished Equipment (GFE) and Notice to Proceed (NTP) for phasing requirements.

3.3.2.5 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.

3.3.2.6 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 within a floor of a building, different floors within a building, and different buildings within a complex of buildings. 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.

3.3.2.7 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.

3.3.2.8 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.

3.3.2.9 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. Code fast track and construction phases proposed by the Contractor to allow filtering and organizing the schedule by fast track design and construction packages. 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.

3.3.2.10 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.

3.3.2.11 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 01 45 04.00 03 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 Preliminary or Initial 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 Interim Completion Dates

Constrain contractually specified interim completion dates to show negative float when the calculated early finish date of the last activity in that phase is later than the specified interim completion date.

3.3.4.1 Start Phase

Include as the first activity for a project phase an activity called "Start Phase X" where "X" refers to the phase of work. The "Start Phase X" activity shall have an "ES" constraint date equal to the date on which the NTP was acknowledged, and a zero day duration.

3.3.4.2 End Phase

Include as the last activity for a project phase an activity called "End Phase X" where "X" refers to the phase of work. The "End Phase X" activity shall have an "LF" constraint date equal to the specified completion date

for that phase and a zero day duration.

3.3.4.3 Phase "X" Hammock

Include a hammock type activity for each project phase called "Phase X" where "X" refers to the phase of work. The "Phase X" hammock activity shall be logically tied to the earliest and latest activities in the phase.

3.3.5 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 and the inability of the Contracting Officer to evaluate Contractor progress for payment purposes. 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.

3.3.6 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.

3.3.7 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.

3.3.8 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.

3.3.9 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, five copies of an updated Construction Schedule Submittal 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

Based on the result of the meeting, specified in PERIODIC SCHEDULE UPDATE MEETINGS, submit periodic schedule updates. 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)

Field	Activity Code	Length	Description
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 Preliminary Schedule, Initial Schedule, and every Periodic Schedule Update 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 Narrative Report

Provide a Narrative Report with the Preliminary, Initial, and each Periodic Update of the project schedule, as the basis of the progress payment request. The Narrative Report shall include: a description of activities along the 2 most critical paths where the total float is less than or equal to 20 work days, a description of current and anticipated problem areas or delaying factors and their impact, and an explanation of corrective actions taken or required to be taken. The narrative report is expected to communicate to the Government, the Contractor's thorough analysis of the schedule output and its plans to compensate for any problems, either current or potential, which are revealed through that analysis. Identify and explain why any activities that, based on their calculated late dates, should have either started or finished during the update period but did not.

3.5.3 Approved Changes Verification

Include only those project schedule changes in the schedule submission that have been previously approved by the Contracting Officer. The Narrative Report shall specifically reference, on an activity by activity basis, all changes made since the previous period and relate each change to documented, approved schedule changes.

3.5.4 Schedule Reports

The format, filtering, organizing and sorting for each schedule report shall be as directed by the Contracting Officer. Typically reports shall contain: Activity Numbers, Activity Description, Original Duration, Remaining Duration, Early Start Date, Early Finish Date, Late Start Date, Late Finish Date, Total Float, Actual Start Date, Actual Finish Date, and Percent Complete. The following lists typical reports that will be requested. One or all of these reports may be requested for each schedule submission.

3.5.4.1 Activity Report

A list of all activities sorted according to activity number.

3.5.4.2 Logic Report

A list of detailed predecessor and successor activities for every activity in ascending order by activity number.

3.5.4.3 Total Float Report

A list of all incomplete activities sorted in ascending order of total float. List activities which have the same amount of total float in ascending order of Early Start Dates. Do not show completed activities on this report.

3.5.4.4 Earnings Report by CLIN

A compilation of the Contractor's Total Earnings on the project from the NTP to the data date. This report shall reflect the earnings of specific activities based on the agreements made in the schedule update meeting defined herein. Provided that the Contractor has furnished a complete schedule update, this report shall serve as the basis of determining progress payments. Group activities by CLIN item number and sort by activity number. This report shall: sum all activities coded to a particular CLIN and provide a CLIN item percent earned value; and complete and sum CLIN items to provide a total project percent complete. The printed report shall contain, for each activity: the Activity Number, Activity Description, Original Budgeted Amount, Total Quantity, Quantity to Date, Percent Complete (based on cost), and Earnings to Date.

3.5.5 Network Diagram

The network diagram is required for the Preliminary, Initial and Periodic Updates. 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:

3.5.5.1 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.

3.5.5.2 Project Milestone Dates

Show dates on the diagram for start of project, any contract required interim completion dates, and contract completion dates.

3.5.5.3 Critical Path

Clearly show the critical path.

3.5.5.4 Banding

Organize activities as directed to assist in the understanding of the activity sequence. Typically, this flow will group activities by category

of work, work area and/or responsibility.

3.5.5.5 S-Curves

Earnings curves showing projected early and late earnings and earnings to date.

3.6 PERIODIC SCHEDULE UPDATE MEETINGS

The periodic schedule update meetings specified in this paragraph shall be held in addition to the regular progress meetings required in Section 01100. Conduct periodic schedule update meetings for the purposes of reviewing the Contractor's proposed out of sequence corrections, determining causes for delay, correcting logic, maintaining schedule accuracy and determining earned value. Unless directed by the COR to decrease the frequency, meetings shall occur monthly within five days of the proposed schedule data date and after the Contractor has updated the schedule with Government concurrence respecting actual start dates, actual finish dates, remaining durations and percent complete for each activity. Provide a computer with the scheduling software loaded and a projector during the meeting which allows all meeting participants to view the proposed schedule update during the meeting. The meeting and resultant approvable schedule update shall be a condition precedent to a formal submission of the update as described in SUBMISSION REQUIREMENTS and to the submission of an invoice for payment. The meeting will be a working interactive exchange which will allow the Government and the Contractor the opportunity to review the updated schedule on a real time and interactive basis. The Contractor's authorized scheduling representative will organize, sort, filter and schedule the update as requested by the Government. The meeting will last no longer than 8 hours. A rough draft of the proposed activity logic corrections and narrative report shall be provided to the Government 48 hours in advance of the meeting. The Contractor's Project Manager and Authorized Scheduler shall attend the meeting with the Authorized Representative of the Contracting Officer.

3.6.1 Update Submission Following Progress Meeting

Submit a complete update of the project schedule containing all approved progress, revisions, and adjustments, pursuant to paragraph SUBMISSION REQUIREMENTS not later than 4 working days after the periodic schedule update meeting, reflecting only those changes made during the previous update meeting.

3.6.2 Status of Activities

Update information, including Actual Start Dates (AS), Actual Finish Dates (AF), Remaining Durations (RD), and Percent Complete shall be subject to the approval of the Government prior to the meeting. As a minimum, address the following items on an activity by activity basis during each progress meeting.

3.6.2.1 Start and Finish Dates

Accurately show the status of the AS and/or AF dates for each activity currently in-progress or completed since the last update. The Government may allow an AF date to be assigned with the percent complete less than 100% to account for the value of work remaining but not restraining successor activities. Only assign AS dates when actual progress occurs on an activity.

3.6.2.2 Remaining Duration

Update the estimated RD for all incomplete activities independent of Percent Complete. Remaining Durations may exceed the activity OD or may exceed the activity's prior update RD if the Government considers the current OD or RD to be understated based on current progress, insufficient work crews actually manning the job, unrealistic OD or deficiencies that must be corrected that restrain successor activities.

3.6.2.3 Percent Complete

Update the percent complete for each activity started, based on the realistic assessment of earned value. Activities which are complete but for remaining minor punch list work and which do not restrain the initiation of successor activities may be declared 100 percent complete. To allow for proper schedule management, cost load the correction of punch list from Government pre-final inspection activity(ies) not less than 1 percent of the total contract value, which activity(ies) may be declared 100 percent complete upon completion and correction of all punch list work identified during Government pre-final inspection(s).

3.6.2.4 Logic Changes

Specifically identify and discuss all logic changes pertaining to NTP on change orders, change orders to be incorporated into the schedule, Contractor proposed changes in work sequence, corrections to schedule logic for out-of-sequence progress, and other changes that have been made pursuant to contract provisions. The Government will only approve logic revisions for the purpose of keeping the schedule valid in terms of its usefulness in calculating a realistic completion date, correcting erroneous logic ties, and accurately sequencing the work.

3.6.2.5 Other Changes

Other changes required due to delays in completion of any activity or group of activities include: 1) delays beyond the Contractor's control, such as strikes and unusual weather. 2) delays encountered due to submittals, Government Activities, deliveries or work stoppages which make re-planning the work necessary. 3) Changes required to correct a schedule that does not represent the actual or planned prosecution and progress of the work.

3.7 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.

3.7.1 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.

3.7.2 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.

3.7.3 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.

3.8 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.

3.9 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.

3.10 TRANSFER OF SCHEDULE DATA INTO RMS/QCS

The Contractor shall download and upload the schedule data into the Resident Management System (RMS) 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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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-09 Manufacturer's Field Reports

Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.

Factory test reports.

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:

US Army Corps of Engineers, Calumet Area Office, 906 Griffith Boulevard, Griffith, IN 46319.

1.7 SUBMITTAL REGISTER

At the end of this section is a submittal register showing items of equipment and materials 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 in accordance with Section 01312A QUALITY CONTROL SYSTEM (QCS).

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 sample transmittal form (ENG Form 4025) attached to this section shall be used for submitting both Government approved and information only submittals in accordance with the instructions on the reverse side of the form. These forms are included in the QCS software that the Contractor is required to use for this contract. This form shall be properly completed

by filling out all the heading blank spaces and identifying each item submitted. Special care shall be exercised to ensure proper listing of the specification paragraph and/or sheet number of the contract drawings pertinent to the data submitted for each item.

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 --

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		01 10 00.00 03	SD-01 Preconstruction Submittals															
			Construction Schedule		G	CS												
			Condition of Existing Structures	1.9														
			and Roads															
			Coordination with Others	1.14	G	CS												
			Drug Free Workplace															
			SD-11 Closeout Submittals															
			As-Built Drawings	1.6	G	CS												
			Construction Documentation	1.7	G	DG												
			Report															
		01 32 01.02 10	SD-01 Preconstruction Submittals															
			Project Schedule	3.4	G	CS												
		01 35 29	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	CS												
			Proof of qualification		G	CS												
			SD-06 Test Reports															
			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														

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		01 45 04.00 03	SD-01 Preconstruction Submittals															
			QUALITY CONTROL PLAN	3.2	G CS													
		01 52 02.00 10	SD-01 Preconstruction Submittals															
			Site Plan	1.3	G DC													
		01 55 26.00 03	SD-01 Preconstruction Submittals															
			Traffic Control Plan		G CS													
		01 57 20.02 10	SD-01 Preconstruction Submittals															
			Environmental Protection Plan	1.7	G DH													
		02 41 00	SD-01 Preconstruction Submittals															
			Work Plan															
			Commercial Landfill Location		G DH													
		03 30 00.00	SD-02 Shop Drawings															
			Reinforcing Steel	2.1.5	G DS													
			Concrete Fabrication Drawings		G DS													
			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														
			Reinforcing Steel	2.1.5	G DS													
			Formliners		G DS													
			Waterstops	2.1.6														
			On-Site Batching and Mixing		G C													
			Equipment															
			Design Calculations		G DS													

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		03 30 00.00	SD-06 Test Reports															
			Aggregates	2.1.2														
			Concrete Mixture Proportions	1.3.2	G	DS												
			Cementitious Grout Proportions		G	DS												
			SD-07 Certificates															
			Cementitious Materials	2.1.1														
			Aggregates	2.1.2														
			Reinforcing Steel	2.1.5	G	DS												
		05 50 00.00 10	SD-02 Shop Drawings															
			Shop Fabricated Metal Items		G	DS												
			Welding of Structural Steel	3.5.2.1														
			SD-05 Design Data															
			Hand Ratchet Winch and Winch		G	DS												
			Related Materials															
			SD-03 Product Data															
			Aluminum Access Hatches															
			Stainless Steel Expansion															
			Anchors															
			Welding of Structural Steel	3.5.2.1	G	DS												
			Hand Ratchet Winch and Winch		G	DS												
			Related Materials															
			SD-05 Design Data															
			Hand Ratchet Winch and Winch		G	DS												
			Related Materials															
		31 00 00	SD-01 Preconstruction Submittals															
			Plan of Operation	1.8	G	CS												

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		31 00 00	Dewatering Work Plan	1.10.3	G	CS												
			Cofferdam Work Plan	1.10.5	G	CS												
			Commercial Borrow Source		G	CS												
			Soil Sampling Plan	3.3.2.1	G	DH												
			SD-06 Test Reports															
			Quality Control Test Reports	1.9.1.2														
			Environmental Soil Sampling	3.3.2.2	G	DH												
			Report															
			SD-07 Certificates															
			Laboratory Certification		G	CS												
		31 05 19.13	SD-04 Samples															
			Geotextile	2.1.1														
			SD-07 Certificates															
			Geotextile	2.1.1														
		31 11 00	SD-01 Preconstruction Submittals															
			Disposal Agreement		G	C-C												
		31 36 00	SD-04 Samples															
			Mattresses	1.6.1														
			Alternative Wire Fasteners	2.1.3														
			SD-06 Test Reports															
			Mattresses	1.6.1														
			Alternative Wire Fasteners	2.1.3														
		31 37 16.00 03	SD-01 Preconstruction Submittals															
			Sources and Evaluation Testing	1.3														
			Gradation and Shape Testing	1.4														
		31 62 16.00 10	SD-01 Preconstruction Submittals															

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		31 62 16.00 10	Piledriving equipment															
			Hammer Information															
			Capblock (Hammer Cushion)															
			Information															
			Pile Cap Information															
			Pile Cushion Information															
			Power Plant and Leads															
			SD-06 Test Reports															
			Mill Test Reports		G	CS												
			Driving Records															
			Pile Placement Plan	3.1.2.1	G	CS												
			Wave Equation Analysis	2.2.1	G	DG												
			Wave Equation Analysis	3.1.1	G	DG												
		32 31 13	SD-02 Shop Drawings															
			Erection/Installation Drawings	1.3														
			Fence Assembly	1.3														
			Gate Assembly	1.3														
			Gate Hardware and Accessories	2.17														
			SD-03 Product Data															
			Fence Assembly	1.3														
			Gate Assembly	1.3														
			Gate Hardware and Accessories	2.17														
			SD-04 Samples															
			Heavy Duty Breathable	2.19	G	C												
			Mesh/Windscreen															
			SD-08 Manufacturer's Instructions															

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		32 31 13	Fence Assembly	1.3														
			Gate Assembly	1.3														
			Hardware Assembly	1.3														
			Accessories	1.3														
			Accessories	1.3														
		32 32 23	SD-02 Shop Drawings															
			Shop Drawings		G													
			SD-03 Product Data															
			Components and Equipment	1.5														
			Supplier Qualifications	1.6														
			Manufacturer's Representative	1.7														
			Soil Testing	3.8	G													
			Reinforcement Testing		G													
			Calculations	1.4.2	G													
			SD-04 Samples															
			Segmental Concrete Units	2.1	G													
			Reinforcement	2.2	G													
			SD-07 Certificates															
			Reinforcement	2.2														
		32 34 00	SD-01 Preconstruction Submittals															
			Manufacturer's Instructions	1.2.1														
			Manufacturer's Instructions	1.2.1														
			Design Analysis and Calculations	1.2.3	G	LRH												
			Design Analysis and Calculations	1.2.3	G	LRH												
			SD-03 Product Data															
			Welding Procedure Qualifications		G	DS												

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		32 34 00	Welder, Welding Operator, and		G	DS												
			Tacker Qualification															
			Inspector Qualification		G	DS												
			Pre-qualified Procedures		G	DS												
			Structural Steel Truss	2.1														
			Bridge Bearings															
			Anchor Bolts															
			SD-04 Samples															
			Stamped and Dyed Concrete															
			SD-06 Test Reports															
			Quality Control															
			Nondestructive Examination															
			Concrete Mixture Proportions for		G	DS												
			Dyed Concrete															
		32 92 19.13	SD-03 Product Data															
			Proof of Seed Order															
			Delivery Schedule															
			SD-06 Test Reports															
			Seeds															
			Fertilizer															
			SD-08 Manufacturer’s Instructions															
			Manufacturer's Literature															
			SD-10 Operation and Maintenance															
			Data															
			Maintenance Instructions															
		33 40 00.00	SD-01 Preconstruction Submittals															

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		33 40 00.00	Temporary Outlet Plan															
			Installation Procedures		G													
			SD-06 Test Reports															
			Certification															
			SD-08 Manufacturer’s Instructions															
			Manufacturer's Recommendation															
		33 46 26.19	SD-02 Shop Drawings															
			Drawings and Schedule		G	DG												
			SD-04 Samples															
			Drainage wick samples															
		33 49 33.00 03	SD-02 Shop Drawings															
			Sluice Gates	2.4	G	DM												
			Flap Gates	2.5	G	DM												
			SD-03 Product Data															
			Sluice gates including stems and		G	DM												
			operating pedestal (lift)															
			Flap gates	2.5	G	DM												
			SD-05 Design Data															
			Gate Stem and Pedestal (lift)		G	DM												
			SD-10 Operation and Maintenance															
			Data															
			Maintenance and Operating	3.2	G	DM												
			Manuals															
			Power Operating Device	2.6	G	DM												
			SD-11 Closeout Submittals															
			Warranty	3.4	G	DM												

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		33 49 33.00 03	Tools	3.3	G	DM												
		35 49 13.10 03	SD-01 Preconstruction Submittals															
			Equipment Descriptions															
			SD-02 Shop Drawings															
			Shop Drawings															
			SD-07 Certificates															
			Materials Test Certificates		G													
			SD-09 Manufacturer's Field															
			Reports															
			Driving Records															

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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SECTION 01 35 29

SAFETY AND OCCUPATIONAL HEALTH REQUIREMENTS

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1.4 REGULATORY REQUIREMENTS
1.5 SITE QUALIFICATIONS, DUTIES AND MEETINGS
1.5.1 Personnel Qualifications
1.5.1.1 Site Safety and Health Officer (SSHO)
1.5.1.2 Crane Operators
1.5.2 Personnel Duties
1.5.2.1 Site Safety and Health Officer (SSHO)/Superintendent
1.5.3 Meetings
1.5.3.1 Preconstruction Conference
1.5.3.2 Safety Meetings
1.6 ACCIDENT PREVENTION PLAN (APP)
1.6.1 EM 385-1-1 Contents
1.7 ACTIVITY HAZARD ANALYSIS (AHA)
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1.9 SITE SAFETY REFERENCE MATERIALS
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1.11 REPORTS
1.11.1 Accident Reports
1.11.2 Accident Notification
1.11.3 Monthly Exposure Reports
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3.1.1 Hazardous Material Exclusions
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3.3.2 Fall Protection Equipment and Systems
3.3.2.1 Personal Fall Arrest Equipment
3.3.3 Fall Protection for Roofing Work
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3.3.5 Horizontal Lifelines
3.3.6 Guardrails and Safety Nets
3.3.7 Rescue and Evacuation Procedures

3.4 SCAFFOLDING
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3.5 EQUIPMENT
3.5.1 Material Handling Equipment
3.5.2 Weight Handling Equipment
3.6 EXCAVATIONS
3.6.1 Utility Locations
3.6.2 Utility Location Verification
3.6.3 Shoring Systems
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3.8.1 Conduct of Electrical Work
3.8.2 Portable Extension Cords
3.9 WORK IN CONFINED SPACES

-- End of Section Table of Contents --

SECTION 01 35 29

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 NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A10.32	Personal Fall Protection - Safety Requirements for Construction and Demolition Operations
ANSI Z359.1	(1992; R 1999) Safety Requirements for Personal Fall Arrest Systems, Subsystems and Components
ANSI/ASSE A10.34	(2001; R2005) Protection of the Public on or Adjacent to Construction Sites

ASME INTERNATIONAL (ASME)

ASME B30.22	(2005) 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	(2002) 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	(2005) National Electrical Code
NFPA 70E	(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 01 33 00 SUBMITTAL PROCEDURES:

Government acceptance is required for submittals with a "G, designation.

SD-01 Preconstruction Submittals

Accident Prevention Plan (APP); G, SO

Activity Hazard Analysis (AHA); G, SO

Crane Critical Lift Plan; G, CS

Proof of qualification for Crane Operators; G, CS

SD-06 Test 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.

c. 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.

d. "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 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 15calendar 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

ANSI/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

a. 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.

a. Excavation Plan. The safety and health aspects prepared in accordance with Section 31 00 00 EARTHWORK.

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.

3.1.2 Unforeseen Hazardous Material

The design should have identified materials such as PCB, lead paint, and friable and non-friable asbestos. If additional material, not indicated, that may be hazardous to human health upon disturbance during construction operations is encountered, stop that portion of work and notify the Contracting Officer immediately. Within 60 calendar days the Government will determine if the material is hazardous. If material is not hazardous or poses no danger, the Government will direct the Contractor to proceed without change. If material is hazardous and handling of the material is necessary to accomplish the work, the Government will issue a modification pursuant to "FAR 52.243-4, Changes" and "FAR 52.236-2, Differing Site Conditions."

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 ANSI A10.32.

3.3.2.1 Personal Fall Arrest Equipment

Personal fall arrest equipment, systems, subsystems, and components shall meet ANSI 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 ANSI 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.

b. Not used.

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.

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01 42 00

SOURCES FOR REFERENCE PUBLICATIONS

PART 1 GENERAL

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1.2 ORDERING INFORMATION

-- End of Section Table of Contents --

SECTION 01 42 00

SOURCES FOR REFERENCE PUBLICATIONS

PART 1 GENERAL

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

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
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QUALITY CONTROL SYSTEM (QCS)

PART 1 GENERAL

1.1 GENERAL

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. 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 01 33 00, SUBMITTAL PROCEDURES, and Section 01 45 04.00 03, 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 3-1/2 inch high-density diskettes or CD-ROM. Any program updates of QCS will be made available to the Contractor via the Government RMS Website as they become available.

1.3 SYSTEM REQUIREMENTS

The following is the minimum system configuration that the Contractor shall have to run QCS:

RMS Server

Hardware

IBM-compatible PC with 1000 MHz Pentium or higher processor

1000+ MB RAM

1 GB free disk space

3 1/2 inch high-density floppy drive

Compact Disk (CD) Reader 8x speed or higher

TCP/IP Network/Internet Connection

Software

Windows 2000 or higher

Oracle 8i Server

Virus protection software that is regularly upgraded with all issued manufacturer's updates

Personnel

Oracle Database Administrator (DBA)

RMS Workstation

Hardware

IBM-compatible PC with 1000 MHz Pentium or higher processor

256+ MB RAM for workstation

500 MB free disk space

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)

TCP/IP Network/Internet Connection

Software

MS Windows 2000 or higher

Oracle 8i Client

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

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; the Contractor can obtain the current address from the Government. 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. This is applicable only if the contract award is in excess of 1 million dollars.

1.5 CONTRACT DATABASE

Prior to the pre-construction conference, the Government shall 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 files attached to E-mail. 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. Data updates to the Government shall be submitted by E-mail with file attachments, e.g., daily reports, schedule updates, payment requests. If permitted by the Contracting Officer, a data diskette or CD-ROM may be used instead of SFTP repository (see Paragraph DATA SUBMISSION VIA COMPUTER DISKETTE OR 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, the Contractor shall deliver Contractor administrative data in electronic format via E-mail.

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. Each subcontractor/trade shall be assigned a unique Responsibility Code, provided in QCS. Within 14 calendar days of receipt of QCS software from the Government, the Contractor shall deliver subcontractor administrative data in electronic format via E-mail.

1.6.1.3 Correspondence

All Contractor correspondence to the Government shall be identified with a serial number. Correspondence initiated by the Contractor's site office shall be prefixed with "S". Letters initiated by the Contractor's home (main) office shall be prefixed 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.

1.6.2 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. Pay activities shall be grouped by Contract Line Item Number (CLIN), and 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

All progress payment requests shall be prepared using QCS. The Contractor shall complete the payment request worksheet and include it with the payment request. The work completed under the contract, measured as percent or as specific quantities, shall be updated at least monthly. After the update, the Contractor shall generate a payment request report using QCS. The Contractor shall submit the payment requests with supporting data by E-mail with file attachment(s). If permitted by the Contracting Officer, a data diskette may be used instead of E-mail. A signed paper copy of the approved payment request is also required, which shall 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. The Contractor shall maintain this data on a daily basis. Entered data will automatically output to the QCS generated daily report. The Contractor shall provide the Government a Contractor Quality Control (CQC) Plan within the time required in Section 01 45 04.00 03, CONTRACTOR QUALITY CONTROL. Within seven calendar days of Government acceptance, the Contractor shall submit a data diskette or CD-ROM 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. Data from any supplemental reports by the Contractor shall be summarized and consolidated onto the QCS-generated Daily CQC Report. Daily CQC Reports shall be

submitted as required by Section 01 45 04.00 03, CONTRACTOR QUALITY CONTROL. Reports shall be submitted electronically to the Government using E-mail or diskette within 24 hours after the date covered by the report. Use of either mode of submittal shall be coordinated with the Government representative. The Contractor shall 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 Three-Phase Control Meetings

The Contractor shall maintain scheduled and actual dates and times of preparatory and initial control meetings in QCS.

1.6.3.4 Accident/Safety Tracking.

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. The Contractor shall regularly update the correction status of the safety comments. In addition, the Contractor shall 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.

1.6.3.5 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.

1.6.3.6 QC Requirements

The Contractor shall develop and maintain a complete list of QC testing, transferred and installed property, and user training requirements in QCS. The Contractor shall update all data on these QC requirements as work progresses, and shall promptly provide this information to the Government via QCS.

1.6.4 Submittal Management

The Government will provide the initial submittal register, ENG Form 4288, 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, ENG

Form 4288, shall be produced using QCS. 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

The Contractor shall develop a construction schedule consisting of pay activities, in accordance with Contract Clause "Schedules for Construction Contracts". 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, and schedule data using SDEF.

1.7 IMPLEMENTATION

Contractor use of QCS as described in the preceding paragraphs is mandatory. The Contractor shall 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 COMPUTER DISKETTE OR CD-ROM

The Government-preferred method for Contractor's submission of updates, payment requests, correspondence and other data is by E-mail with file attachment(s). For locations where this is not feasible, the Contracting Officer may permit use of computer diskettes or CD-ROM for data transfer. Data on the disks or CDs shall be exported using the QCS built-in export function. If used, diskettes and CD-ROMs will be submitted in accordance with the following:

1.8.1 File Medium

The Contractor shall submit required data on 3-1/2 inch double-sided high-density diskettes formatted to hold 1.44 MB of data, capable of running under Microsoft Windows 95 or newer. Alternatively, CD-ROMs may be used. They shall conform to industry standards used in the United States. All data shall be provided in English.

1.8.2 Disk or CD-ROM Labels

The Contractor shall affix a permanent exterior label to each diskette and 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 Government will provide the file names to be used by the Contractor with the QCS software.

1.9 MONTHLY COORDINATION MEETING

The Contractor shall update the QCS database each workday. At least monthly, the Contractor shall 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, the Contractor shall meet with the Government representative to review the planned progress payment data submission for errors and omissions. The Contractor shall 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. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, shall be deemed sufficient for the purpose of notification.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

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SECTION 01 45 04.00 03

CONTRACTOR QUALITY CONTROL

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.

ASTM INTERNATIONAL (ASTM)

ASTM D 3740	(2004) Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
ASTM E 329	(2005b) Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

1.2 PAYMENT

Separate 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.

1.3 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 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

QUALITY CONTROL PLAN; G,CS

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

The Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with the Contract Clause titled "Inspection of Construction." The quality control system shall consist of plans, procedures, and organization necessary to produce an end product which complies with the contract requirements. The system shall cover all construction operations, both onsite and offsite, and shall be keyed to the proposed construction sequence. The site project

superintendent will be held responsible for the quality of work on the job and is subject to removal by the Contracting Officer for non-compliance with the quality requirements specified in the contract. The site project superintendent in this context shall be the highest level manager responsible for the overall construction activities at the site, including quality and production. The site project superintendent shall maintain a physical presence at the site at all times, except as otherwise acceptable to the Contracting Officer, and shall be responsible for all construction and construction related activities at the site.

3.2 QUALITY CONTROL PLAN

The Contractor shall furnish for review by the Government, not later than 15 days after receipt of notice to proceed, the Contractor Quality Control (CQC) Plan proposed to implement the requirements of the Contract Clause titled "Inspection of Construction." The plan shall identify personnel, procedures, control, instructions, tests, records, and forms to be used. The Government will consider an interim plan for the first 15 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.

3.2.1 Content of the CQC Plan

The CQC Plan shall include, as a minimum, the following to cover all construction operations, both onsite and offsite, 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 superintendent.

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 shall also be furnished to the Government.

d. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subContractors, offsite fabricators, suppliers, and purchasing agents. These procedures shall be in accordance with Section 01 33 00 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. (Laboratory facilities approved by the Contracting Officer shall be used.)

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 shall 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 which is separate and distinct from other tasks, has separate control requirements, and may be identified by different trades or disciplines, or it may 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 are frequently more than one definable features under a particular section. This list will be agreed upon during the coordination meeting.

3.2.2 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.

3.2.3 Notification of Changes

After acceptance of the CQC Plan, the Contractor shall notify the Contracting Officer in writing of any proposed change. Proposed changes are subject to acceptance by the Contracting Officer.

3.3 COORDINATION MEETING

After the Preconstruction Conference, before start of construction, and prior to acceptance by the Government of the CQC Plan, the Contractor shall meet with the Contracting Officer or Authorized Representative and discuss the Contractor's quality control system. The CQC Plan shall be submitted for review a minimum of 15 calendar days prior to the Coordination Meeting. 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 onsite and offsite work, and the interrelationship of Contractor's Management and control with the Government's Quality Assurance. Minutes of the meeting shall be prepared by the Government 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 Personnel Requirements

The requirements for the CQC organization are a CQC System Manager and sufficient number of additional qualified personnel to ensure safety and contract compliance. The Safety and Health Manager shall receive direction and authority from the CQC System Manager and shall serve as a member of the CQC staff. Personnel identified in the technical provisions as requiring specialized skills to assure the required work is being performed properly will also be included as part of the CQC organization. The Contractor's CQC staff shall maintain a presence at the site at all times during progress of the work and have complete authority and responsibility to take any action necessary to ensure contract compliance. The CQC staff shall be subject to acceptance by the Contracting Officer. The Contractor shall provide adequate office space, filing systems and other resources as necessary to maintain an effective and fully functional CQC organization. Complete records of all letters, material submittals, shop drawing submittals, schedules and all other project documentation shall be promptly furnished to the CQC organization by the Contractor. The CQC organization shall be responsible to maintain these documents and records at the site at all times, except as otherwise acceptable to the Contracting Officer.

3.4.2 CQC System Manager

The Contractor shall identify as CQC System Manager an individual within the onsite work organization who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. The CQC System Manager shall be a graduate engineer, or a graduate of construction management, with a minimum of 5 years construction experience on construction similar to this contract. This CQC System Manager shall be on the site at all times during construction and shall be employed by the prime Contractor. The CQC System Manager shall be assigned no other duties . An alternate for the CQC System Manager shall be identified in the plan to serve in the event of the System Manager's absence. The requirements for the alternate shall be the same as for the designated CQC System Manager.

3.4.3 Additional Requirement

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.

3.4.4 Organizational Changes

The Contractor shall maintain the CQC staff at full strength at all times. When it is necessary to make changes to the CQC staff, the Contractor shall revise the CQC Plan to reflect the changes and submit the changes to the Contracting Officer for acceptance.

3.5 SUBMITTALS AND DELIVERABLES

Submittals, if needed, shall be made as specified in Section 01 33 00 SUBMITTAL PROCEDURES. The CQC organization shall be responsible for certifying that all submittals and deliverables 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. At least three phases of control shall be conducted by the CQC System Manager for each definable feature of the construction work as follows:

3.6.1 Preparatory Phase

This phase shall be performed prior to beginning work on each definable feature of work, after all required plans/documents/materials are approved/accepted, and after copies are at the work site. This phase shall include:

a. A review of each paragraph of applicable specifications, reference codes, and standards. A copy of those sections of referenced codes and standards applicable to that portion of the work to be accomplished in the field shall be made available by the Contractor at the preparatory inspection. These copies shall be maintained in the field and available for use by Government personnel until final acceptance of the work.

b. A review of the contract drawings.

c. A check to assure that all materials and/or equipment have been tested, submitted, and approved.

d. Review of provisions that 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 drawings 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 controlling quality of the work including repetitive deficiencies. Document construction tolerances and workmanship standards for that feature 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. Discussion of the initial control phase.

k. The Government shall be notified at least 48 hours in advance of beginning the preparatory control 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 CQC report. 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 work to ensure that it is in full compliance with contract requirements. Review minutes of the preparatory meeting.

b. Verify adequacy of controls to ensure 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 required sample panels as 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 beginning the initial phase. Separate minutes of this phase shall be prepared by the CQC System Manager and attached to the daily CQC report. 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 onsite, or any time acceptable specified quality standards are not being met.

3.6.3 Follow-up Phase

Daily checks shall be performed to assure control activities, including control testing, are providing continued compliance with contract requirements, 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 which may be affected by the deficient work. The Contractor shall not build upon nor conceal non-conforming work.

3.6.4 Additional Preparatory and Initial Phases

Additional preparatory and initial phases shall be conducted on the same definable features of work if: the quality of on-going work is unacceptable; if there are changes in the applicable CQC staff, onsite

production supervision or work crew; 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 specified or required tests to verify that control measures are adequate to provide a product which conforms to contract requirements. Upon request, the Contractor shall furnish to the Government duplicate samples of test specimens for possible testing by the Government. 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. 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, shall be recorded on the CQC report for the date taken. Specification paragraph reference, location where tests were taken, and the sequential control number identifying the test shall be given. If approved by the Contracting Officer, actual test reports may be submitted later with a reference to the test number and date taken. An information copy of tests performed by an offsite or commercial test facility shall 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. Laboratories utilized for testing soils, concrete, asphalt, and steel shall meet criteria detailed in ASTM D 3740 and ASTM E 329.

3.7.2.2 Capability Recheck

If the selected laboratory fails the capability check, the Contractor will be assessed a 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 Onsite 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 shall 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

3.8.1 Punch-Out Inspection

Near the end of the work, or any increment of the work established by a time stated in the SPECIAL CONTRACT REQUIREMENTS Clause, "Commencement, Prosecution, and Completion of Work", or by the specifications, the CQC Manager shall conduct an inspection of the work. A punch list of items which do not conform to the approved drawings and specifications shall be prepared and included in the CQC documentation, as required by paragraph DOCUMENTATION. The list of deficiencies 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. Once this is accomplished, the Contractor shall notify the Government that the facility is ready for the Government Pre-Final inspection.

3.8.2 Pre-Final Inspection

The Government will perform the pre-final inspection to verify that the facility is complete and ready to be occupied. A Government Pre-Final Punch List may be developed as a result of this inspection. The Contractor's CQC System Manager shall ensure that all items on this list have been corrected before notifying the Government, so that a Final inspection with the customer can be scheduled. Any items noted on the Pre-Final inspection shall be corrected in a timely manner. These inspections and any deficiency corrections required by this paragraph shall be accomplished within the time slated for completion of the entire work or any particular increment of the work if the project is divided into increments by separate completion dates.

3.8.3 Final Acceptance Inspection

The Contractor's Quality Control Inspection personnel, plus the superintendent or other primary management person, and the Contracting Officer's Representative shall be in attendance at the final acceptance inspection. Additional Government personnel including, but not limited to, those from Base/Post Civil Facility Engineer user groups, and major commands may also be in attendance. The final acceptance inspection will be formally scheduled by the Contracting Officer based upon results of the Pre-Final inspection. Notice shall be given to the Contracting Officer at least 14 days prior to the final acceptance inspection and shall include the Contractor's assurance that all specific items previously identified to the Contractor as being unacceptable, along with all remaining work

performed under the contract, will be complete and acceptable by the date scheduled for the final acceptance inspection. Failure of the Contractor to have all contract work acceptably complete for this inspection will be cause for the Contracting Officer to bill the Contractor for the Government's additional inspection cost in accordance with the contract clause titled "Inspection of Construction".

3.9 DOCUMENTATION

The Contractor shall maintain current records providing factual evidence that required quality control activities and/or tests have been performed. These records shall include the work of subContractors and suppliers and shall be on an acceptable form that includes, as a minimum, the following information:

a. Contractor/subContractor and their area of responsibility.

b. Operating plant/equipment with hours worked, idle, or down for repair.

c. Work performed each day, 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/drawings requirements. The control phase shall be identified (Preparatory, Initial, Follow-up). List of deficiencies noted, along with corrective action.

e. Quantity of materials received at the site with statement as to acceptability, storage, and reference to specifications/drawings requirements.

f. Submittals and deliverables reviewed, with contract reference, by whom, and action taken.

g. Offsite surveillance activities, including actions taken.

h. Job safety evaluations stating what was checked, results, and instructions or corrective actions.

i. 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.

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 covered by the report, except that reports need not be submitted for days on which no work is performed. As a minimum, one report shall be prepared and submitted for every 7 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 take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, 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 01 52 02.00 10

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 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Site Plan; G, DC

1.3 Site Plan

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.

1.4 USE OF UTILITY SERVICES

1.4.1 Sanitation

The Contractor shall provide and maintain within the construction area minimum field-type sanitary facilities approved by the Contracting Officer.

1.4.2 Telephone, Water and Electricity

The Contractor shall make arrangements and connect, maintain, and pay all costs for telephone, water and electricity use.

1.5 BULLETIN BOARD, PROJECT SIGN, AND PROJECT SAFETY SIGN

1.5.1 Bulletin Board

Immediately upon beginning of work, the Contractor shall provide a

weatherproof glass-covered bulletin board not less than 915 by 1220 mm(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.

1.5.2 Project and Safety Signs

The requirements for the signs, their content, and location shall be as specified in SECTION 01 58 00.00 03, PROJECT SIGN AND SAFETY SIGN.

1.6 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. 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. Traffic control shall be in accordance with the requirements of SECTION 01 55 26.00 03, MAINTENANCE OF TRAFFIC.

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.

1.7 CONTRACTOR'S TEMPORARY FACILITIES

1.7.1 Administrative Field Offices

The Contractor shall provide and maintain administrative field office facilities within the construction area.

1.7.2 Storage Area

Trailers, materials, or equipment shall not be placed or stored outside the fenced area. 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.

1.7.3 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 the project site.

1.7.4 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.

1.8 TEMPORARY PROJECT SAFETY FENCING

As soon as practicable, but not later than 15 days after the date established for commencement of work, the Contractor shall furnish and erect temporary project safety fencing at the project site as indicated on the drawing. The fence shall be made of high density polyethylene grid or approved equal, a minimum of 42 inches high, supported and tightly secured to steel posts located on minimum 10 foot centers. 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.

1.9 WARNING SIGNS

Place warning signs at the construction area perimeter designating the presence of construction hazards requiring unauthorized persons to keep out. Signs must be placed on all sides of the project, that are are adjacent to residential or public areas. Such along 5S alignment, 6S alignment, 6N alignment east of the utility cooridor. All points of entry shall have signs designating the construction site as a hard hat area.

1.10 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.

1.11 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.

PART 2 PRODUCTS (Not Used)

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SECTION 01 55 26.00 03

MAINTENANCE OF TRAFFIC AND HAUL ROUTES

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 and guidance for establishing haul routes.

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.

INDIANA DEPARTMENT OF TRANSPORTATION (INDOT)

INDOT	Indiana Department of Highways Standard Specifications (1999) and Current Supplemental Specifications

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 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Traffic Control Plan; G, CS

1.4 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 (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. 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 Indiana Department of Transportation, INDOT, policies and prescribed standards. 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 signalling devices. The Contractor shall submit an approved maintenance of traffic plan to INDOT or the Cities of Hammond and Highland whichever may be required to the Contracting Officer for approval before start of any construction that will require lane restrictions.

3.1.1 Access Roads, Haul Roads, Parking, and Construction Areas

a. Prior to any hauling or moving of heavy equipment onto the access roads, parking, storage, and construction areas, the Contractor shall make a field inspection to determine the condition of the respective areas to be used. The Contractor shall notify the Contracting Officer and City Authorities at least 10 working days in advance of the inspection so that they may participate. Notification to the Contracting Officer shall include the names and telephone numbers of the City Authorities to be notified.

b. When work is completed to the point no further use of the access roads, parking, or construction areas is needed by the Contractor, he shall make such permanent repairs as required to leave the access roads, parking, storage, and construction areas in as good a condition as before the work began. No separate payment will be made for the required repairs and the cost thereof shall be included in the Contractor's bid prices.

c. The Contractor, accompanied by the COR and any interested officials associated with the project, will be required to document the condition of the roads prior to the start of construction. The Contractor will be responsible for maintaining the road in the same condition it was before the hauling operation started. It shall be strictly the Contractor's responsibility for working out his own agreement with the Cities of Hammond and Towns of Highland, Munster and Griffith, Lake County and INDOT as to the use of haul roads. The Contractor shall contact INDOT, local authorities and other contractors for any road closure prior to construction. The Contractor shall not close any two consecutive roads. The Contractor shall not shutdown any roads for more than 45 days. Also, the Contractor shall at his own expense furnish warning signs, or any other signs that may be required by the Cities and Towns above, Lake County and INDOT for safe protection of its citizens on streets. Roads used by the Contractor during construction shall be kept free of accumulation of mud and debris.

3.1.2 Traffic Work

All work around/involving roadways, to include roadway excavations and utility crossings, will be conducted in accordance with Manual of Traffic Control Devices. Contractors shall provide and ensure appropriate road closure and detour signs are established as necessary for motor traffic management. All road closures shall be coordinated with the Contracting Officer in advance. Self-illuminated (lighted) barricades shall be provided during hours of darkness. Brightly-colored (orange) vests are required for all personnel working in roadways. Road closures shall require a road closure plan showing the location of signage.

3.1.3 State rights-of-way

Specific restrictions have been set by INDOT concerning work accomplished on State right of way. All work shall be restricted to daylight hours and maybe further restricted by INDOT to provide safe flow of traffic on I 80/94. No vehicles shall be stored on State right of way. At least one weeks advance notice shall be given to the State's La Porte District Director prior to commencing work on the State right of way. Access must be maintained on all I 80/94 ramps. Any deviations must be coordinated with INDOT through the La Porte District Director.

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 and the Cities of Hammond and Highland, 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 Hammond and Highland 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.

3.2.1 HAUL ROUTES

This project is divided into four main reaches:

5N
- Location: North of Little Calumet River, East of Northcote Rd, and West of Indianapolis Blvd.
- City: Hammond

5S-WEST
- Location: South of Little Calumet River, East of Northcote Rd, and West of Harts Ditch
- City: Town of Munster

5S-EAST
- Location: South of Little Calumet River, East of Harts Ditch, and West of Indianapolis Blvd

City: Town of Munster

6N

Location: North of Little Calumet River, East of Indianapolis Blvd, and West of Kennedy
City: Hammond

6S

Location: South of Little Calumet River, East of Northfolk Southern Rail Road, and
West of Kennedy
City: Highland

The Contractor shall coordinate haul routes with municipalities, property owners, INDOT, and utility owners. US Army Corps of Engineers has coordinated the project with those impacted and shall provide the best available information at the time of design. This information is subject to change, as there are no formal agreements outside of the work limits. Please refer to the "HAUL ROUTE AND CONSTRUCTION ACCESS" drawing in the plan set.

5S-EAST: According to Project Coordinator for the North Township, the primary haul route will be off of Indianapolis blvd. There are two entrances, one has a stop light and maybe accessed traveling north or south. The other does not contain a stoplight and may only be accessed traveling south. The entrances are over an underground pipeline. Wolverine pipeline shall be contacted to determine any additional requirement for crossing their pipelines. The road may be widened to accommodate the contractors equipment. Any damage done to the road, shall be repaired back to the existing conditions. If the width of the road is increased, its width shall not reduced after construction. The road is partially used for recreation, but shall be closed to the public during construction.

The other access point will not be available spring to early fall, when the park is being utilized by the public. The access point is off of Ridge Road, near Harts Ditch.

5S-WEST: This is a residential area with limited construction area. Hawthorn road and Riverview Drive shall remain open during construction, to allow residents to access their homes. Precedence is given to complete this reach with minimal disturbance to the residence. No materials shall be stored within the work limits, unless they are stored behind a privacy fence. The roads shall be kept in good operating condition, free of excess dirt. Extra precaution should be noted in preserving trees within this reach.

5N: The primary access point will be off of Indianapolis Blvd. The Contractor shall coordinate with INDOT on any access restrictions. The City of Hammond was opposed to using Northcote Road as a haul route.

6N: West of the Northfolk Southern rail road tracks, the primary access point will be off of Indianapolis Blvd, at Interstate Plaza Drive. The Contractor may consider coordinating with INDOT to access the levee directly off of Indianapolis blvd. East of the Northfolk Southern rail road will be off of Kennedy Ave. Any work that will impact the utilities owners or rail road shall be coordinated.

6S: The Contractor will need to access this area through the utility corridor off of 81st Street. It should be noted that this road was recently resurfaced and will need to be repaired back to existing

conditions. Any work that will impact the utilities owners or rail road shall be coordinated.

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 01 45 04.00 03, CONTRACTOR QUALITY CONTROL.

-- End of Section --

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ENVIRONMENTAL PROTECTION FOR INDIANA

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
49 CFR 171 - 178	Hazardous Materials Regulations

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT (IDEM)

326 IAC 6	Indiana Administrative Code, Volume 6, Title 326, Article 6. Particulate Rules
327 IAC 2-6.1	Indiana Administrative Code, Volume 6, Title 327, Article 2, Rule 6.1. Spills; Reporting, Containment, and Response
327 IAC 15-5	Indiana Administrative Code, Volume 6, Title 327, Article 15, Section 5. Storm Water Run-off Associated with Construction Activity

327 IAC 15-5-6	Indiana Administrative Code, Volume 6, Title 327, Article 15, Section 5-6. Submittal of an NOI letter and construction plans
327 IAC 15-5-6.5	Indiana Administrative Code, Volume 6, Title 327, Article 15, Section 5-6.5. Requirements for Construction Plans
327 IAC 15-5-7	Indiana Administrative Code, Volume 6, Title 327, Article 15, Section 5-7. General Requirements for Storm Water Quality Control

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 Hazardous Waste

Wastes designated by the U.S. Environmental Protection Agency as hazardous, as defined in 40 CFR 261.

1.2.5 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. Land Application shall be in compliance with all applicable Federal, State, and local laws and regulations.

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". 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 Indiana Department of Environmental Management. All projects with discharge of dredged or fill material to waters of the United States must have a Section 401 Water Quality Permit issued by the Indiana Department of Environmental Management.

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 01 33 00 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 on site by the Contractor. 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.

1.7.1 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.

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 personnel and all subcontractor's personnel in environmental protection.

d. Description of the Contractor's environmental protection personnel training program, including training for all site employees and 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. Construction Plan and Storm Water Pollution Prevention Plan.

1. All projects must comply with the State of Indiana's NPDES General Permit for storm water run-off associated with construction activity, as described in 327 IAC 15-5. The Construction Plan shall meet all requirements listed in 327 IAC 15-5-6.5, including, but not limited to: project narrative and supporting documents; vicinity map depicting the project site location; existing project site layout map that indicates structures, waterways, soil maps, vegetation, adjacent land-use, and topography; final project site layout map; a grading plan indicating locations of proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil material; a drainage plan; and a Storm Water Pollution Prevention Plan. The Storm Water Pollution Prevention Plan shall include all items listed in 327 IAC 15-5-7 including, but not limited to, the following: description of temporary and permanent storm water quality measures; temporary stabilization plans; permanent stabilization plans; construction sequencing describing the relationship between implementation of storm water quality measures and stages of construction, including a schedule of these activities; self-monitoring program; description of potential pollutant sources associated with construction activities; and material handling and storage.

2. If land disturbing activities are greater than or equal to one acre, it is the responsibility of the Contractor to have the Construction Plan, which includes the Storm Water Pollution Prevention Plan, reviewed and approved by the applicable reviewing agency. The State of Indiana designates different reviewing agencies for different counties in the state. Commonly, the reviewing agency is the local Soil and Water Conservation District (SWCD) or Department of Natural Resources Division of Soil Conservation. Information on approving agencies can be obtained from the Indiana Department of Environmental Management. The reviewing agency has up to 28 days from the date of submittal to review the Construction Plan. The Environmental Protection Plan must include documentation of the reviewing agency's approval of the Construction Plan, or the Contractor shall submit, in the instance that the reviewing agency has exceeded the 28 day review period, documentation that the reviewing agency has exceeded the review period. If notice of a deficient plan is received, the plans must be revised to satisfy the deficiencies in accordance with 327 IAC 15-5-6 and resubmitted to the reviewing agency, at which time the 28-day review period starts over.

3. The Government will review the Environmental Protection Plan, including the Construction and Storm Water Pollution Prevention Plans and then will submit the Notice of Intent (NOI), along with the proof of public notice and permit fee, to the Indiana Department of Environmental Management and the appropriate reviewing agency after the plan has been approved. The Contractor will be notified of the submission date for the NOI. No land disturbing activity shall take place until 48 hours after 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.

4. The Government will provide copies of the NOI, and all other Government correspondence with IDEM, to the Contractor. The Contractor shall post the information required in 327 IAC15-5-7(b)(6) in a publicly accessible location near the main entrance of the project site. The location will be jointly agreed to by the Contractor and the Government during the Pre-Construction Conference. The Contractor shall take all actions necessary to keep the NOI and correspondence protected from the weather so that it remains legible. If, in the judgment of the Contracting Officer's Representative, the documents degrade to the point of being illegible, the Contractor shall replace the documents with fresh copies and remedy the problems that caused the degradation.

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. Traffic control plan that includes measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather. The traffic control plan shall also include measures to prevent and minimize the amount of mud transported onto paved public roads by vehicles or runoff. Should mud or dirt be transported onto paved public roads by vehicles or runoff, the Contractor shall as needed or directed by the Contracting Officer remove the mud or dirt from the pavement using commercial street cleaning equipment, such as a "street sweeper," or other equipment approved by the Contracting Officer's Representative.

i. 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.

j. Drawing showing the location of proposed borrow areas.

k. 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. The plan shall meet the requirements of 327 IAC 2-6.1. 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.

l. 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 off-site disposal of solid waste, if necessary. 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.

m. A recycling and solid waste minimization plan with a list of measures to reduce consumption of energy and natural resources. The plan shall detail the Contractor's actions to comply with and to participate in Federal, State, Regional, and local government sponsored recycling programs to reduce the volume of solid waste at the source.

n. An air pollution control plan detailing provisions to assure that dust, debris, materials, trash, etc. do not become airborne and travel off the project site. The air pollution control plan shall include a dust control plan. Air pollution control shall comply with 326 IAC 6.

o. 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.

p. A waste water management plan that identifies the methods and procedures for management and/or discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines. If a settling/retention pond 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.

q. 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 on site 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.

r. A sediment disposal plan, that gives the proposed disposal location(s) for all sediment and entrained water to be removed during cofferdam construction. No sediment nor entrained water may be placed in the Little Calumet River untreated, and no sediment or entrained water may be discharged or placed on the banks of the river.

1.7.3 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

Prior to the start of any on-site 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 SPECIAL ENVIRONMENTAL REQUIREMENTS

The Contractor shall comply with the environmental requirements of this section.

1.10 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.

1.11 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

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.

3.1.1 NOI Posting Requirement

The Government will provide copies of the NOI, and all other applicable Government correspondence with IDEM, to the Contractor. The Contractor shall post the information required in 327 IAC 15-5-7 (b)(6) in a publicly accessible location near the entrance of the project site. The location will be jointly agreed to by the Contractor and the Government during the pre-construction conference. The Contractor shall take all actions necessary to keep the NOI and applicable correspondence protected from the weather so that it remains legible. If, in the judgment of the Contracting Officer's Representative, the documents degrade to the point of being

illegible, the Contractor shall replace the documents with fresh copies and remedy the problems that caused the degradation.

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 Control 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 Indiana National Pollutant Discharge Elimination System (NPDES) Storm Water Pollution Prevention requirements. Any temporary measures shall be removed after the area has been stabilized.

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 and minimize sediment from entering nearby waters. 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, removal of cofferdams, tailrace excavation, and tunnel closure shall be controlled at all times to maintain compliance with existing State water quality standards and designated uses of the surface water body. The Contractors cofferdams, diversions, and dewatering operations shall comply with the State of Indiana water quality standards and anti-degradation provisions, Section 404 of the Clean Water Act, and the Section 401 Water Quality Certification for this project. If the Contractor proposes cofferdams, diversions, and dewatering operations not shown on the project drawings, or authorized under an existing permit, the Contractor must obtain all necessary permits for these features prior to the start of work.

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. The Contractor shall comply with the State of Indiana water quality standards and anti-degradation provisions, Section 404 of the Clean Water Act, and the Section 401 Water Quality Certification for construction of stream crossing for this project. If the Contractor proposes additional temporary or permanent stream crossings not shown on the project drawings, or authorized under an existing permit, the Contractor must obtain all necessary permits for construction of the proposed stream crossing prior to the start of work.

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.

3.3.4 Control of Aquatic Nuisance Species

The Contractor shall conduct operating practices to prevent the spread of Aquatic Nuisance Species (ANS). Such practices shall include, but not be limited to, cleaning equipment to prevent the spread of seeds, eggs, larvae, or other dispersal vectors; and discharging or exchanging ballast water, or other water, from a vessel of any type to prevent transfer of water from one water body into another. Contractor remove all plants, sediment, and organisms from the vessel and shall thoroughly clean all equipment before being used on the project site.

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 shall be controlled at all times. The odors shall not cause a health hazard and shall be in compliance with State of Indiana 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. Noise levels shall be in compliance with applicable local codes and regulations.

3.4.4 Burning

Burning will not be allowed on the project site unless 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 (excluding 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, and the details concerning the disposal of waste water shall be described in the Waste Water Management Plan.

a. Waste water from construction activities, such as onsite material processing (including sediment dewatering), concrete curing, foundation and concrete clean-up, water used in concrete trucks, forms, etc. shall not be allowed to enter water ways or to be discharged prior to being treated to remove pollutants. The Contractor shall dispose of the 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 a State or Federal permit specific for pumping and discharging ground water prior to surface discharging. All surface discharge shall be done in accordance with the requirements of the NPDES Construction Site Activity Storm Water Permit. Land application shall be in accordance with all Federal, State, Regional, and/or Local laws and regulations for pumping and land applying ground water.

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 --

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
We make Indiana a cleaner, healthier place to live.

Mitchell E. Daniels, Jr.
Governor

Thomas W. Easterly
Commissioner

100 North Senate Avenue
Indianapolis, Indiana 46204
(317) 232-8603
(800) 451-6027
www.IN.gov/idem

September 29, 2005

VIA CERTIFIED MAIL 70020500 0002 5827 8144

Mr. Gregory Moore
U.S. Army Corps of Engineers
Chicago District
111 North Canal Street, Suite 600
Chicago, IL 60606-7206

Dear Mr. Moore:

Re: Section 401 Water Quality Certification
Project: Little Calumet River Flood Control Project
IDEM No.: 2004-596-45-MTM-A
County: Lake

Office of Water Quality staff has reviewed your application for Section 401 Water Quality Certification dated October 14, 2004, and received October 18, 2004. According to the application, you are seeking after-the fact authorization for existing impacts and authorization for existing and future impacts to wetlands and other waters associated with the construction of 22 miles of levees and floodwalls. The project requires impacts to approximately 156 acres of wetlands by clearing, excavation, or fill. As mitigation for the impacts you will restore hydrology to 400 acres of hydric soil. Mitigation areas include an 89 acre field and a 58 acre field on the south side of the Little Calumet River just west of Chase Street in Gary, Lake County. You will also purchase, protect, and enhance both upland and wetland areas in the Hobart Marsh area. Any shortfall of hydric soil mitigation acreage from the aforementioned mitigation sites will be made up through the restoration of a maximum of 200 acres in an existing agricultural field located south of the Little Calumet River between Chase and Grant Streets. The project boundaries for the impacts are along the Little Calumet River from Hohman Avenue in Hammond to just east of Indiana Street in Gary, Lake County.

We have also reviewed a request for a modification to an existing Section 401 Water Quality Certification No. 2003-170-45-MTM-B by the Indiana Department of Transportation (INDOT) for impacts to waters of the State of Indiana associated with the I-80/94 Expressway construction project. The impacts included 0.16 acres of wetland impacts that resulted from INDOT rebuilding a portion of a Little Calumet River Flood Control levee as part of their construction project. The wetlands, as agreed to by you in correspondence dated

March 15, 2005, to Greg Kicinski, INDOT, will be mitigated by the Corps of Engineers as part of the Little Calumet River Flood Control Project mitigation. IDEM issued Section 401 Water Quality Certification No. 2003-170-45-MTM-B for the I-80/94 Expressway construction project in correspondence dated August 9, 2005.

Based on available information, it is the judgment of this office that the proposed project will comply with the applicable provisions of 327 IAC 2 and Sections 301, 302, 303, 306, and 307 of the Clean Water Act if the recipient of the certification complies with the conditions set forth below. Therefore, subject to the following conditions, the Indiana Department of Environmental Management (IDEM) hereby grants Section 401 Water Quality Certification for the project described in your application received October 18, 2004. Any changes in project design or scope not detailed in the application described above or modified by the conditions below are not authorized by this certification.

GENERAL CONDITIONS:

The recipient of the certification shall:

1. Deposit any dredged material in a contained upland disposal area to prevent sediment runoff to any waterbody. Dispose of all dredged and excavated material according to the requirements of 329 IAC 10, governing Solid Waste Land Disposal Facilities. Your project information may be forwarded to the IDEM Office of Land Quality, Industrial Waste Section for review. Sampling may be required to determine if the dredged sediment is contaminated. Failure to properly dispose of contaminated sediment may result in enforcement action against you.

2. Install erosion control methods prior to any soil disturbance to prevent soil from leaving the construction site. Appropriate erosion control methods include, but are not limited to, straw bale barriers, silt fencing, erosion control blankets, phased construction sequencing, and earthen berms. Monitor and maintain erosion control structures and devices regularly, especially after rain events, until all soils disturbed by construction activities have been permanently stabilized.

3. Clearly mark the construction limits at the project site during construction.

4. Allow the commissioner or an authorized representative of the commissioner (including an authorized contractor), upon the presentation of credentials:

    a. to enter the property of the recipient of the certification;
    b. to have access to and copy at reasonable times any records that must be kept under the conditions of this certification;
    c. to inspect, at reasonable times, any monitoring or operational equipment or method; collection, treatment, pollution management or discharge facility or device; practices required by this certification; and any mitigation wetland site;

d. to sample or monitor any discharge of pollutants or any mitigation wetland site.

5. Complete all approved discharges no later than five (5) years of the date of issuance of this Section 401 Water Quality Certification. The applicant may request a one (1) year extension to the Section 401 Water Quality Certification by submitting a written request ninety (90) days prior to the deadline stated above. The written request shall contain an account of which discharges and mitigation have been completed and list the reasons an extension is requested.

PROJECT SPECIFIC CONDITIONS:

The recipient of the certification shall:

1. Implement the mitigation plan as described in the application received October 8, 2004, (referred to collectively hereinafter as the "mitigation plan"), and as modified by the conditions of this certification. The wetland(s) created or restored pursuant to the mitigation plan shall be referred to hereinafter as the "mitigation wetland" or "mitigation wetlands."

2. Complete all activities necessary to complete all wetland mitigation activities within seven (7) years of the effective date of this certification, unless IDEM grants a written extension upon request. These activities include excavation, grading, installation of hydrologic controls, and planting.

3. For all wetland mitigation areas submit annual monitoring reports of the mitigation wetland to this office by December 31 of each year until released from monitoring by this office. These reports shall contain information concerning what steps the recipient of the certification has taken to create the mitigation wetlands and whether the wetland is achieving each of the success criteria outlined in Project Specific Condition 7. The reports shall include the following:

   a. The IDEM identification number.
   b. As-built plans (in the first year's report).
   c. Discussion of hydrology at the mitigation site.
   d. Discussion of plant community development at the mitigation wetland site.
   e. Discussion of methods or means used to determine compliance with the success criteria.
   f. Photographs representative of the mitigation wetland site and sampling points.
   g. Identification of any problems with meeting the success criteria.
   h. Recommendations for correcting any problems identified.
   i. Wetland delineation for the mitigation wetland in the final report.

4. Monitor the wetland mitigation areas between Clark Street and Chase Street annually to determine whether they are achieving the success criteria contained in Project Specific Condition 7 of this certification and complete corrective actions as are necessary to ensure the mitigation wetland will achieve the success within the required period. These corrective actions may include additional grading, plantings, or relocation of the mitigation wetland, along with extended monitoring. Describe in the monitoring reports any corrective actions taken to ensure success of the mitigation site.

5. Monitor all wetland mitigation areas for a minimum period of three (3) years. In order to be released from monitoring, the recipient of the certification must demonstrate to IDEM, through monitoring reports, that the success criteria specified in Project Specific Condition 7 have been met for two (2) consecutive years within a five (5) year period. Once the recipient of the certification believes it has met this requirement, they may submit a proposed final monitoring report to IDEM and suspend monitoring unless notified otherwise by IDEM. If IDEM determines that the success criteria have not been met, then the recipient of the certification shall resume monitoring. If IDEM confirms that the success criteria have been met, then the recipient of the certification may permanently discontinue monitoring after it receives written notification of this determination from IDEM.

6. Include separate wetland delineations for the mitigation wetlands between Chase Street and Clark Street; Hobart Marsh; and the Project Area mitigation wetlands in the final monitoring report. The delineation must be conducted on-site using the hydrology and vegetation parameters from the United States Army Corps of Engineers Wetland Delineation Manual, Technical Report Y-87-1 (January 1987). The delineation report must include data sheets and a survey, map or drawing with area measurements (in acres) of all mitigation wetland boundaries.

7. Ensure that the wetland mitigation between Clark Street and Chase Street meets all of the following success criteria for two consecutive years within five (5) years of the creation of the wetland:

    a. Greater than 50% of the dominant vegetation species must be classified as hydrophytic.
    b. The hydrology at the mitigation wetland site must meet the wetland hydrology criteria contained in the United States Army Corps of Engineers Wetland Delineation Manual, Technical Report Y-87-1 (January, 1987).
    c. The combined surface area coverage of reed canary grass (*Phalaris arundinacea*) and cattail (*Typha spp.*) shall not cover more than 15% of the mitigation wetland.
    d. The mitigation wetland is free of the following exotic species: *Lythrum salicara* (purple loosestrife), *Phragmites australis* (common reed) *and Myriophyullum spicatum* (water milfoil).

e. No more than 20% of the surface area coverage of the mitigation wetland may be open water, bare ground or a combination of the two. Open water and bare ground are defined as areas with less than 10% vegetative cover.

8. For the Project Area and Hobart Marsh mitigation areas, monitor them annually to determine whether they are achieving the success criteria contained in Project Specific Condition 9 of this certification and complete corrective actions as are necessary to ensure the mitigation wetland ill achieve the success within the required period. These corrective actions may include additional grading, plantings, or relocation of the mitigation wetland, along with extended monitoring. Describe in the monitoring reports any corrective actions taken to ensure success of the mitigation site.

9. Ensure that the Hobart Marsh mitigation wetlands meet all of the following success criteria for two consecutive years within five (5) years of the creation of the wetland:

   a. Greater than 50% of the dominant vegetation species must be classified as hydrophytic.
   b. The hydrology at the mitigation wetland site must meet the wetland hydrology criteria contained in the United States Army Corps of Engineers Wetland Delineation Manual, Technical Report Y-87-1 (January, 1987).
   c. The combined surface area coverage of reed canary grass (*Phalaris arundinacea*) and cattail (*Typha spp.*) shall not cover more than 15% of the mitigation wetland.
   d. The mitigation wetland is free of the following exotic species: *Lythrum salicara* (purple loosestrife), *Phragmites australis* (common reed) *and Myriophyullum spicatum* (water milfoil).
   e. Native vegetation excluding cattail (*Typha spp.*) must cover at least 70% of the mitigation wetland site.
   f. No more than 10% of the surface area coverage of the mitigation wetland may be open water, bare ground or a combination of the two. Open water and bare ground are defined as areas with less than 10% vegetative cover.
   g. At the end of the sixth full growing season the vegetation inventory data in seeded areas shall yield mean C and FQI values of 3.5 and 35, respectively, at the transect level and mean quadrat levels generally shall be rising steadily. It shall also be documented that no less than 35% of the species seeded are present in the landscape

10. At the end of the monitoring period, ensure there is a combined minimum of 400 acres of wetland mitigation on hydric soils between Chase Street and Clark Street mitigation areas; the Project Area mitigation areas and the Hobart Marsh mitigation area. A minimum of 60 acres mitigation wetland, of the required 400 hundred acres of mitigation wetland, shall be established on the Project Area mitigation areas and a minimum of 100 acres shall be established in the Hobart Marsh mitigation area.

11. Protect all areas upon which a mitigation wetland is to be created or restored with a conservation easement or deed restriction. These areas shall be protected as wetlands for a minimum period of fifty (50) years and the discharge of pollutants, including fill material, in them or their excavation shall be prohibited. A copy of the signed and recorded modification to the deed shall be filed with this office within sixty (60) days of the recipient of the certification's release from monitoring requirements.

12. Remove any temporary causeway or other structures used to facilitate construction or access upon completion of construction activities.

13. Install silt fence or other erosion control measures around the perimeter of any wetlands and/or other waterbodies to remain undisturbed at the project site.

14. Allow no construction equipment, temporary run-arounds, coffer dams, causeways, or other such structures to enter or be constructed within the stream, unless specifically stated, depicted, or detailed in the aforementioned correspondence and project plans.

A modification of this Section 401 Water Quality Certification is required from this office if any of the aforementioned items are needed for project construction.

This certification does not relieve the recipient of the responsibility of obtaining any other permits or authorizations that may be required for this project or related activities from IDEM or any other agency or person. You may wish to contact the Indiana Department of Natural Resources at 317-232-4160 (toll free at 877-928-3755) concerning the possible requirement of natural freshwater lake or floodway permits. In addition, you may wish to contact IDEM's Stormwater Permits Section at 317-233-1864 concerning the possible need for a 327 IAC 15-5 (Rule 5) permit if you plan to disturb greater than one (1) acre of soil during construction.

This certification does not:
(1) authorize impacts or activities outside the scope of this certification;
(2) authorize any injury to persons or private property or invasion of other private rights, or any infringement of federal, state or local laws or regulations;
(3) convey any property rights of any sort, or any exclusive privileges;
(4) preempt any duty to obtain federal, state or local permits or authorizations required by law for the execution of the project or related activities; or
(5) authorize changes in the plan design detailed in the application.

Failure to comply with the terms and conditions of this Section 401 Water Quality Certification may result in enforcement action against the recipient of the certification. If an enforcement action is pursued, the recipient of the certification could be assessed up to $25,000 per day in civil penalties. The recipient of the certification may also be subject to criminal

liability if it is determined that the Section 401 Water Quality Certification was violated willfully or negligently.

This certification is effective eighteen (18) days from the mailing of this notice unless a petition for review and a petition for stay of effectiveness are filed within this 18-day period. If a petition for review and a petition for stay of effectiveness are filed within this period, any part of the certification within the scope of the petition for stay is stayed for fifteen (15) days, unless or until an Environmental Law Judge further stays the certification in whole or in part.

This decision may be appealed in accordance with IC 4-21.5, the Administrative Orders and Procedures Act. The steps that must be followed to qualify for review are:

1. You must petition for review in writing that states facts demonstrating that you are either the person to whom this decision is directed, a person who is aggrieved or adversely affected by the decision, or a person entitled to review under any law.

2. You must file the petition for review with the Office of Environmental Adjudication (OEA) at the following address:

   Office of Environmental Adjudication
   100 North Senate Avenue
   IGCN Room N1049
   Indianapolis, IN 46204

3. You must file the petition within eighteen (18) days of the mailing date of this decision. If the eighteenth day falls on a Saturday, Sunday, legal holiday, or other day that the OEA offices are closed during regular business hours, you may file the petition the next day that the OEA offices are open during regular business hours. The petition is deemed filed on the earliest of the following dates: the date it is personally delivered to OEA; the date that the envelope containing the petition is postmarked if it is mailed by United States mail; or, the date it is shown to have been deposited with a private carrier on the private carrier's receipt, if sent by private carrier.

Identifying the certification, decision, or other order for which you seek review by number, name of the applicant, location, or date of this notice will expedite review of the petition.

Note that if a petition for review is granted pursuant to IC 4-21.5-3-7, the petitioner will, and any other person may, obtain notice of any prehearing conferences, preliminary hearings, hearings, stays, and any orders disposing of the proceedings by requesting copies of such notices from OEA.

If you have procedural questions regarding filing a petition for review you may contact the Office of Environmental Adjudication at 317-232-8591.

If you have any questions about this certification, please contact Mr. Marty Maupin, Project Manager, of my staff at 317- 233-2471, or you may contact the Office of Water Quality through the IDEM Environmental Helpline (1-800-451-6027).

Sincerely,

Martha Clark Mettler, Chief
Watershed Planning Branch
Office of Water Quality

Enclosure - Sample Deed Restriction

cc: Liz McCloskey, USFWS
Jomary Crary, IDNR

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DIVISION 01 - GENERAL REQUIREMENTS

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SECTION 01 58 00.00 03

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, LOCAL FLOOD PROTECTION
FOR LINE 2, LITTLE CALUMET RIVER, INDIANA
FOR LINE 3, STAGE 5 PHASE 2

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

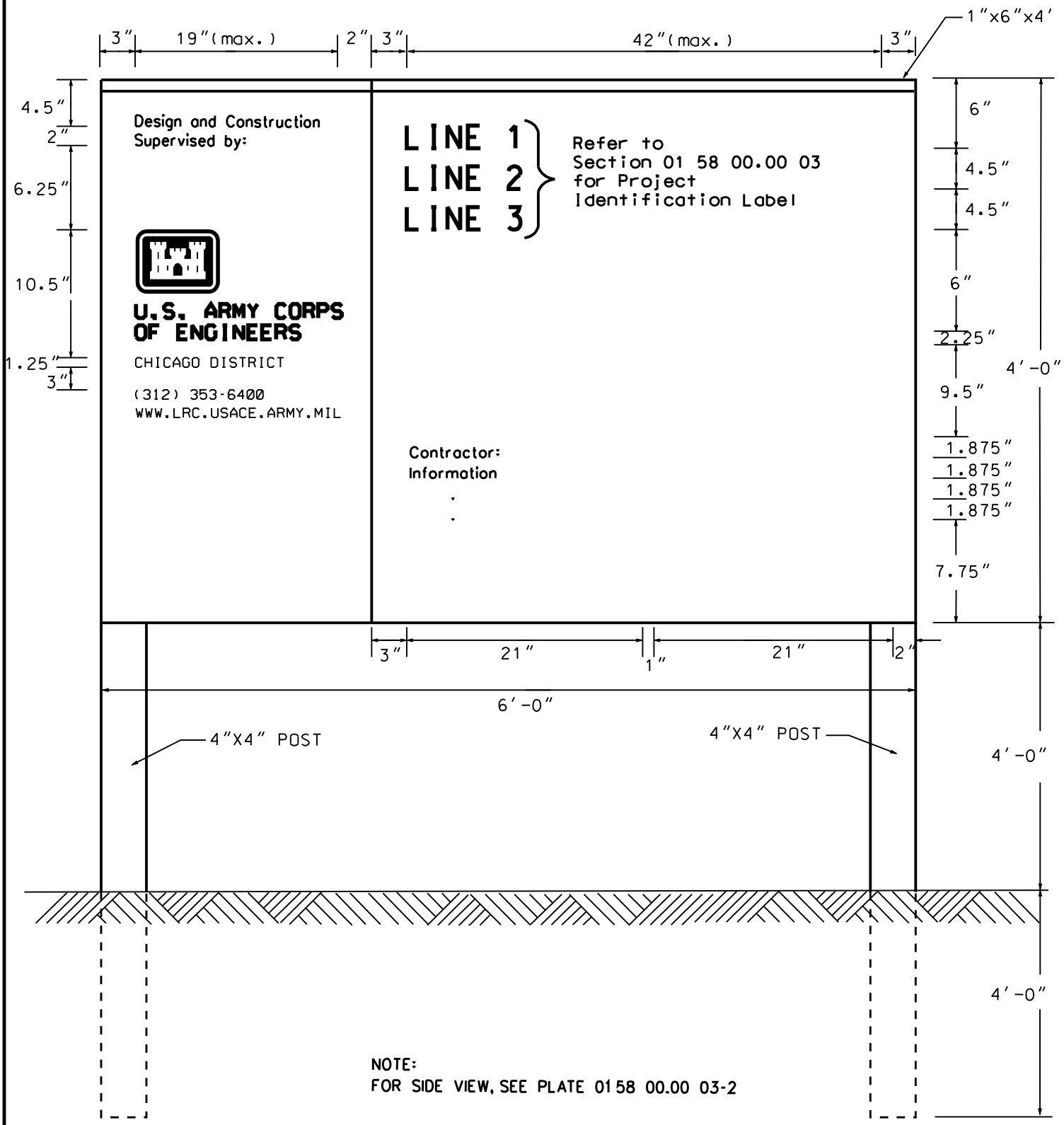
The Contractor shall establish and maintain a quality control system for all operations performed under this section to assure compliance with contract requirements. The Contractor shall maintain records of his quality control for all operations performed, including, but not limited to, the following:

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 01 45 04.00 03 CONTRACTOR QUALITY CONTROL.

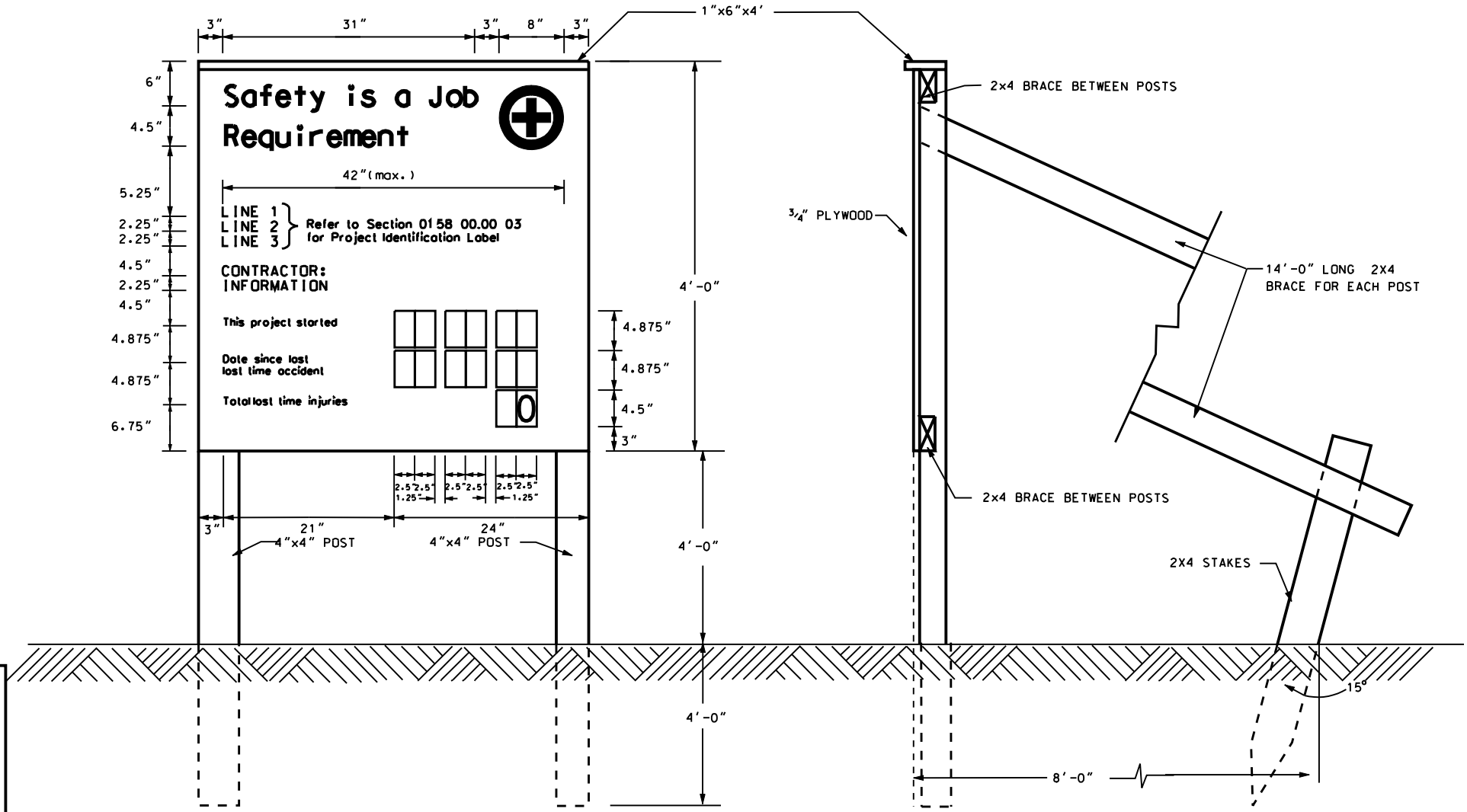
-- End of Section --



NOTE:
FOR SIDE VIEW, SEE PLATE 01 58 00.00 03-2

GENERIC PROJECT IDENTIFICATION SIGN

NOT TO SCALE



GENERIC SAFETY PERFORMANCE SIGN

NOT TO SCALE

PLATE 01 58 00.00 03-2

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SECTION 02 41 00

SITE DEMOLITION

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

The work includes demolition, salvage of identified items and materials, and removal of resulting rubbish and debris and reconstruction of some items as indicated. Rubbish and debris shall be removed from Government property daily, unless otherwise directed, 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 conservation salvage shall be pursued to the maximum extent possible; salvaged items and materials shall be disposed of as specified.

1.1.1 Site Inspection

All Contractors are encouraged to inspect the site to ascertain the extent of the removals necessary to accomplish the required work prior to preparation of bids so that proposed bids accurately reflect anticipated costs.

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 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Work Plan

The procedures and materials proposed for the accomplishment of the work shall be included in the work plan and provide for safe conduct of the work, careful removal and disposition of materials specified to be salvaged, protection of property which is to remain undisturbed, coordination with other work in progress, and timely disconnection of utility services. The procedures shall include a detailed description of the methods and equipment and materials to be used for each operation, and the sequence of operations.

Commercial Landfill Location; G,DH

The name and location of the proposed Commercial Landfill to be used for the disposal of unsalvageable materials.

1.3 DUST CONTROL

The amount of dust resulting from demolition shall be controlled to prevent the spread of dust to occupied portions of the construction site and to avoid creation of a nuisance 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.

1.4 PROTECTION

1.4.1 Protection of Existing Property

Before beginning any demolition work, the Contractor shall carefully survey the site and examine the drawings and specifications to determine the extent of the work. The Contractor shall take all necessary precautions to avoid damage to existing items to remain in place, to be reused, or to remain the property of the Government. Damaged items shall be repaired or replaced as approved by the Contracting Officer at no additional cost to the Government. The Contractor shall carefully coordinate the work of this section with all other work and shall construct and maintain shoring, bracing and supports, as required. The Contractor shall ensure that structural elements are not overloaded and shall be responsible for increasing structural supports or adding new supports as may be required as a result of any cutting, removal, or demolition work performed under this contract.

1.5 BURNING

The use of burning at the project site will not be permitted.

1.6 EXPLOSIVES

Use of explosives will not be permitted.

1.7 AVAILABILITY OF WORK AREAS

Areas in which the work is to be accomplished will be available when the Contractor receives the Notice to Proceed and shall be limited to the areas indicated on the plans as work limits.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 EXISTING STRUCTURES

Existing structures indicated shall be removed completely. This includes but is not limited to abandoned railroad bridge piling and footings, pavement, wooden posts, sprinkler system, water fountain, and three (3) golf course bridges and abutments.

A horizontal saw cut for partial curb and gutter, and pavement removal is required where these removals are indicated or are necessary to complete the work.

3.2 UTILITIES

Existing utilities shall be removed as indicated. 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.

3.3 FILLING

Holes and other hazardous openings shall be filled in accordance with Section 31 11 00, CLEARING AND GRUBBING.

3.4 DISPOSITION OF MATERIAL

Title to materials and equipment to be demolished, excepting Government salvage and historical items, is vested in the Contractor upon receipt of Notice to Proceed. The Government will not be responsible for the condition, loss or damage to such property after Notice to Proceed.

3.4.1 Salvageable Items and Materials

Contractor shall salvage items and materials to the maximum extent possible.

3.4.1.1 Material Salvaged for the Contractor

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. Materials salvaged for the Contractor shall not be sold on the site.

3.4.1.2 Unsalvageable Materials

Concrete, masonry, bituminous, and other materials, shall be disposed of in the Approved Commercial Landfill.

3.5 CLEANUP

Debris shall be removed and transported in a manner that prevents spillage on streets or adjacent areas. Local regulations regarding hauling and disposal shall apply.

3.6 QUALITY CONTROL

3.6.1 Quality Control System

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 demolition operations including, but not limited to the following:

(1) Demolition
(2) Removal and salvage
(3) Removal and disposal

3.6.2 Records

A copy of these records, as well as the records corrective actions taken, shall be furnished to the Government as directed by the Contracting Officer. See Section 01 45 04.00 03, CONTRACTOR QUALITY CONTROL.

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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 211.1	(1991; R 2002) Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete
ACI 318/318R	(2005) Building Code Requirements for Structural Concrete and Commentary
ACI 347R	(1994; R 1999) Guide to Formwork for Concrete
ACI SP-66	(2004) ACI Detailing Manual

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 A 706/A 706M	(2006a) Low-Alloy Steel Deformed and Plain 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	(2001) 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 94/C 94M	(2004a) Standard Specification for Ready-Mixed Concrete
ASTM D 5249	(1995; R 2000) Backer Material for Use with Cold-and Hot-Applied Joint Sealants in Portland-Cement Concrete and Asphalt Joints
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

PRECAST/PRESTRESSED CONCRETE INSTITUTE (PCI)

PCI MNL-120	(2004) Design Handbook - Precast and Prestressed Concrete

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 572 (1974) Specifications for Polyvinylchloride Waterstops

1.1.1 Special Note

Italicized items within this specification pertain to the railroad closure.

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 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Reinforcing Steel; G, DS.

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

Concrete Fabrication Drawings; G, DS

Drawings showing details of the precast pile cap segments, in accordance with ACI SP-66 and ACI 318/318R. Detail drawings shall indicate separate identification marks for each different precast segments, location of segments in the work, elevations, fabrication details, reinforcement, connections, dimensions, lifting devices installation, interface with adjacent members, blocking points for segment stored at the precast concrete plant or at the jobsite, lifting points and special handling instructions in sufficient detail to cover manufacture, handling, and erection

SD-03 Product Data

Air-Entraining Admixture
Accelerating Admixture
Water-Reducing or Retarding Admixture
Curing Materials
Reinforcing Steel; G, DS
Formliners; G, DS
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.

Design Calculations; G, DS

Submit design calculations prior to the manufacture of any precast concrete segments for the project. The design calculations shall include, but not limited to, design of the precast concrete cap reinforcing steel for lifting, erection, handling, locations of grout placement holes and grout pressures under cap; and the design of any lifting inserts to be provided in the precast concrete items.

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, DS

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.

Cementitious Grout Proportions; G, DS

Ten days prior to placement of the cementitious grout, the Contractor shall submit the mixture proportions that will produce the cement grout required. Applicable test reports shall be submitted to verify that the mixture proportions will achieve the flowability and performance requirements specified.

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, DS

Certified copies of mill reports attesting that the reinforcing steel furnished meets the requirements specified, prior to the installation of reinforcing steel.

1.3 DESIGN AND PERFORMANCE REQUIREMENTS

1.3.1 Strength

Acceptance test results will be the average strengths of two specimens tested at 28 days (90 days if pozzolan is used). The strength of the concrete will be considered satisfactory so long as the average of three consecutive acceptance test results equal or exceed the specified compressive strength, f'c, and no individual acceptance test result falls below f'c by more than 500 psi.

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.

1.4 PRECAST CONCRETE CAP

1.4.1 Standards and Loads

Precast unit design shall conform to ACI 318/318R and PCI MNL-120. The Contractor shall perform and provide complete structural analyses for precast concrete units to account for handling, lifting inserts, transportation, erection and grouting stresses. The analyses shall be completed in accordance with ACI 318/318R or PCI MNL-120, whichever is customary with the precast concrete manufacturer.

1.4.2 Connections

The design and sizing of all lifting and handling inserts for all design loads shall be by the Contractor

1.4.3 Concrete Strength

Precast concrete segments shall have a 28-day compressive strength of 5,000 psi.

1.4.4 Concrete Proportion

Selection of proportions for concrete shall be based on the methodology presented in ACI 211.1 for normal weight concrete. The Contractor shall provide a mix with a maximum slump of 6 inches and an air content of 6 percent plus or minus 2.0 percent. The coarse aggregate shall have a maximum nominal size aggregate of 3/4 inch. The concrete proportion shall be developed using the same type and brand of cement, the same type and gradation of aggregates, and the same type and brand of admixture that will be used in the manufacture of concrete for the project. Calcium chloride shall not be used in precast concrete and admixtures containing chloride ions, nitrates, or other substances that are corrosive shall not be used in

precast concrete. The Contractor shall develop the concrete mixture in accordance with the requirements of Section 03307 CONCRETE ***this is the concrete section?***

1.4.5 Calculations

Calculations for design of concrete segments and connections not shown shall be made by a professional engineer experienced in the design of precast concrete items. The Contractor shall perform and provide complete structural analyses for precast concrete units to account for handling, lifting inserts, transportation, erection and grouting stresses. Calculation shall include the analysis of member for stresses and the sizing of the lifting inserts. As a minimum, the concrete geometry, section length, reinforcing steel and location, number and size of the base grouting holes within the precast concrete cap shall be designed by the Contractor. The designer shall determine and specify the maximum grouting base pressure to be used by the Contractor

1.4.6 Cement Grout

The precast concrete cap shall be attached to the sheet piling using base grouting. The grout shall be a mixture of cement, sand and admixtures necessary to achieve the desired self-consolidating and flowability under the cap and shall completely fill all voids under the cap. The cement grout shall obtain a compressive strength of 1,250 psi at 7 days and 3,000 psi at 28 days. The mix design shall be designed by the Contractor and submitted to the Contracting Officer for approval. The grouting technique and procedure shall be determined by the Contractor and submitted to the Contracting Officer for review and approval.

1.4.7 Segment Joints

The precast concrete cap shall be fabricated in segments. The Contractor shall determine the actual number of segments and segment lengths required. A minimum of two segments is required to ensure adequate operation of the adjacent rail line. Additional segments to be utilized by the Contractor to facilitate construction procedures shall be reviewed and approved by the Contracting Officer. Design calculations shall be prepared using the intended segment geometry and lengths. The joints between segments shall be filled with an injected epoxy material to be selected by the Contractor and approved by the Contracting Officer. The Contractor shall submit the joint sealing system to the Contracting Officer for review and approval.

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. *Where welding of reinforcing steel is required and shown on the drawings reinforcing steel shall comply with the requirements of ASTM A 706/A 706M deformed, Grade 60, with sizes and lengths shown on the drawings.*

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

Polyvinylchloride (PVC) 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 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 Ashlar Stone Finish Formliner

The Ashlar Stone formliner shall be a multi-use product with a random stone size that varies from two and a quarter to nine inch widths (2 1/4" to 9"). The maximum relief shall be one and one quater inch (1 1/4") and the gap

between stones shall be in the range of three eights inch to one and one quater inch (3/8" to 1 1/4"). The Ashlar Stone finish shall be used where indicated on the drawings.

2.1.7.5 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 Premolded Expansion Joint Filler Strips

Premolded expansion joint filler strips shall be sponge rubber conform to ASTM D 1752, Type I. Filler material shall be of a thickness and width applicable for the joint formed. Backer material, when required, shall conform to ASTM D 5249.

2.1.13 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.t

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.

3.1.2.5 Welding

Welding of steel bars will be permitted only where indicated or authorized. Welding shall be performed in accordance with AWS D1.4 except where otherwise specified or indicated.

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 caulking at the joint. The panel shall include one wall pilaster, pilaster top, and top of wall cap where applicable. The panel shall be of typical wall thickness for the construction represented. Forming, form liner, reinforcement, waterstop, expansion joint, joint caulking, 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 and spliced as directed by the manufacturer. *PVC Waterstops shall be carefully and correctly positioned during installation to eliminate faulty installation that may result in joint leakage. All waterstops shall be installed to form a continuous watertight diaphragm in each joint. 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. Waterstop splices shall not be permitted.*

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 01 45 04.00 03 CONTRACTOR QUALITY CONTROL.

-- End of Section --

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MISCELLANEOUS METAL

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.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A14.3	(2002) Standard for Fixed Ladders and Safety Requirements

ASME INTERNATIONAL (ASME)

ASME B18.22.1	(1965; R 2003) Plain Washers

ASTM INTERNATIONAL (ASTM)

ASTM A 123/A 123M	(2002) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 307	(2004) Standard Specification for Carbon Steel Bolts and Studs, 60 000 psi Tensile Strength
ASTM A 325	(2006) Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
ASTM A 36/A 36M	(2005) Carbon Structural Steel
ASTM A 153/A 153M	(2005) Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A 240/A 240M	(2006c) Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels for General Applications
ASTM A 276	(2006) Stainless Steel Bars and Shapes
ASTM A 53/A 53M	(2006a) Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
ASTM A 500	(2003a) Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
ASTM A 563	(2004) Standard Specification for Carbon and Alloy Steel Nuts

ASTM A 780	(2001) Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
ASTM D 471	(1998e2) Standard Test Method for Rubber Property - Effect of Liquids
ASTM F 436	(2004) Hardened Steel Washers

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1/D1.1M	(2004) Structural Welding Code-Steel

INDIANA DEPARTMENT OF TRANSPORTATION (INDOT)

INDOT	Indiana Department of Highways Standard Specifications (2008) and Current Supplemental Specifications

1.2 Special Note

Italicized items within this specification pertain to the railroad closure.

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 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Shop Fabricated Metal Items; G, DS

Detail drawings indicating thickness, type, grade, and class; dimensions; and construction details. Drawings as applicable shall include catalog cut, erection details, manufacturer's descriptive data and installation instructions, and templates.

Detail drawings shall include all shop and erection details. Members and connections for any portion of the structure not shown on the contract drawings shall be detailed by the fabricator and indicated on the detail drawings. All welds shall be indicated by standard welding symbols of the AWS D1.1/D1.1M.

Welding of Structural Steel; G, DS

Schedules of welding procedures for steel structures, prior to commencing fabrication. Welding procedures shall be submitted on forms similar to those contained in AWS D1.1/D1.1M, Appendix E. The welding procedure number shall be identified in the tail of the arrow of the welding symbols on the shop drawings.

SD-05 Design Data

Hand Ratchet Winch and Winch Related Materials; G, DS

Contractor shall submit the gate operating equipment and items with design calculations for the Contractor design items meeting the performance specification requirements to the Contracting Officer for approval.

SD-03 Product Data

Manufacturer's literature, available from suppliers, which demonstrates compliance with applicable specifications, listed in this specification, for the items listed below.

Aluminum Access Hatches

Stainless Steel Expansion Anchors

Welding of Structural Steel; G, DS

Schedules of welding procedures for steel structures, prior to commencing fabrication

Hand Ratchet Winch and Winch Related Materials; G, DS

Manufacturer's literature, available from suppliers, which demonstrates compliance with the applicable specifications listed within this section. This shall include the ratchet winch, cable diameter and length, eye bolt assemblies, hooks, pulleys, stating their capacity including the attachment of the items to the cable and the attachment to the concrete foundations and steel gates

SD-05 Design Data

Hand Ratchet Winch and Winch Related Materials; G, DS

Contractor shall submit the gate operating equipment and items with design calculations for the Contractor design items meeting the performance specification requirements to the Contracting Officer for approval.

1.4 GENERAL REQUIREMENTS

The Contractor shall verify all measurements and shall take all field measurements necessary before fabrication. Welding shall be in accordance with AWS D1.1/D1.1M. Items specified to be galvanized, when practicable and not indicated otherwise, shall be hot-dip galvanized after fabrication. Galvanizing shall be in accordance with ASTM A 123/A 123M. Exposed fastenings shall be compatible materials, shall generally match in color and finish, and shall harmonize with the material to which fastenings are applied. Materials and parts necessary to complete each item, even though such work is not definitely shown or specified, shall be included. Poor matching of holes for fasteners shall be cause for rejection. Fastenings shall be concealed where practicable. Thickness of metal and details of assembly and supports shall provide strength and stiffness. Joints exposed to the weather shall be formed to exclude water.

1.5 DISSIMILAR MATERIALS

Where dissimilar metals are in contact the surfaces shall be protected with a coat of bituminous paint or asphalt varnish.

1.6 WORKMANSHIP

Miscellaneous metalwork shall be well formed to shape and size, with sharp lines and angles and true curves. Drilling and punching shall produce clean true lines and surfaces. Welding shall be continuous along the entire area of contact except where tack welding is permitted. Exposed connections of work in place shall not be tack welded. Exposed welds shall be ground smooth. Exposed surfaces of work in place shall have a smooth finish, and unless otherwise approved, exposed riveting shall be flush. Where tight fits are required, joints shall be milled. Corner joints shall be coped or mitered, well formed, and in true alignment. Work shall be accurately set to established lines and elevations and securely fastened in place. Installation shall be in accordance with manufacturer's installation instructions and approved drawings, cuts, and details.

1.7 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 made to engage with the anchors, expansion shields, and power-driven fasteners when approved for concrete; or machine and carriage bolts for steel.

PART 2 PRODUCTS

2.1 STRUCTURAL STEEL

Structural Steel shall conform to the requirements of ASTM A 36/A 36M. *The structural steel for the railroad gate closure structure shall be shop painted in accordance with the INDOT Specifications Standard Specifications (2008 Edition). The full paint system shall be applied in the fabrication shop in accordance with INDOT Section 619.11 (Shop Painting) using the three coat structural steel paint system specified in INDOT Section 619.09 (Structural Steel Paint System).*

Stainless steel and structural steel and steel items coated with a protective zinc finish shall not be painted.

2.2 HEADED SHEAR STUDS

Headed Shear Studs shall conform to the requirements of AWS D1.1/D1.1M for type B studs. *Headed studs shall conform to ASTM A 108, Grade 1010 through 1020, headed stud type cold finished carbon steel, AWS D1.1/D1.1M, Type B (60,000 psi minimum tensile strength). Studs shall be attached using arc shields.*

2.3 ALUMINUM LADDERS

2.3.1 Aluminum Ladders

Ladders shall be aluminum, fixed rail type conforming to ANSI A14.3. Ladders shall be located and sized as shown on drawings. Ladders shall have a minimum load capacity of 300 pounds. Ladder rungs shall be spaced 1'-0" on center. The dimension of from the center of the ladder rung to the wall shall be 7 inches.

2.3.2 Telescoping Safety Post

The telescoping safety post shall be a manufactured item suited for use

with the aluminum ladder. It shall be constructed of aluminum with stainless steel hardware. The unit shall employ telescoping tubular sections that are pulled up by a fixed loop at the top of the sections. The unit shall be supplied completely assembled with all necessary hardware for securing to the ladder rungs in accordance with the manufacturers instructions.

2.4 A-FRAME GATES

2.4.1 Gate Pipes

All A-frame gate pipes shall be one piece and conform to ASTM A 53/A 53M Type S Grade B. Size and strength of the pipes shall be as shown on the drawings. Joints shall be scribed and mitered, groove welded, and then ground smooth. After fabrication the A-Frame gates shall be hot-dipped galvanized.

2.4.2 Gateposts

All A-Frame gateposts shall be one piece and conform to ASTM A 53/A 53M Type S Grade B. Size and strength of the pipes shall be as shown on the drawings. Gateposts shall be hot-dipped galvanized after the 2 X 2 X ¼ inch steel stabilizer plates and hasps have been welded to the posts.

2.4.3 Gate Hinges

The A-Frame gate hinges shall be a butt type hinge that is a commercially available product specifically manufactured for use with this type of gate. Hinges shall be galvanized.

2.4.4 Gate Chains

Two chains per gate shall be provided. The chains shall be 1/2" P-30 proof coil zinc plated. Each chain shall be 30" long.

2.5 MISCELLANEOUS

Miscellaneous plates and shapes for items that do not form a part of the structural steel framework, such as angles, miscellaneous mountings, and frames, shall be provided to complete the work. Unless otherwise indicated these items shall conform to ASTM A 36/A 36M. Where indicated on the drawings these items shall be hot-dipped galvanized.

2.5.1 Galvanizing

Zinc coatings shall be applied in a manner and of a thickness and quality conforming to ASTM A 123/A 123M and ASTM A 153/A 153M. Where zinc coatings are destroyed by cutting, welding or other causes the affected areas shall be regalvanized. Coatings less than 2 ounces shall be repaired in accordance with ASTM A 780. Zinc coating shall be applied after the all metal fabrication is completed. Items requiring galvanizing are indicated on the drawings.

2.6 GUARDRAILS

Guardrails shall be as indicated on the drawings.

2.6.1 Guardrail Requirements

Steel guardrails shall be structural tubing conforming to ASTM A 500, Grade B and sized as shown on the drawings. Joint posts, rail, and corners shall be fabricated by mitered and welded joints made by fitting post to top rail and intermediate rail to post, mitering corners, groove welding joints, and grinding smooth. Railing splices shall be Butt splices reinforced with a tight fitting interior sleeve not less than 6 inches long. The spice joint shall be groove welded and ground smooth. After fabrication all guardrails shall be hot dipped galvanized.

2.7 EXPANSION ANCHORS

Expansion anchors shall have diameters as indicated and approved for use with concrete.

2.6.1 Expansion Anchor Requirements

Expansion anchors shall be stainless steel conforming to ASTM A 276 Type 304 or 316. Expansion anchors used to attach the fence brackets shall have a minimum ultimate pull out (tension) capacity of 5,000-pounds (lbs). All other expansion anchors shall have a minimum ultimate pull out (tension) capacity of 10,000-pounds (lbs).

2.8 ANCHOR BOLTS

Anchor Bolts shall conform to the requirements of ASTM A 307, galvanized.

2.9 ALUMINUM ACCESS HATCHES

Aluminum access hatches shall be a commercially manufactured item. Hatches shall be the size shown on the drawings. The hatches shall have a load capacity of 300 pounds per square foot (PSF). The hatches shall have a mill finish and and the hatch frame shall have an epoxy coating at areas in contact with concrete. Where indicated on the drawings the hatches shall be provided with a keyed padlock locking device.

2.10 Stainless Steel

2.10.1 Stainless Steel Plate

ASTM A 240/A 240M, UNS S30400

2.10.2 Stainless Steel Bar and Shapes

Stainless steel bars and shapes shall be ASTM A 276, UNS S30400.

2.11 Structural Bolts

a. High strength bolts - ASTM A 325, Type 1, Bolts, ASTM A 563 Nut and ASTM F 436 washer. All hot dip galvanized.

b. Non-High Strength Bolts and Nuts - ASTM A 307, Grade A. All hot-dip galvanized.

c. Plain Washers - ASME B18.22.1, Type B, hot-dip galvanized.

d. Stainless Steel Bolts - ASTM A 276, 300 Series Stainless Steel. All stainless steel bolts shall be furnished with stainless steel nuts and

washers

2.12 Rubber J-Type Seal

Rubber J-type seals shall be of the mold type only, 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.

2.12.1 Physical Characteristics

Physical characteristics of the seals shall meet the following requirements:

PHYSICAL TEST	TEST METHOD TEST VALUE	SPECIFICATION
Tensile Strength	2,500 psi (min.)	ASTM D 412
Elongation at Break	450% (min.)	ASTM D 412
300% Modulus	900 psi (min.)	ASTM D 412
Durometer Hardness (Shore Type A)	60 to 70	ASTM D 2240
*Water Absorption	5% by weight (max.)	ASTM D 471
Compression Set	30% (max.)	ASTM D 395
Tensile Strength (after aging 48 hrs)	80% tensile strength (min.)	ASTM D 572

* 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 for 22 plus or minus 1/4 hour. 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 M subscript 1 (M subscript 1 is defined in ASTM D 471). The immersion temperature shall be 70 degrees C plus or minus 1 degree and the duration of immersion shall be 166 hours.

2.13 Neoprene Rubber Waterstop/Membrane

The rubber membrane shall be a neoprene rubber material, with a medium strength classification and a thickness of one-half inch. The neoprene rubber shall be resistant to most alkalides and petroleum based products and handle the rigors of constant stretching and flexing, while maintaining its physical characteristics. It shall be manufactured for outdoor use. It shall possess a durometer hardness of 40 to 50. The rubber shall be obtained from Rubber Sheet Roll, Inc. (866-834-8606) or approved equal.

2.14 Manual Gate Operating Winch and Related Features

2.14.1 General

The gate operating system for the railroad closure shall consist of a mechanical hand operated winch and steel cables with various appurtenances attached to the abutment and to the gate. The gate operating equipment

shall be designed and selected by the Contractor meeting the performance criteria presented below and intended operation sequence identified.

The gate operation criteria is as follows: Two manual winches (one for the north gate structure and one for the south gate structure) shall be located on the east or west abutment adjacent to the gate. Steel cables attached directly between the winch and the gate will be used to open or close the gate. A redirection pulley will be attached to the abutment opposite of the winch abutment and used in conjunction with the subject cables and winch to reverse the direction of the gate.

The desired gate operational sequence is described as follows: To close the gate (position gate across the railroad tracks), unwind the steel cable from the winch and attach the hook secured to the end of the cable to the eye hook connected to the gate that is located closest to from the winch location. Using the winch, pull the gate from the storage area across the railroad tracks to the extent possible, until the angle of the cable between the winch and the eyehook reduces the pulling force on the gate. At this time, relocate the hook and cable to the eyehook on the opposite side of the gate (eyehook is farthest from the winch). Use the winch to complete the pulling of the gate to its final position. To open the gate (remove gate from railroad tracks), install a redirection pulley on an eyehook connected to the abutment opposite of the winch abutment. Unwind the steel cable from the winch, thread the cable through the redirection pulley and attach the hook secured to the end of the cable to the eyehook on the gate that is located closest to the redirection pulley. Using the winch, pull the gate off of the railroad tracks to the extent possible until the angle of the cable between the winch and the eyehook reduces the pulling force on the gate. At this time, relocate the hook and cable to the eyehook on the opposite side of the gate (eyehook is closest to the winch). Use the winch to complete the pulling of the gate to its final stored position.

2.14.2 Performance Criteria

a. The gate operating system shall be designed and rated for a minimum 1,800 pound pulling capacity.

b. All components shall be rated to operate outdoors and maybe subjected to water, dirt and debris.

c. The size of the winch, cable, hooks, eye hooks pulley and all attachments shall be designed by the Contractor to meet the rated capacity of the hand winch selected. The winch shall be a ratchet type winch and have a minimum of two speed gear ratios. A low gear ratio to permit the initial movement of the gate and a higher gear ratio to maintain the movement of the gate. The winch shall be heavy duty construction steel drive gears, large diameter molded hand arm, permanently lubricated bearings with protective finishes to the winch and drum. The winch shall meet the requirements of the winch listed for the Deluxe Ratchet Winch, catalog number 2Z602 manufactured by Grainger or an approved equivalent.

d. The Contractor shall be responsible to establish the mounting location of the winch and related items based upon the manufacturer's suggested installation details. The Contractor shall design all embedment anchor bolts, hooks, pulleys and eye hook attachment to the gate. The design shall consider all potential locating conditions and consider tension, shear and bending effects.

e. The hand winch shall be enclosed within a metal weather proof enclosure. The enclosure shall be lockable using a standard metal hasp and key padlock. The enclosure shall have sufficient room to store any features not permanently attached to the gate. These shall include, but not limited to hooks and redirection pulley. The enclosure shall not interfere with the intended operation gate operating system.

f. All items exposed to the weather shall be painted, galvanized or stainless steel.

g. The cable shall not rub against the concrete foundations or gate structure throughout the entire travel distance of the gate.

h. The winch shall have a drum diameter/capacity to satisfactorily store the length of cable needed to operate the gate as described herein, with sufficient reserve capacity. The length of cable needed shall be 100 feet and verified by the Contractor.

i. The cable shall be steel and have a corrosion protective coating that will not be damaged during normal use.

j. The gate operating system design with calculations shall be submitted to Contracting Officer for approval prior to fabrication and installation at the site.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

All items shall be installed at the locations shown on the drawings and according to the manufacturer's recommendations.

3.2 INSTALLATION OF ALUMINUM HATCHES

Install aluminum hatches per manufacturers recommendations.

3.3 ATTACHMENT OF LADDERS

Install ladders securely to concrete per manufactures recommendations.

3.4 QUALITY CONTROL

3.4.1 Quality Control System

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. See Section 01 45 04.00 10, CONTRACTOR QUALITY CONTROL.

3.4.2 Records and Tests

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.

3.5 FABRICATION

3.5.1 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. Bolts, nuts and screws shall be tight.

3.5.1.1 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.

3.5.1.2 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 noted on the Drawings or 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 or as required on the Drawings shall be chipped, ground or machined to sound metal.

3.5.2 Welding

3.5.2.1 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. Welding procedures must show types and locations of welds designated or in the specifications to receive nondestructive examination.

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.

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.

3.5.2.2 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.

3.5.3 Bolted Connections

3.5.3.1 Bolted Structural Steel Connections

Bolts, nuts and washers shall be of the type specified or indicated. All nuts shall be equipped with washer. 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.

Bolt holes shall be accurately located, smooth, perpendicular to the member and cylindrical. 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. Slotted and oversize holes shall be as indicated on the drawings.

3.6 Seals

Seal assemblies shall consist of rubber seals, stainless steel retainer and spacer bars, 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 seals shall be fully molded, develop a minimum tensile strength of 50 percent of

the unspliced seal. 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. Stainless steel retainer bars shall be field-spliced only where shown on the drawings and shall be machine-finished after splicing. Rubber seals shall be fitted in the shop and drilled to match seal retainer plates and gaskets for the gate, match-marked, and then removed for shipping. Drilled slotted holes for attaching the seal, shall be of the size shown. The sealing surfaces of side seal plates and sill beams shall be flush, straight, and free from offsets, warps, twists or other distortions.

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DIVISION 31 - EARTHWORK

SECTION 31 00 00

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SECTION 31 00 00

EARTHWORK

PART 1 GENERAL

1.1 Special Note

Italicized items within this specification pertain to the railroad closure.

1.2 SUMMARY

The work covered by this section consists of furnishing all plant, labor, equipment, and materials; and performing all operations necessary for stripping, stockpiling materials, excavation of existing levees, excavation of borrow areas, excavation of drainage ditches and swales, miscellaneous excavation, removal of unsuitable material from levee foundations, and all other excavation incidental to the construction of levees, drainage structures, and channel improvement *excavation, removal of unsuitable material, foundation preparation and backfilling of foundations for railroad closure structures and the removal and reinstallation of the rail track*. The work covered by this section also consists of performing all operations in connection with foundation preparation and the construction of levee embankments, including inspection trench excavations, new levee, placement of impervious fill for the access ramps, backfill at drainage structures, and other incidental earthwork as may be necessary to complete the levee, as shown on the drawings, as hereinafter specified, and as directed by the Contracting Officer or Contracting Officer's Representative (COR).

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.

ASTM INTERNATIONAL (ASTM)

ASTM C 117	(2004) Materials Finer Than 75 micrometer (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C 127	(2004) Density, Relative Density (Specific Gravity), and Absorption of Coarse Aggregate
ASTM C 136	(2005) Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C 142	(1997; R 2004) Clay Lumps and Friable Particles in Aggregates
ASTM C 535	(2003e1) Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine

ASTM C 88	(2005) Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM D 1556	(2000) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 1557	(2002e1) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cu. ft. (2,700 kN-m/cu.m.))
ASTM D 2166	(2006) Standard Test Method for Unconfined Compressive Strength of Cohesive Soil
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 3017	(2005) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
ASTM D 4318	(2005) Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D 448	(2003a) Sizes of Aggregate for Road and Bridge Construction
ASTM D 698	(2000a) Laboratory Compaction of Soil Using Standard Effort (12,400 ft-lb/ft3 (600 kn-m/m3)

U.S. ARMY CORPS OF ENGINEERS (USACE)

COE CRD-C 119	(1997) Handbook for Concrete and Cement Standard Method of Test for Flat or Elongated Particles in Coarse Aggregate
EM 385-1-1	(2003) Safety -- Safety and Health Requirements

1.4 DEFINITIONS

1.4.1 Satisfactory Materials

Satisfactory 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, SM, SC, ML, CL, and CL-ML. Satisfactory materials shall consist of material free from roots and other organic matter, contamination from hazardous, toxic, or radiological substances, trash, debris, ice, snow, frozen materials, and stones larger than 3 inches in any dimension. Satisfactory materials may also be called acceptable materials in these specifications. Satisfactory materials obtained from any given borrow source shall meet the environmental requirements in paragraph "Environmental Testing of Borrow Materials."

1.4.2 Unsatisfactory Materials

Unsatisfactory materials also include rubbish, vegetation, muck, highly plastic soils, construction debris, or other materials not meeting the definition of satisfactory materials. 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.

1.4.3 Impervious Materials for Levee Construction

Satisfactory impervious materials shall consist of any materials classified as SC, CL-ML, or CL by ASTM D 2487 with not less than 35 percent by weight passing a No. 200 sieve.

1.4.4 Topsoil

Topsoil shall be natural, friable sandy loam material consisting of 30 percent to 50 percent sand. Topsoil shall have an organic content between 3 percent and 20 percent by weight, a pH range between 6.1 and 7.8, and shall be characteristic of representative productive soils in the vicinity. Topsoil shall be free from subsoil, noxious weeds, stones, roots, lime, concrete, ashes, slag, toxic substances, and all materials and substances that may be harmful and or hinder grading, planting, establishment, and maintenance operations. Topsoil shall be obtained from required stripping operations, and from offsite sources selected by the Contractor and approved by the Contracting Officer.

1.4.5 Degree of Compaction

Degree of compaction for levee embankments, levee subgrades, and all other earthwork will be evaluated relative to the Standard Proctor Test described in ASTM D 698.

1.4.6 Excavation

Excavation shall include the satisfactory removal and deposition of all materials.

1.4.7 Embankment

As used in these specifications, the term "embankment" is defined as the earth fill portions of the levee or roadway subgrade prepared to finish grade after stripping and removal of unsatisfactory material.

1.4.8 Fill

As used in these specifications, the term "fill" includes all fill, except structural backfill, deposited in layers and compacted by rolling or tamping.

1.4.9 Structural Backfill

Structural backfill material shall consist of satisfactory materials free from rocks 3 inches or larger in any dimension or free from rocks of such size as recommended by the pipe manufacturer, whichever is smaller. *Structural backfill under foundations shall be placed and compacted in layers in accordance with the specifications. Stone aggregate under the railroad closure structure foundation shall meet the gradation of ASTM D 448*

#57 stone. A 6-inch compacted layer shall be placed under the foundation and compacted

1.4.10 Pervious Fill

Pervious fill for closure structures shall be well graded sand with 100 percent by weight passing the 3/8 inch sieve and not more than 10 percent by weight passing the No. 200 sieve.

1.4.11 Flowable Fill

A cementitious fill material consisting of Portland cement, water, admixtures, and fillers. Flowable fill shall be used as backfill in trenches for pipe structures, culverts, and utility cuts at the locations shown on the plans. Flowable fill shall conform to INDOT Standard Specification Section 213.

1.4.12 Imported Earth Fill

As used in these specifications includes all fill imported from off site, deposited or placed in layers and compacted, that is obtained from a non-commercial borrow source. Imported earth fill must meet the testing requirements detailed in paragraph 3.17 IMPORTED EARTH FILL TESTING REQUIREMENTS. Terminologies used in project plans for various types of fill material that may fall under definition of imported earth fill include but are not limited to topsoil, structural backfill, pervious fill/materials, impervious fill/materials, satisfactory fill/materials, and flowable fill.

1.5 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 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Plan of Operation; G, CS

Dewatering Work Plan; G, CS

Cofferdam Work Plan; G, CS

Commercial Borrow Source; G, CS

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.

Soil Sampling Plan for Contractor-chosen borrow source; G, DH, PL

Prior to sampling borrow material from a Contractor-chosen borrow 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 CS, PL, 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 soil sampling plan.

SD-06 Test Reports

Quality Control Test Reports

Contractor shall submit copies of all quality control testing within 48 hours after the completion of laboratory testing.

Environmental Soil Sampling Report for Contractor-chosen 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 CN 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.

SD-07 Certificates

Analytical Laboratory Certification; G, CS

Contractor shall submit a valid Engineer Research Development Center, Waterways Experiment Station (ERDC/WES) letter of lab certification for the testing laboratory used. Significant lead time may be required to obtain an ERDC/WES certification.

1.6 SUBSURFACE DATA

Complete boring logs are appended to Section 00 31 32.13 GEOTECHNICAL DATA. The subsoil investigation report may be examined at the Corps of Engineers Chicago District office. These data represent the best subsurface information available; however, variations may exist in the subsurface between boring locations.

1.7 BORROW, STOCKPILE, AND DISPOSAL AREAS

1.7.1 Borrow Area

All costs to load, haul, and place the material and any other work associated with the placement of the material are to be the Contractor's costs. The Contractor shall bear all costs for developing the borrow area as necessary to obtain the material including the construction, repair and maintenance of any roads or facilities damaged by the Contractor's operations. Materials required in this Section for construction may be

taken from approved commercial borrow sites or from approved borrow site locations obtained by the Contractor.

1.7.2 Selection of Borrow Material

Borrow material shall be selected to meet the requirements and conditions for the particular fill or embankment for which it is to be used. The Contractor shall bear all expense of developing the source, including rights-of-way for hauling.

1.7.3 Testing of Borrow Materials

Testing of borrow materials will be required before construction begins. Testing requirements are presented in paragraph 3.3 SELECTION OF BORROW MATERIAL.

1.7.4 Stockpile Locations

Stockpile locations have not been specified. The Contractor may stockpile material anywhere within the work limits, on the landward side; but, not in or near a collector ditch, on the levee embankment, nor in a location which would interfere with the line-of-protection. No stockpile shall remain in place after construction. Stockpiled impervious material for levee construction shall be used in embankment construction and unsatisfactory material shall be disposed of in accordance with the environmental requirements of these specifications. Disposal of both satisfactory and unsatisfactory material shall be the Contractor's responsibility. Unsatisfactory material may be disposed of in an approved commercial disposal site.

1.8 PLAN OF OPERATION

1.8.1 General

The Contractor shall submit a Plan of Operation to the Contracting Officer for approval. The Plan of Operation shall cover the timetable for construction, the sequence in which the construction will take place, all subcontractor information including schedules and sequencing, maintenance of existing flood protection during construction, temporary outlets and drainage, fill placement procedures, equipment to be used, and the name of the commercial laboratory to be used for the testing services. *The work around and associated with construction of the railroad closure structures requires permission, a construction permit and coordination with Norfolk Southern Railroad. The Contractor shall identify this feature within the Plan of Operation. The Contractor shall coordinate with the Contracting Officer and Norfolk Southern Railroad regarding the time necessary to excavate and construct the closure structures to minimize railroad track outages. The Contractor is required to maintain one track in operation at all times during the construction and shall provide any necessary excavation support, staging requirements and bracing to maintain the one operational track.* The Plan of Operation must be submitted to the Contracting Officer at least 15 days before starting earthwork operations.

1.8.2 Equipment

Before the work is started, the Contractor shall submit to the Contracting Officer for approval in the Plan of Operations a list of all plant, equipment and tools to be used in the performance of the work. The equipment shall be maintained in satisfactory working condition at all

times. The equipment shall be adequate and have the capability of producing the required compaction and meet the requirements specified in paragraph 3.7.1.1; and otherwise be suitable for construction of embankments as set forth herein.

1.8.3 Commercial Laboratory

Testing shall be performed at the expense of the Contractor by an approved commercial testing laboratory. The Contractor shall submit for approval in the Plan of Operations the name and qualifications of the laboratory to be used.

1.9 TESTING

1.9.1 General

1.9.1.1 Procedures

The Contracting Officer reserves the right to direct the location, and select the material for samples to be tested. Field moisture and density tests shall be performed when and where directed. Field in-place density shall be determined in accordance with ASTM D 1556 or ASTM D 2922. When field in-place density is determined in acordance with ASTM D 2922, field in-place moisture shall be determined in accordance with ASTM D 3017. Laboratory moisture and density tests shall be determined in accordance with ASTM D 698. When ASTM D 2922 is used, the calibration curves shall be checked and adjusted, if necessary, with ASTM D 1556. The calibration checks of both the density and moisture gages shall be made at the beginning of a job, on each different type of material encountered, or at intervals as directed by the Contracting Officer. Copies of calibration curves, results of calibration tests, and field and laboratory density tests shall be furnished to the Contracting Officer within 24 hours of conclusion of the tests as part of the Quality Control Test Reports.

1.9.1.2 Compliance

When Quality Control Test Reports indicate that compaction is not as specified, the material shall be removed, replaced and recompacted to meet specification requirements, at no additional expense to the Government. Tests on recompacted areas shall be performed to determine conformance with specification requirements. All 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 times, will be the minimum acceptable for each type of operation and if, in the opinion of the Contracting Officer, compacted fill of an acceptable quality is not being obtained, increased testing rates will be required at no cost to the Government. Tests of materials which do not meet the specified requirements will not be counted as part of the tests required.

1.9.2 Schedule of Tests (Minimum)

1.9.2.1 Moisture Density Relations

Levee embankment/fill: One for each type of levee fill material by the Standard Proctor Test (ASTM D 698). *Railroad Closure Structure: The fill material to be placed under each of the foundations shall be*

tested at least once per each type of foundation material by the Standard Proctor Test (ASTM D 698), prior to the construction of any concrete foundations.

All other fills and subgrades: One for each type of fill material (ASTM D 698)

1.9.2.2 Field Density and Moisture Content

ASTM D 1556, or ASTM D 2922 and ASTM D 3017

Levee Embankment/Fill: One per 400 LF (In place measure) on each lift, or one per lift, whichever results in the greater number of tests; but, not less than 1 per day on days when fill is placed. The Contractor shall perform one (1) sand cone test (ASTM D 1556) after each ten (10) nuclear density tests performed, to check the accuracy of the nuclear gage. At least one (1) sand cone should be performed when the type of embankment fill material changes. *Railroad Closure Structure: The fill material to be placed under each of the foundations shall be tested at least twice at each foundation location in accordance with ASTM D 2922 prior to the construction of any concrete foundations.*

All subgrades: One per 1000 SY of subgrade prepared, but not less than one per location.

All hand compacted areas: One per 1000 SY of area prepared, but not less than one per location.

1.9.2.3 Unconfined Compressive Strength

For the portion of levee between stations 5N 17+00 to 31+71, for each type of fill material, two unconfined compressive strength tests will be run on laboratory compacted specimens in accordance with ASTM D 2166. One test will be performed on a specimen compacted at about optimum moisture (+/-1%). The second test will be performed on a speciment compacted at about +3% of optimum moisture.

1.9.2.4 Atterberg Limits

One Atterberg Limits ASTM D 4318 test for each laboratory moisture density shall be performed only on cohesive materials. Ten additional Atterberg Limits tests shall be performed to correlate field density and moisture content tests to laboratory moisture density relation tests. The ten additional tests shall be done on representative samples taken from in place embankment material at the locations where field density tests are performed. Results of these tests shall be submitted to the Contracting Officer within 24 hours of their completion.

1.10 DRAINAGE AND DEWATERING

1.10.1 Control of Water

The Contractor shall control, by acceptable means, all water regardless of its source. The Contractor shall be fully responsible for disposal of the water; and shall provide all necessary means to control and dispose of the water at no additional cost to the Government.

1.10.2 Drainage

Surface water shall be directed away from excavation and construction sites so as to prevent erosion and undermining of foundations. Diversion ditches, dikes and grading shall be provided and maintained as necessary during construction. Excavation slopes and backfill surfaces shall be protected to prevent erosion and sloughing. Excavation shall be performed so that the site, the area immediately surrounding the site, and affected construction operations at the site shall be continually and effectively drained.

1.10.3 Control Measures

Control measures shall be taken as needed by the time the excavation reaches the ground water level in order to maintain the integrity of the in-situ material while the excavation is open. Dry excavations shall be maintained during fill placement and compaction. The methods to be used shall be detailed in the Dewatering Work Plan and submitted 15 days prior to starting point.

1.10.4 Ground Water

The Contractor should be aware that the ground water levels at the site are possibly high, often close to the ground surface and will vary seasonally and approximately with river levels. Any excavations may encounter significant seepage. The boring logs included with these plans and specifications should be thoroughly reviewed by the Contractor.

1.10.5 Cofferdams

The Contractor shall design temporary cofferdams and a temporary culvert bypass for the Hart Ditch Control Structure and submit a Cofferdam Work Plan. The cofferdams are to be removed after construction of the Hart Ditch Control Structure. The bypass culvert can be removed or filled as directed in the plans and specifications. All sediment and entrained water removed from the river and bank area during cofferdam construction must be disposed of at an off-site location in accordance with all federal, state, and local laws. Sediment and entrained water may not be placed back into the river or on the banks. However, water from dewatering the cofferdam to maintain dry working conditions may be discharged to the river untreated.

1.11 EMBANKMENT/BACKFILL PROTECTION

Newly graded areas shall be protected from traffic and erosion, that may occur from any cause, prior to acceptance of the work; and shall be repaired and grades reestablished to the required elevations and slopes. All work shall be conducted in accordance with Section 01 57 20.02 10 ENVIRONMENTAL PROTECTION requirements of the contract.

1.12 MAINTAINING FLOOD PROTECTION AND DRAINAGE DURING CONSTRUCTION

The Contractor shall take appropriate measures to maintain flood protection within the project area for the duration of this contract. The existing flood protection shall be maintained until such time as the new flood barrier is constructed to the elevations listed in the table below. This shall be addressed in the Plan of Operation by the Contractor.

Minimum Levee Crest Elevation During Construction

Northcote to Indianapolis	598.4
Indianapolis to Norfolk Southern RR	598.0
Norfolk Southern RR to Kennedy	597.8
Along Hart Ditch	600.0

The Contractor shall maintain drainage through construction of the line of flood protection across existing drainage paths such as swales, ditches, culverts, or pump outfalls, by temporary means as required to avoid increasing landward flooding of structures or private property. The Contractor shall be responsible for any increased flood damages that may be caused by construction operations as compared to preconstruction drainage conditions.

Where existing flap gated culverts are removed during construction, temporary replacement culverts shall prevent backflow from the river as needed. The Contractor shall coordinate construction of structures located on pump station outfalls and other storm sewer outlets with the local government or private entities that operate these facilities. In particular the outlets for the Baring, S. Kennedy, and Indianapolis pump stations shall be coordinated with the Hammond Sanitary District. The Contractor shall maintain their operability during construction. Bypass piping may be required during construction of new outlets.

Coffer dams and a bypass pipe will be required to construct the Hart Ditch Control structure as shown on plan sheet C-55.

There are two areas with specific restrictions that require special phased construction to prevent increased flooding impacts. These areas include:

1. The "no fill area" between the concrete portion of the Hart Ditch Control Structure and the floodwall along the south side of the Little Calumet River - No fill or any other blockage to flow shall be placed in the no fill area as shown on plan sheet C-55 until all other Stage V-2 floodwalls, levees and drainage structures through the line of protection are completed. At that time, the tie back berm that connects the concrete portion of the Hart Ditch Control Structure and the floodwall along the south side of the river can be constructed.

2. A 100 foot long gap shall be left between stations 5S 51+00 and 5S 69+00, until the remainder of the levee has been constructed. Within the gap the levee shall not be built above elevation 597. The location of the 100 ft gap must be placed within the provided station range. The gap allows water to flow into the Wicker Park Golf Course during a flood event. This gap shall be filled after the no fill area is filled as described in the above paragraph.

These two items must be constructed in the order presented above, but not until all other items of the Phase V-2 project are constructed and functional. Constructing any of these items earlier in the construction sequence would cause increased flood levels and shall not be allowed.

1.13 CONSTRUCTION LIMITS

The Contractor shall perform all work within the construction limits as shown on the drawings. Notice shall be given to INDOT's Lake County District Director at least one week before commencing work on INDOT right-of-ways.

PART 2 PRODUCTS

2.1 2.1 Ballast

All ballast material shall be submitted to and approved by the Contracting Officer prior to delivery to the site. Ballast material type (granite or limestone) shall be as specified on the plans. If unspecified, granite is to be used, unless an alternate material is approved by the Contracting Officer.

Prepared ballast shall be crushed stone composed of hard durable particles, free from objectionable amounts of deleterious substances and shall meet the following specifications:

a. Gradation, as determined using ASTM C 136. One test shall be performed each 1000 tons or fraction thereof of material loaded for delivery.

Ballast shall comply with the modified AREA gradation #3, as shown in the table:

Percent Passing Standard Sieve Size by Weight

Type	2 1/2"	2"	1 1/2"	1"	3/4"	1/2"	3/8"	#4	No. 200
AREA #3 Mod	100	95-100	30-65	0-15	---	0-5	---	---	0.5 max

Note: All Gradation Testing shall be done according to ASTM C 136

2.2 Ballast Quality Requirements

a. Clay lumps and friable material - percentage as determined by ASTM C 142 shall not exceed 0.5%.

b. Material finer than #200 sieve - percentage as determined by ASTM C 117 test shall not exceed 0.5%.

c. Absorption - as determined by ASTM C 127 shall not exceed 1.0%.

d. Sodium sulfate soundness - average weighted loss after five (5) cycles shall not exceed 2.5%, as determined by ASTM C 88.

e. Resistance to degradation - as determined by ASTM C 535, grading type 2, (Los Angles Abrasion Test 535-2) shall not result in a wear percentage greater than 27.5% for granite, or 25.0% for limestone.

f. Flat and/or elongated particles - as determined by U.S. Army Corps of Engineers' Test COE CRD-C 119, using a 3:1 ratio shall not exceed 5.0%.

g. Rock cementing value (limestone only) shall not exceed 200 psi. The test shall conform to the following procedure:

1. Take 350 grams of stone dust passing #100 mesh sieve. Dust is obtained by running approximately one (1) quart pea size stone chips (retained on #4 sieve, passing 3/8" sieve) in standard Deval Abrasion machine for 10,000 revolutions, or 5 to 6 hours at 30 to 33 rpm with three (3) standard ASTM C 535 balls.

2. Place dust on glass surface, make a crater, add approximately 70 cc water, cover and allow to absorb for one (1) minute. Wearing rubber

gloves, mix roll, and knead for five (5) minutes to obtain a stiff dough. Adjust amount of water to obtain this. Place in an air tight can for two (2) hours.

3. Mold ten (10) standard 1" diameter x 1" high cylinders. Weigh about 30 to 31 grams stiff dough (or sufficient to obtain cylinders 1" plus or minus 1/32" high) in balance. Place mold and compress with 1475 lbs (1877.5 psi), holding load constant for one (1) minute.

4. Air Dry cylinders for 20 hours at room temperature, then for four (4) hours in hot air bath at 212°F. Place immediately in a desiccator for 20 minutes and then test in compression testing machine with pivoted or ball socket head for uniform load distribution. Load is applied at 600 lbs. per minute.

5. Report average crushing strength in psi as cementing value of stone. Calculation: PSI = Load / 0.7854.

h. Contractor shall furnish a certification of compliance stating that the material meets or exceeds the requirements of the specification. For sources not currently approved by the Contracting Officer, the Contractor shall provide independent certification as required by the Contracting Officer.

i. Graded aggregates subject to on site stockpiling prior to placement shall be reblended as directed by the Contracting Officer to ensure compliance with the original gradation specified.

PART 3 EXECUTION

3.1 STRIPPING

After inspection and approval of cleared and grubbed areas, stripping may proceed.

3.1.1 Levee Foundation

The area within the limits of the levee foundation shall be stripped to remove heavy growth of grasses, weeds, other vegetation, and surface soils to a depth not to exceed 12 inches as shown on the drawings.

3.1.2 Borrow Areas

The Contractor shall remove heavy growth of grasses, weeds, other vegetation, and topsoil.

3.1.3 Topsoil

Stripped materials suitable for use as topsoil, shall be spread on areas already graded and prepared for topsoil; or when so specified topsoil shall be transported and deposited in stockpiles convenient to areas that are to receive application of the topsoil later, or at locations indicated or specified by the Contracting Officer. Topsoil shall be kept separate from other unusable excavated materials, brush, litter, objectionable weeds, roots, stones larger than 3 inches in diameter, and other materials that would interfere with planting and maintenance operations. Unusable material shall be removed and properly disposed of.

3.2 EXCAVATION

3.2.1 General

Excavation shall consist of removal of every type of material encountered within the limits of the project in preparing the foundations to the lines, grades, and elevations indicated on the drawings as specified herein, or as approved by the Contracting Officer. Excavation shall consist of removal of material for the inspection trenches, structures, and for ditches and swales, to the sections indicated on the drawings, or as approved by the Contracting Officer. Excavation also includes removal of objectionable materials; and obtaining required fill materials from borrow areas. Care shall be exercised by the Contractor not to excavate below the grades shown on the drawings, or as approved by the Contracting Officer. Grading shall be in conformity with the typical sections shown, and the tolerances specified in paragraph 3.12 GRADE TOLERANCES. Any excessive excavation, as determined by the Contracting Officer, due to the fault or negligence of the Contractor, shall be backfilled to grade with satisfactory, thoroughly compacted material to grades shown on the drawings. Corrective measures shall be done by and at the expense of the Contractor. During construction, excavation and fill procedures shall be performed in a manner and sequence that will provide proper drainage at all times and in accordance with EM 385-1-1 standards. Excavation areas shall be kept free from water during placement of pipe, concrete, earth fill, and backfill.

3.2.2 Disposition of Satisfactory Materials

Excavated materials which are suitable to construct the embankment or other fills shall be placed directly therein or stockpiled for future use within the limits of the work, as shown on the drawings, unless otherwise directed by the Contracting Officer.

3.2.3 Disposition of Unsatisfactory Materials

Materials encountered within the limits of the work which are unsatisfactory for use in the completed project shall be hauled off site and disposed of at an approved commercial disposal site or as directed by the Contracting Officer. Unsatisfactory materials shall be excavated below grade and replaced with satisfactory materials as directed by the Contracting Officer.

3.2.4 Excavation for Structures and Utilities

Excavation for structures and utilities shall be performed within the work limits shown on the drawings, or as modified by the Contracting Officer. *Excavation associated with the Railroad Closure Structure shall be done only after coordination and permission is obtained from Norfolk Southern Railroad and the Contracting Officer. The excavation shall be performed to the limits shown and to the planned foundation level shown on the drawings. Any unsatisfactory material encountered at the planned foundation level shall be removed to the level as directed by the Contracting Officer. The Contractor is required to maintain one track in operation at all times during the construction process and shall provide any necessary excavation support, staging requirements and bracing to maintain the one operational track.*

3.2.5 Drainage Ditches and Swales

Drainage ditches and swales and culvert outlet ditches and swales shall be

excavated accurately to the cross-sections, lines, grades, and elevations shown on the drawings. Care shall be taken not to excavate ditches and swales below grades specified on the drawings. Satisfactory material excavated from drainage ditches and swales shall be stockpiled as covered in subparagraph 3.2.2, unless otherwise directed by the Contracting Officer. Unsatisfactory materials excavated from drainage ditches and swales and any excess material shall be removed from the site as covered in in subparagraph 3.2.3, or as directed by the Contracting Officer. The Contractor shall maintain all drainage ditch and swale excavations free from detrimental quantities of leaves, brush, sticks, trash, and other debris until final acceptance of the work. Any fence removed for the ditch and swale excavation shall be replaced with similar construction.

3.2.6 Inspection Trench

An inspection trench will be installed for the total length of the levee as shown on the plans. This work shall be considered incidental. The inspection trench will be used to locate any undesirable underground features such as near surface pipes, buried debris, unsatisfactory foundation materials, etc. Any pipes, tiles, conduits, buried debris, or other unsatisfactory foundation materials encountered shall be removed from within the footprint of the levee or plugged as directed by the Contracting Officer. Excavation and backfilling of the inspection trench shall be performed in a continuous operation. The Contractor shall notify the Contracting Officer 48 hours prior to start of this work, so that the Contracting Officer's Representative may be present during excavation and backfilling work. During construction of the inspection trench, the Contractor shall immediately notify the Contracting Officer's Representative in the event that soil conditions encountered are significantly different from those shown in the boring logs. Of particular concern are open work gravels, whether or not they are water bearing, or other granular materials, located immediately beneath the proposed levee fill, especially in the area of Optimist Lake. The Contractor shall not place impervious levee fill in these areas without the expressed approval of the Contracting Officer's Representative.

3.2.6.1 Inspection Trench Type

The trenches shall be excavated to the dimensions indicated below unless otherwise indicated on the drawings. The slit inspection trench shall be a minimum of 1.5 feet wide and 6 feet deep. If a slit trench cannot be maintained stable due to soil conditions, the trench shall be expanded to permit inspection by the Contracting Officer's Representative.

3.2.6.2 Inspection Trench Backfill

After inspection by the Contracting Officer's Representative and upon authorization, the inspection trench may be backfilled. Backfilling shall be completed at least 200 feet in advance of the embankment construction. The excavated material may be used to backfill the trench if it is considered to be satisfactory under subparagraph 1.3.1 and does not include granular material. All inspection trench backfill shall be compacted to a density comparable to that of the surrounding soil. Unsatisfactory material as defined in subparagraph 1.3.2 shall be removed and replaced with impervious levee material as defined in subparagraph 1.3.3 when so directed by the Contracting Officer.

3.2.7 Utilization of Excavated Materials

All unsatisfactory materials removed during excavation shall be disposed of by the Contractor in an approved commercial disposal site. No satisfactory excavated materials shall be wasted without specific written authorization. Satisfactory materials may be stockpiled in the staging areas until the material is incorporated into the completed work. Upon completion of the work, all excess excavated materials shall be removed from the project and properly disposed. No excavated materials shall be disposed in such a manner as to obstruct the flow of any stream, or be detrimental to the completed work in any way.

3.3 SELECTION OF BORROW MATERIAL

Borrow material shall be satisfactory material, as defined in paragraph 1.3.1, selected to meet the requirements and conditions for the particular fill for which it is to be used. Borrow material shall be obtained from a commercial borrow site or from Contractor-chosen borrow site. The Contractor shall bear all the expense of developing the borrow site. Contractor shall not bring 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 01 10 00.00 03 GENERAL PROVISIONS.

3.3.1 Borrow materials from 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 SECTION 01 10 00.00 03 GENERAL PROVISIONS. 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.

3.3.2 Environmental Testing of Borrow Materials

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 attached. If the values obtained by the analysis of one or more of the parameters set forth in Table 1 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.

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.

3.3.2.1 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 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 using SW-846 methodology. Total 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.

3.3.2.2 Environmental Soil Sampling Report for Contractor-chosen borrow source

After completing soil sampling and testing from any given borrow source, the Contractor shall prepare and submit an environmental soil sampling reportenvironmental 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.

3.4 EMBANKMENT/FILL FOUNDATION PREPARATION

3.4.1 Foundation Preparation

All foundation work shall be completed at least 200 feet in advance of the levee embankment construction.

3.4.2 Placement

Satisfactory materials shall be used in bringing fills and backfills to the lines and grades indicated and for replacing unsatisfactory materials. Backfilling shall not begin until construction below finish grade has been approved. Backfill shall be brought to the indicated finish grade. Backfill shall not be placed in wet or frozen areas. Each layer of fill and backfill shall be compacted to not less than the percentage of maximum density and moisture content specified. After excavation or stripping of the embankment/fill foundation, and excavation and backfilling of the inspection trench to the extent indicated on the drawings or otherwise required, cavities or depressions shall be broken down, where so directed, to flatten out the slopes. Immediately prior to the placement of embankment/fill material, the entire earth surface on or against which embankment/fill is to be placed, except areas which were occupied by roadways within the levee foundation, shall be thoroughly broken to a depth of 12 inches. Existing pavement and subbase within the levee foundation shall be removed from the embankment foundation. All areas shall be compacted to a minimum 95 percent maximum dry density ASTM D 698.

3.4.3 Fill Locations

If for any cause the foundation, or other surface that is to receive levee embankment/fill, is such that, in the opinion of the Contracting Officer, a plane of seepage or weakness might be induced, it shall again be thoroughly scarified before placing the material thereon. All scarifying and breaking of ground surface shall be done parallel to the centerline of the levee.

3.4.4 Foundation within the Levee Footprint

The foundation within the levee footprint shall be cleared of unsatisfactory material as defined in subparagraph 1.3.2. Ponded water greater than 12 inches deep shall be drained before placement of embankment/fill. The contractor will be permitted to use the displacement method described below to construct an earthen cofferdam to permit dewatering of the levee foundation, where feasible. This method will not be permitted in the Optimist Lake area. Where surficial granular fill is encountered within the levee footprint, the fill shall be removed from within the levee footprint and replaced with compacted impervious levee fill. Where highly plastic or soft soils are present near or at the

surface within the levee footprint, the material shall be removed and replaced with compacted impervious levee fill.

3.4.5 Fill Material

Where fill must be placed in standing water not greater than 12 inches deep, or where foundation conditions will not support equipment for placement of an 8 inch lift, the Contracting Officer may waive the maximum 8 inch loose lift thickness restriction for the first lift of the embankment/fill. These conditions may exist in areas inundated with ponded water, marshes, secondary river channels, or wetlands. When approved by the Contracting Officer, and where material must be placed in water, the levee shall be constructed by pushing the embankment/fill material ahead of the equipment so as to displace the water. Water must not be entrapped in or behind the embankment/fill material. Fill should be advanced with a V-shaped leading edge so that the center of the fill is most advanced, thereby displacing soft soil and/or water to both sides. In areas where placement is along an existing embankment, displacement of soft soil and/or water shall be away from the embankment. Fill shall be placed until it reaches an elevation 1.0 foot above water surface, or until a stable fill surface is obtained. The Contractor will have achieved a stable surface when the fill can be compacted to the extent that the top 8 inches meet the compaction requirements of subparagraph 3.7.1.3 "Compaction". To facilitate compaction, fill placed in standing water shall not exhibit water contents greater than two (2) percentage points above the optimum moisture content. Placement of fill in standing water shall be specifically addressed in the Plan of Operation.

3.4.6 Staged Construction

Borings indicate that portions of the foundation soils beneath the levee alignment between stations 5N 17+00 to 31+71 are soft. These soils may cause stability problems during or immediately after construction. To minimize the risk of levee failure in this area the Contractor shall build this portion of the levee using staged construction. The levee shall be constructed to half of the design height as shown on the drawings. This partial levee section will then be allowed to consolidate for a period of not less that 120 calendar days before the remaining levee fill is placed. The partial levee section will be constructed to its full width as shown on the drawings. Fill placed within the first half of the design height may be compacted at water contents up to +3 percent over optimum provided that the required density can be achieved and the material possesses a minimum shear strength of 450 psf.

3.4.7 Preload Embankment

Preload embankments have been specified to surcharge the soft foundation soils at the locations shown before the structure is constructed. Wick drains and a granular blanket will be installed, as specified in Section 33 46 26.19, before the fill for the preload embankment is placed. In addition, a settlement gage shall be installed beneath the preload embankment to monitor the foundation settlement. It is estimated that six (6) months will be required to surcharge the soft foundation soils with wick drains installed as shown. The surcharge period will be considered completed after the time-settlement curve based on the settlement gage readings indicates the primary consolidation of the foundation soils is essentially complete. However, the full surcharge shall be applied for a minimum of three (3) months, regardless of the observed settlement. The settlement data shall be submitted to the COR for review. Removal of the

preload embankment shall not be performed without authorization of the COR.

Approx. Location	Description	Anticipated Settlement
STA 5S 73+00	48" Gatewell (Tri-State)	4.4"
STA 6N 12+60	24" Culvert (6-3C)	5.3"
STA 6N 22+00	24" Culvert (6-5C)	7.5"
STA 6N 34+40	12" Culvert (6-7C)	7.6"

3.5 FROZEN GROUND

3.5.1 Fill Placement

No fill shall be placed upon natural ground or previously placed fill which is frozen or covered with snow or ice.

3.5.2 Fill Material Conditions

Under no circumstances shall frozen earth, snow, or ice be placed in the embankments/fills.

3.6 EMBANKMENT MATERIALS

The levee and preload embankments shall be constructed of earth material obtained from borrow areas as prescribed in paragraph 3.3 SELECTION OF BORROW MATERIAL, having the characteristics defined in subparagraph 1.3.3.

The granular blanket installed beneath the preload embankment shall be constructed of clean, natural granular material, and filter fabric. The material for the granular blanket shall be course aggregate, as described in Section 32 11 23.00 GRADED CRUSHED AGGREGATE BASE COURSE.

The filter fabric to be used for the preload embankment shall be as specified in Section 31 05 19.13 GEOTEXTILES USED AS FILTERS AND UNDERLAYS.

3.7 EMBANKMENT CONSTRUCTION

3.7.1 Compacted Impervious Levee Embankment

The compacted levee embankment shall be built to the grades and elevations shown on the drawings.

3.7.1.1 Equipment

A.) Compaction of cohesive soils shall be accomplished by sheepsfoot rollers. The Contractor has the option of using either self-propelled or tractor-drawn sheepsfoot rollers. The tractor drawn rollers shall consist of a heavy duty double drum unit with a drum diameter not less than 60 inches and an individual drum length of not less than 60 inches. The drums shall be water, or sand and water ballasted. Each drum shall have staggered feet uniformly spaced over the cylindrical surface such as to provide approximately three tamping feet for each two square feet of drum surface. The tamping feet shall be seven (7) to nine (9) inches in clear projection from the cylindrical surface of the roller and shall have a face area of not less than five (5) nor more than seven (7) square inches. The roller shall be equipped with cleaning fingers, so designed and attached as to prevent the accumulation of material between the tamping feet, and these cleaning fingers shall be maintained at their full length throughout the periods of use of the

roller. The weight of the roller shall not be less than 3500 pounds per foot of linear drum length weighted, and shall not be more than 2000 pounds per foot of drum length empty. The two drums comprising one roller unit shall be yoked such that they will oscillate when traversing uneven surfaces. The design and operation of the roller shall be subject to the approval of the Contracting Officer who shall have the right at any time during the prosecution of the work to direct such repairs to the tamping feet, minor alternations in the roller and variations in the weight as may be found necessary to secure optimum compaction of the earth fill materials. The Contractor may be required to add ballast to the roller to the maximum capacity specified by the manufacturer of the roller. The roller shall be operated at a speed not to exceed 3.5 miles per hour. If the roller is drawn by a rubber-tired tractor, the use of the rubber-tired tractor shall be discontinued if the tires leave ruts that prevent uniform compaction by the tamping roller.

B.) At the option of the Contractor, self-propelled sheepsfoot rollers may be used in lieu of tractor-drawn sheepsfoot rollers. Self-propelled rollers exceeding the empty weight requirement may be used provided that by the substitution of tamping feet having a face area not exceeding 14 square inches, the nominal foot pressure on the tamping feet of the self-propelled roller can be adjusted to approximate the nominal foot pressure of the towed roller for the particular working condition required for the towed rollers. For self-propelled rollers, in which steering is accomplished through use of rubber-tired wheels, the tire pressure shall not exceed 40 pounds per square inch. Self-propelled rollers shall be operated at a speed not to exceed 3.5 miles per hour. Hand compactors shall be used as directed by the Contracting Officer.

C.) The Contracting Officer may approve a specific sheepsfoot roller provided it does not deviate significantly from the preceding description, and can achieve the required compaction. Trucks, dozers, and other earth moving equipment shall not be used as substitutes for a sheepsfoot roller.

3.7.1.2 Placement

A.) The Contractor shall submit for approval to the Contracting Officer a written procedure with sketches of their placement and procedure prior to the start of embankment placement. This procedure shall be included in the Plan of Operations. The gradation and distribution of materials throughout the compacted embankment shall be such that the embankment will be free from lenses, pockets, streaks, and layers of material differing substantially in texture or gradation from surrounding material.

B.) After dumping, the materials shall be spread by bulldozers or other approved means over the embankment areas. Layers shall be started full out to the slope stakes; and shall be carried substantially horizontal with sufficient crown or slope to provide satisfactory drainage during construction. Unless otherwise directed, the thickness of impervious layers before compaction shall be not more than 8 inches. When in the opinion of the Contracting Officer, the surface of any compacted layer is too smooth to bond properly with the succeeding layer, it shall be scarified to the satisfaction of the Contracting Officer before the succeeding layer is placed thereon.

C.) During the dumping and spreading processes, the Contractor shall maintain at all times an adequate workforce to remove all stones greater than 3 inches in maximum dimension, roots, and debris from all embankment materials. Stones, roots, and debris removed from the embankment shall be removed from the site. Removal and disposal of such stone, roots and debris as specified herein will not be paid for separately; but all cost in connection therewith will be considered a subsidiary obligation of the Contractor and will be included in the applicable contract price. The entire surface of any section of the embankment under construction shall be maintained in such condition that construction equipment can travel on any part of any one section. Ruts in the surface layer shall be filled satisfactorily before compacting.

D.) After a layer of impervious embankment material has been dumped and spread, it shall be disked to break up and blend the embankment materials. Disking shall be performed with a heavy disk plow or other approved disk, to the full depth of the layer. If one pass of the disk does not accomplish the breaking up and blending of materials, additional passes of the disk may be required; but in no case will more than 3 passes of the disk on any one layer be required for this purpose.

3.7.1.3 Compaction

A.) Each lift of impervious embankment shall be compacted to a minimum of 95 percent maximum dry density (Standard Proctor Test) within plus or minus 2 percent of optimum moisture as determined by the moisture density relation ASTM D 698.

B.) If in the opinion of the Contracting Officer or Contracting Officer's Representative, the material is too dry for proper compaction, the Contractor will be required to pre-wet the material, or to uniformly distribute sufficient moisture in each layer before rolling to permit the desired compaction. Material that is too wet shall be spread on the embankment and permitted to dry, assisted by disking, if necessary.

3.7.1.4 Preload Embankment

The preload embankment shall be constructed in accordance with these specifications and as shown on the drawings. After the surcharge period is completed, but before the embankment fill is placed, the preload material, granular blanket and filter fabric shall be removed in its entirety.

3.7.1.5 Reading of Settlement Gages

Gage readings taken in conjunction with preloading activities shall be performed as follows. The Contractor shall read the settlement gage before placing fill, before and after the addition of each new section of riser pipe, and immediately upon completion of fill placement. After completion of fill placement, the Contractor shall take four (4) readings at weekly intervals. Thereafter, readings shall be taken monthly. The reading period shall continue until the settlement gage readings indicate that primary consolidation of the foundation material is substantially complete. The COR shall review the settlement data. When the settlement stops, the COR will direct the Contractor to stop taking the readings, and proceed with construction.

3.7.2 Dressing

The entire levee embankment, including topsoil where required, shall be brought to not less than the prescribed gross cross section at all points. The surface shall be finished to a smoothness suitable for the application of turfing materials. Vertical tracking on side slopes should be used to minimize erosion rate.

3.8 SPREADING TOPSOIL

Topsoil shall be distributed and spread uniformly on the levee to the average thickness of 6 inches unless shown otherwise on the plans. Topsoil shall be spread such that planting can proceed with little additional soil preparation or tillage. Surface irregularities resulting from topsoiling or other operations shall be leveled to prevent depressions. Compacted soil shall be slightly scarified or disced to assure bond.

3.9 ANNULAR BACKFILL

Annular backfill for culverts through the levee shall be placed as shown on the drawings.

3.10 STRUCTURAL BACKFILL

3.10.1 Structural Backfill Material

Structural backfill shall consist of refill around structures. In areas below existing grade where impervious fill is not indicated, the backfill may be any satisfactory material. Impervious fill shall be placed as shown on the drawings. Structural backfill shall not be placed around or adjacent to a structure until the structure is completed, or until a specified time interval has elapsed after completion.

3.10.2 Placement

Backfill shall be placed in 6-inch thick loose lifts and thoroughly compacted. Unless otherwise directed, the placing and compacting of all backfill material and the control of its moisture content shall conform to the applicable provisions of paragraphs 1.3, 1.6, 3.7.1.2, and 3.7.1.3. Heavy compaction equipment shall not be permitted to operate within three (3) feet of structures, conduit sides, or conduit tops. Within this restricted area, and other areas where rollers can not be used, the material shall be compacted by means of hand operated power tampers. Unless otherwise specified, the materials shall be placed and compacted to obtain 95 percent maximum dry density as determined by ASTM D 698.

3.11 CROSS SECTIONS

Unless otherwise specified, the dimensions and slopes shall conform to the applicable "Typical Sections" shown on the drawings.

3.12 GRADE TOLERANCES

All levee embankments shall be constructed to the lines, grades and cross-sections shown on the drawings. At all points a tolerance of plus five-tenth (5/10) of one foot above, and minus zero feet below the prescribed grade will be permitted in the final dressing, provided that any excess material is so distributed that the crown of the levee drains riverward; and that there are no abrupt humps or depressions in surfaces or

bulges in the width of the crown. However, this tolerance above grade may be modified at locations where, in the opinion of the Contracting Officer, such modifications will not impair the design or appearance of the structure. For topsoil, a tolerance of 1 inch above the thickness as shown on the drawings will be permitted. No tolerance will be allowed for the drainage ditchs and swales.

3.13 SLIDES

In the event a slide occurs on any part of the levee during construction or after its completion, but prior to its acceptance, the Contractor shall, upon written order of the Contracting Officer, cut out and remove the slide from the levee and then rebuild that portion of the levee in accordance with the applicable provisions of paragraphs 1.3, 1.6., 3.6, 3.7, and 3.10. If the slide is caused through fault of the Contractor, the foregoing operations shall be performed at no cost to the Government. If the slide is due to no fault of the Contractor, the yardage ordered removed will be paid for as specified in SECTION 01 22 00.00 10, and the yardage replaced will be paid for as specified in SECTION 01 22 00.00 10, in addition to any payment due to the Contractor for materials previously placed.

3.14 DITCHES AND DEPRESSIONS

All sloughs, old pits, ditches, or depressions beyond the limits of the levee foundation within the permanent rights-of-way, when required by the Contracting Officer, shall be filled to the natural surface of the ground with approved satisfactory material. The material for the fill shall be placed in layers or lifts not to exceed 12 inches in thickness. The only compaction required will be that obtained by the necessary spreading and dumping operations, except that the equipment shall be so operated that the tracks are distributed evenly over the surface of each lift.

3.15 EXCAVATION, EMBANKMENT, AND PREPARATION OF SUBGRADE FOR ROADWAYS

3.15.1 Subgrade Preparation

Subgrade shall be shaped to lines, grades, and cross-sections shown on the drawings; and the top 12 inches compacted to a minimum of 95 percent maximum dry density ASTM D 698. This operation shall include plowing, discing, and any moistening or aerating required to obtain specified compaction. Unsatisfactory material shall be removed and replaced with approved satisfactory material as directed by the Contracting Officer. Low areas resulting from removal of unsatisfactory material shall be brought up to required grade with approved satisfactory materials; and the entire subgrade shall be shaped to lines, grades, elevations, and cross-sections shown on the drawings, and compacted as specified. The elevation of the finished subgrade shall not vary more than 0.10 foot from the established grade and cross-section. Subgrade shall be tested according to paragraph 1.8.2.

3.15.2 Embankment

3.15.2.1 Earth Embankment

Earth embankments shall be constructed in accordance with applicable provisions in paragraphs 3.4 through 3.14 of this specification. If conditions warrant, special fill materials may be used in the embankment. However, a core of impervious levee embankment material of the same cross sectional configuration as the levee must continue through the line of

protection.

3.15.2.2 Compaction

Compaction for clayey soils shall be accomplished by sheepsfoot rollers, as described in subparagraph 3.7.1.3. Compaction of any granular fill shall be accomplished by vibratory rollers, as described in paragraph 3.5, BACKFILLING, in Section 33 40 00.00 STORM-DRAINAGE SYSTEM. Measured compaction shall meet the 95 percent of maximum dry density (Standard Proctor test) as specified in subparagraph 1.3.5. Compaction shall be tested according to paragraph 1.8.

3.15.3 Shoulder Construction

Shoulders shall be constructed of satisfactory or borrow materials, or as otherwise shown or specified herein. Shoulders shall be constructed as soon as possible after adjacent paving is completed. Compaction shall be accomplished by sheepsfoot rollers. Shoulder construction shall be done in proper sequence in such a manner that adjacent ditches will be drained effectively; and that no damage of any kind is done to the adjacent completed pavement. The completed shoulders shall be true to alignment and grade, and shaped to drain in conformity with the cross-sections shown on the drawings.

3.15.4 Finishing

The surface of all roadway excavations, embankments, and subgrades shall be finished to a smooth and compact surface in accordance with the lines, grades, cross-sections, and elevations shown on the drawings. The degree of finish for all graded areas shall be within 0.1 foot of the grades and elevations indicated. Ditches and swales 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.

3.15.5 Subgrade and Embankment Protection

During construction, embankments and excavations shall be kept shaped and drained. Ditches and drains along subgrade shall be maintained in such a manner as to drain effectively at all times. The finished subgrade shall not be disturbed by traffic or other operations; and shall be protected and maintained by the Contractor in a satisfactory condition until subbase, base, and pavement are placed. The storage or stockpiling of materials on finished subgrade will not be permitted. No subbase, base course ballast, and or pavement shall be laid until the subgrade has been checked and approved. In no case shall subbase, base, surfacing, or pavement be placed on a muddy, spongy, or frozen subgrade.

3.15.6 Roads

At locations where access roads to fields or buildings are destroyed because of the work required under this contract, the Contractor shall provide temporary roads, if directed by the Contracting Officer, to give access to fields and buildings during the construction period. Such facilities shall be removed after construction is complete, and replaced with permanent access roads to the extent required by the Contracting Officer.

3.15.7 Ramps

Road ramps and crossings shall be constructed at the locations shown on the drawings by placement of compacted impervious fill as specified in paragraph 3.7 EMBANKMENT CONSTRUCTION.

3.16 QUALITY CONTROL

3.16.1 Quality Control System

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:

(1) Foundation materials;
(2) Foundation preparation;
(3) Layer thickness;
(4) Moisture control;
(5) Compaction;
(6) Lines, grades, and tolerances; and
(7) Test results.

3.16.2 Records

A copy of the records of inspections 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 01 45 04.00 03, CONTRACTOR QUALITY CONTROL.

3.17 Railroad Ballast and Trackwork

3.17.1 General

All ballast shall be placed in accordance to project plans, using standard railroad construction practices and equipment. Changes or substitutions must be approved in advance of installation by the Contractor. Ballast that is contaminated by foreign material during stockpiling or construction shall not be used in track construction. Contaminated material shall be removed prior to tamping. Ballast that becomes segregated by field stockpiling will be reblended to specification prior to use in track construction. Ballast section depth, width, and slope shall conform to typical section(s) shown on the plans. The Contractor will be required to add or remove ballast from the track section if deemed necessary by the Contracting Officer.

Damage to completed ballast layers/section caused by the Contractor during subsequent operations shall be repaired by the Contractor at his expense prior to acceptance of work by the Government. This shall include, but is not limited to, rutting, inter-mixing of foreign materials, or disturbance of finished shoulders.

Any Contractor furnished material which is placed and then subsequently determined through material testing to not be in compliance with the Specifications shall be removed as directed the Contracting Officer at no cost to the Government.

3.17.2 Placement of Backfill Material

In a fill section, after stripping topsoil and organic material, the entire area where the embankment is to be constructed shall be plowed and scarified for a minimum depth of 6 inches. This surface and all future fill layers shall be compacted to 95 percent of maximum density per Standard Proctor in accordance ASTM D 698 or 90 percent of maximum density per Modified Proctor in accordance with ASTM D 1557, except that a minimum of the top 2 feet of fill shall be compacted to 100 percent Standard Proctor. The top 12 inches of the subgrade in cuts shall be plowed, scarified and compacted to 100 percent Standard Proctor. The Contracting Officer shall determine the ASTM test method to be used after review of the soil analysis.

The Contractor shall notify the Contracting Officer when fill layers are ready for compaction testing. Successive layers shall not be placed prior to compaction testing. The Contractor shall not make any claims for delay to work due to compaction testing.

Field testing for density control for fill and subgrade materials shall be made in accordance with the requirements of ASTM D 1556 and ASTM D 2922 using a portable nuclear density testing device with field test locations selected by the Contracting Officer. All soil tests shall be performed at the expense of the Contractor. Testing shall not relieve the Contractor of the responsibility for ensuring that the work is done in accordance with these Specifications.

Contractor may increase the depths of successive fill layers beyond the depths specified if tests, performed at his expense, determine that the required densities can be obtained for the increased layer's depths.

Moisture content of soil shall be controlled as necessary to obtain the specified densities based upon the optimum moisture content for each material. Water shall be added to the soil when, in the opinion of the Contracting Officer, additional moisture may be necessary to obtain the specified density. Soil that is too wet shall be allowed to dry or be worked by plowing, disking, harrowing, or other means to dry the material to a workable moisture content.

In the event a specified density is not obtained, the Contracting Officer may order additional rolling, watering, or drying of the soil as necessary to obtain the specified density. Fill layers not meeting a specified density after additional working shall be removed and new material shall be placed and compacted to the specified density at no cost to the Government.

The lower part of fills constructed across inundated areas shall be built by dumping successive loads of rock in layers no thicker than necessary to support the hauling equipment. Succeeding layers shall be constructed as specified herein.

Rutted areas shall be immediately excavated of unstable material and replaced with rock or suitable earth fill and compacted to prevent additional rutting.

3.17.3 Trackwork

The existing track and ties shall be removed to the nearest existing rail splice and reinstalled. No track shall be laid until the roadbed (subgrade and subballast) is completed and approved by the Contracting Officer. All track work shall be performed by a Contractor found acceptable and approved

to work on Norfolk-Southern Railroad projects.

The Contractor shall construct, ballast, line and surface the track to the required grade and alignment. The Contractor shall be responsible for the track until the track is accepted by the Contracting Officer.

3.17.3.1 Crossties

Crosstie installation shall conform to the following:

1. Crossties shall be spaced 20 inches center to center, and laid at right angles to the track centerline with the end measuring 1 foot 10-3/4 inches from the end of the tie to the gauge line of the rail.

2. The bearing surfaces of the crossties shall be clean before tie plate and rail installation.

3.17.3.2 Tie Plate

Tie plate installation shall conform to the following:

1. All crossties shall be fully tie plated before the rail is laid.

2. The bottom of the tie plates shall be cleaned before the plate is applied.

3. Tie plates shall be applied with the 1:40 cant down towards the center of track.

4. The tie plate shall be spiked to gauge, not greater than every third crosstie, and shall be set so that the outside shoulder of the tie plate shall bear squarely against the base of the rail, having a full bearing for the rail and, at the same time, a full bearing on the crosstie.

3.17.3.3 Continuous Welded Rail

Continuous welded rail installation shall conform to the following:

1. Installation of the continuous welded rail shall be done with off track equipment so as to not interfere with the operation of main line traffic.

2. Although the Railroad shall endeavor to unload the rail in the approximate final location, it shall be the duty of the Contractor to position the rail in its final location which may require moving the welded rail strands.

3. The following rail temperature criteria shall apply:

a. Prior to laying continuous welded rail, the Contractor shall determine and record the maximum and minimum rail temperatures in the area, as laying procedures are dependent on the total range of temperatures to be experienced by the rail.

b. Although it is a recommended practice to lay continuous welded rail when the temperature is within plus or minus 10°F. of the regional mean temperature, the Contractor shall consult with the Contracting Officer and Norfolk-Southern Railroad to establish

the desired laying temperature.

c. When it is not possible to lay the rail at the desired laying temperature, the Contractor shall record the temperature of each rail laid and make the necessary adjustments at a later date. All adjustments shall be as instructed by the Contracting Officer.

d. The Contractor shall be required to keep an accurate record of rail temperatures taken three times daily (morning, noon and afternoon). Rail temperature report chart shall be furnished to the Contractor by the Railroad.

4. If relay continuous welded rail is laid, the rail shall be laid so that the least worn side of the head of the rail is on the gauge side.

5. Continuous welded rail shall be handled in such a manner as to prevent bending and damaging the rail. Any rail damaged by the Contractor, due to mishandling, shall be replaced at the Contractor's expense.

6. The bottom of the rail shall be cleaned before the rail is laid.

7. Strands of continuous welded rail shall be connected by 36 inch joint bars and bolts as directed by the Contracting Officer. In some cases only the outside holes will be drilled for later thermit welding. Continuous welded rail shall be laid without expansion gaps at the joints.

8. Joints are not allowed in continuous welded rail on or within 234 feet of open deck bridges except those associated with expansion joints.

9. The Contractor shall not be required to field weld joints.

10. Flame cutting of rails or burning of bolt holes with a torch shall be prohibited. Rails shall be cut with a rail saw only. Bolt holes shall be drilled with a rail drill only. Any Railroad or Industry owned rail which is flame cut by the Contractor shall be replaced by the Contractor at his expense.

3.17.3.4 Joint Bar

Joint bar installation shall conform to the following:

1. Joint bars shall be clean of any foreign material, except metal preservative, and properly installed with the full number of and correct size of bolts, nuts and spring washers.

2. Before placing joint bars, the bearing surfaces of the bars as well as the rail ends within the joint bar area shall be free of any foreign material except metal preservative.

3. Bolts placed with nuts alternately on inside and outside of rail shall be drawn tight before spiking.

4. Where possible, all joints shall be kept out of road crossings.

5. Before acceptance of work, all bolts shall be checked by the Contractor and, if necessary, tightened.

3.17.3.5 Final Gauging

Final gauging shall conform to the following:

1. Necessary final gauging shall be done after the rail is laid and jointed.

2. Before spikes are driven, crossties shall be evenly spaced and square to the rail. Tie plates shall be centered on the tie and provide full bearing.

3. When spiking, care shall be exercised not to spike the rail.

4. The final gauge shall be 56-1/2 inches.

5. Track shall be gauged as spikes are driven home.

6. Any crossties that do not fully bear on the subballast shall be nipped up while spiking.

7. When constructing skeleton track, final gauging and anchor spiking shall not be performed until after the track is lined to final alignment.

3.17.3.6 Anchor and Double Spiking

Anchor and double spiking shall conform to the following:

1. Track curvature shall be spiked as shown on the plans.

2. Drive screw spikes shall be used for anchor spiking of curves if specified on the plans.

3. When driving spikes in secondhand crossties, tie plugs shall be placed in all holes before driving spikes.

4. All spikes shall be started and driven perpendicular to the crosstie and square with the rail and so driven that the head of the spike shall have a full hold on the base of rail or the tie plate when anchor spiking.

5. Spikes shall not be overdriven so that the lip of the spike head bends upward.

6. No spikes shall be driven at the ends of joint bars.

7. The Contractor shall remove any overdriven spikes or spikes that are bent while driving. Tie plugs shall be placed and then spikes properly driven.

8. Relay spikes shall be used for all anchor spiking of tie plates. The Contractor shall straighten all relay spikes before use.

3.17.3.7 Rail Installation

Rail anchor installation shall conform to the following:

1. For continuous welded rail box anchor as follows:

a. Every other crosstie on tangent track and curves less than 3 degrees.

b. Every crosstie on curves 3degrees or greater.

c. Every crosstie 234 feet on each side of a joint.

3.17.3.8 Ballasting

Ballasting shall conform to the following:

1. The Contractor shall supply ballast. Contractor shall unload the ballast promptly upon delivery to the job site.

2. Contractor shall be responsible for unloading, hauling, transferring, spreading, tamping and dressing ballast.

3. Ballast shall be uniformly distributed as it is unloaded by the contractor after anchoring of the track has been completed.

4. The depth of preliminary ballast for surfacing shall not be more than 4 inches between the bottom of crossties and the top of subballast. Each successive raise shall not exceed 4 inches.

5. Care shall be taken to avoid disturbing or destroying any centerline or top of rail stakes.

6. The Contractor shall dress ballast to conform to typical roadbed sections as shown on the plans.

3.17.3.9 Surfacing

Surfacing shall conform to the following:

1. A preliminary surfacing shall follow each unloading of ballast.

2. The Contractor shall thoroughly tamp (surface) track with an on-track power (mechanical) tamper.

3. If jacks are used they must be placed close enough together to prevent undue bending of rails or strains at joints.

4. Both rails must be raised at one time as uniformly as possible.

5. The track shall not be raised more than 4 inches in one lift and ballast shall be well tamped under each crosstie before the next lift is made.

6. All crossties that are pulled loose shall be restored to proper position and fully nipped and spiked before tamping.

7. The Contractor shall raise the track to the final profile grades with the necessary additional ballast mechanically tamped under the crossties.

8. Ballast shall be well tamped from a point 15 inches inside of each rail, on both sides and under the crosstie, to the end of the crosstie.

3.17.3.10 Alignment

The alignment for the track shall not deviate from uniformity more than 1/8 inch at the midoffset in any 62 foot line on tangent track or more than 1/8 inch mid-offset in any 62 foot chord on curved track.

Track surface may not deviate from uniformity more than the following:

1. The deviation from design profile on any rail at the mid-ordinate of a 62 foot chord may not be more than 1/8 inch. Cross level must be maintained.

2. Curved track shall be superelevated as shown by the plans. Deviation from superelevation on spirals may not be more than 1/8 inch.

Upon completion of the final surfacing and lining of the track, the Contractor shall trim the ballast as shown on the plans, and dispose of any surplus ballast as directed by the Contracting Officer. The completed ballast section shall have all tie cribs filled, and crossties, tie plates and rails shall be swept clean.

-- End of Section --

Table 1: Indiana - Compound	CAS Number	Total Concentration (mg/kg)
Acenaphthene	83-32-9	130
Acenaphthylene	208-96-8	18
Acetochlor	34256-82-1	8.1
Acetone (2-Propanone)	67-64-1	28
Acrolein	107-02-8	0.00027
Aldrin	309-00-2	0.25
Anthracene	120-12-7	51
Antimony and compounds	7440-36-0	5.4
Arsenic	7440-38-2	13.0
Atrazine	1912-24-9	0.048
Barium	7440-39-3	1600
Benzene	71-43-2	0.034
Benzo(a)anthracene	56-55-3	5
Benzo(a)pyrene	50-32-8	0.5
Benzo(b)fluoranthene	205-99-2	5
Benzo(k)fluoranthene	207-08-9	39
Benzoic acid	65-85-0	590
Benzyl Alcohol	100-51-6	48
Beryllium	7440-41-7	63
Bis(2-chloro-1-methylethyl) ether	108-60-1	0.027
Bis(2-Chloroethyl)ether	111-44-4	0.0007
Bis(2-chloroisopropyl)ether	39638-32-9	0.027
Bis(2-ethylhexyl)phthalate	117-81-7	300
Bromodichloromethane	75-27-4	0.51
Bromoform(tribromomethane)	75-25-2	0.6
n-Butanol	71-36-3	16
Butylbenzylphthalate	85-68-7	310
Cadmium	7440-43-9	7.5
Carbazole	86-74-8	5.9
Carbon disulfide	75-15-0	10
Carbon tetrachloride	56-23-5	0.066
Chlordane	12789-03-6	9.6
p-Chloroaniline	106-47-8	0.97
Chlorobenzene	108-90-7	1.3
Chloroethane	75-00-3	0.65
Chloroform	67-66-3	0.47
2-Chloronapthalene	91-58-7	42
2-Chlorophenol	95-57-8	0.75
Chromium	16065-83-1	10000
Chromium VI	18540-29-9	38
Chrysene	218-01-9	25
Copper	7440-50-8	920
Cyanide, Free	57-12-5	0.94
Cyclohexane	110-82-7	69
DDD	72-54-8	28
DDE	72-55-9	20
DDT	50-29-3	20
Dibenzo(a,h)anthracene	53-70-3	0.5
Dibenzofuran	132-64-9	4.9
1,2-Dibromoethane	106-93-4	0.00034
Dibutyl phthalate	84-74-2	760
1,2-Dichlorobenzene	95-50-1	17

Table 1: Indiana - Compound, continued	CAS Number	Total Concentration (mg/kg)
1,3-Dichlorobenzene	541-73-1	2.3
1,4-Dichlorobenzene	106-46-7	2.2
3,3-Dichlorobenzidine	91-94-1	0.062
1,1-Dichloroethane	75-34-3	5.6
1,2-Dichloroethane	107-06-2	0.024
1,1-Dichloroethylene	75-35-4	0.058
cis-1,2-Dichloroethylene	156-59-2	0.4
trans-1,2-Dichloroethylene	156-60-5	0.68
2,4-Dichlorophenol	120-83-2	1.1
2,4-Dichlorophenoxyacetic acid (2,4-D)	94-75-7	0.35
1,2-Dichloropropane	78-87-5	0.03
1,3-Dichloropropene	542-75-6	0.04
Dieldrin	60-57-1	0.046
Diethylphthalate	84-66-2	450
N,N Dimethylformamide	68-12-2	15
2,4-Dimethylphenol	105-67-9	9
Dimethylphthalate	131-11-3	1100
2,4-Dinitrophenol	51-28-5	0.29
Dinitrotoluene mixture	25321-14-6	0.0091
Di-n-octyl phthalate	117-84-0	2000
Endosulfan	115-29-7	20
Endrin	72-20-8	0.99
Ethyl acetate	141-78-6	44
Ethylbenzene	100-41-4	13
Fluoranthene	206-44-0	880
Fluorene	86-73-7	170
alpha-HCH(alpha-BHC)	319-84-6	0.0072
beta-HCH(beta-BHC)	319-85-7	0.026
gamma-HCH(Lindane)	58-89-9	0.0094
Heptachlor	76-44-8	0.93
Heptachlor epoxide	1024-57-3	0.47
Hexachloro-1,3-butadiene	87-68-3	24
Hexachlorobenzene	118-74-1	2.2
Hexachlorocyclopentadiene	77-47-4	400
Hexachloroethane	67-72-1	2.8
n-Hexane	110-54-3	100
Indeno(1,2,3-cd)pyrene	193-39-5	3.1
Isophorone	78-59-1	5.3
Isopropylbenzene (Cumene)	98-82-8	11
Lead	7439-92-1	81
Mercury	7487-94-7	2.1
Methoxychlor	72-43-5	160
Methyl bromide (bromomethane)	74-83-9	0.052
Methyl ethyl ketone (MEK)	78-93-3	35
Methyl tertiary butyl ether (MTBE)	1634-04–4	0.18
4-Methyl-2-pentanone (MIBK)	108-10-1	20
Methylene chloride	75-09-2	0.023
2-Methylnaphthalene	91-57-6	3.1
3-Methylphenol (m-cresol)	108-39-4	9.8
4-Methylphenol (p-cresol)	106-44-5	1.1
2-Methylphenol(o-cresol)	95-48-7	14
Metolachlor	51218-45-2	86

Table 1: Indiana - Compound, continued	CAS Number	Total Concentration (mg/kg)
Naphthalene	91-20-3	0.7
Nickel, soluble salts	various	950
2-Nitroaniline	88-74-4	0.67
Nitrobenzene	98-95-3	0.028
N-Nitrosodi-n-propylamine	621-64-7	0.0006
N-Nitrosodiphenylamine	86-30-6	9.7
PCBs (polychlorinated biphenyls)	1336-36-3	1.8
Pentachlorophenol	87-86-5	0.028
Phenanthrene	85-01-8	13
Phenol	108-95-2	56
n-Propylbenzene	103-65-1	36
Pyrene	129-00-0	570
Selenium	7782-49-2	5.2
Silver	7440-22-4	31
Styrene	100-42-5	3.5
1,1,1,2-Tetrachloroethane	630-20-6	0.053
1,1,2,2-Tetrachloroethane	79-34-5	0.007
Tetrachloroethylene (PCE)	127-18-4	0.058
Thallium	7440-28-0	2.8
Toluene	108-88-3	12
Toxaphene	8001-35-2	3.9
1,2,4-Trichlorobenzene	120-82-1	5.3
1,1,1-Trichloroethane	71-55-6	1.9
1,1,2-Trichloroethane	79-00-5	0.03
Trichloroethylene (TCE)	79-01-6	0.057
2,4,5-Trichlorophenol	95-95-4	250
2,4,6-Trichlorophenol	88-06-2	0.07
2,4,5-Trichlorophenoxyacetic acid (2,4,5-T)	93-76-5	2.2
1,2,4-Trimethylbenzene	95-63-6	2.5
1,3,5-Trimethylbenzene	108-67-8	0.61
Vinyl acetate	108-05-4	2.3
Vinyl chloride (chloroethene)	75-01-4	0.013
Xylene (total)	1330-20-7	170
Zinc	7440-66-6	10000

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GEOTEXTILES USED AS FILTERS AND UNDERLAYS

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.

ASTM INTERNATIONAL (ASTM)

ASTM D 4354	(1999) Sampling of Geosynthetics for Testing
ASTM D 4355	(2002) Deterioration of Geotextiles from Exposure to Light, Moisture and Heat in a Xenon-Arc Type Apparatus
ASTM D 4491	(1999; R 2004) Water Permeability of Geotextiles by Permittivity
ASTM D 4533	(1991; R 1996) Trapezoid Tearing Strength of Geotextiles
ASTM D 4632	(1991; R 2003) Grab Breaking Load and Elongation of Geotextiles
ASTM D 4751	(2005) Determining Apparent Opening Size of a Geotextile
ASTM D 4759	(2002) Determining the Specification Conformance of Geosynthetics
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

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. The following shall be submitted in accordance with Section 01 33 00SUBMITTAL PROCEDURES:

SD-04 Samples

Geotextile

If requested, submit geotextile samples for testing to determine compliance with the requirements in this specification. When

required, submit samples a minimum of 60 days prior to the beginning of installation of the same textile. Upon delivery of the geotextile, submit duplicate copies of the written certificate of compliance signed by a legally authorized official of the manufacturer. The certificate shall state that the geotextile shipped to the site meets the chemical requirements and exceeds the minimum average roll value listed in TABLE 1, MINIMUM PHYSICAL REQUIREMENTS FOR DRAINAGE GEOTEXTILE. Upon request, supply quality control and quality assurance tests for the geotextile. 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. For needle punched geotextile, the manufacturer shall certify that the geotextile has been inspected using permanent on-line metal detectors and does not contain any needles.

SD-07 Certificates

Geotextile

A minimum of 7 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.

1.3 DELIVERY, STORAGE AND HANDLING

Only approved geotextile rolls shall be delivered to the project site. All geotextile shall be labeled, shipped, stored, and handled in accordance with ASTM D 4873. No hooks, tongs, or other sharp instruments shall be used for handling geotextile.

1.3.1 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.

1.3.2 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.

1.3.3 Handling

Geotextile rolls shall be handled and unloaded with load carrying straps, a fork lift with a stinger bar, or an axial bar assembly. Rolls shall not be dragged along the ground, lifted by one end, or dropped to the ground.

PART 2 PRODUCTS

2.1 RAW MATERIALS

2.1.1 Geotextile

Geotextile shall be a nonwoven pervious sheet of polymeric material and shall consist of long-chain synthetic polymers composed of at least 95 percent by weight polyolefins, polyesters, or polyamides. The use of woven slit film geotextiles (i.e. geotextiles made from yarns of a flat, tape-like character) will not be allowed. Stabilizers and/or inhibitors shall be added to the base polymer, as needed, to make the filaments resistant to deterioration by ultraviolet light, oxidation, and heat exposure. Regrind material, which consists of edge trimmings and other scraps that have never reached the consumer, may be used to produce the geotextile. Post-consumer recycled material shall not be used. Geotextile shall be formed into a network such that the filaments or yarns retain dimensional stability relative to each other, including the edges. Geotextiles shall meet or exceed the requirements specified in Table 1. Where applicable, Table 1 property values represent minimum average roll values (MARV) in the weakest principal direction. Values for AOS represent maximum average roll values.

TABLE 1
MINIMUM PHYSICAL REQUIREMENTS FOR DRAINAGE GEOTEXTILE

PROPERTY	UNITS	ACCEPTABLE VALUES	TEST METHOD
GRAB STRENGTH	LBS	200	ASTM D 4632
SEAM STRENGTH	LBS	N/A	ASTM D 4632
PUNCTURE	LBS	80	ASTM D 4833
TRAPEZOID TEAR	LBS	55	ASTM D 4533
APPARENT OPENING SIZE	U.S. SIEVE	50	ASTM D 4751
PERMITTIVITY	SEC -1	1.2	ASTM D 4491
ULTRAVIOLET DEGRADATION	PERCENT	50 AT 500 HRS	ASTM D 4355

2.1.2 Seams

The seams of the geotextile shall be overlapped.

2.1.3 Securing Pins

The geotextile may be secured to the embankment or foundation soil by pins to prevent movement prior to placement of revetment materials. Other appropriate means to prevent movement such as staples, sand bags, and stone could also be used. Securing pins shall be inserted through both strips of overlapped geotextile along the line passing through midpoints of the overlap. Securing pins shall be removed as placement of revetment materials are placed to prevent tearing of geotextile or enlarging holes maximum spacing between securing pins depends on the steepness of the embankment slope. The maximum pins spacing shall be equal to or less than the values listed in TABLE 2, MAXIMUM SPACING FOR SECURING PINS. When windy conditions prevail at the construction site, the number of pins should be increased upon the demand of the Contracting Officer. Terminal ends of the geotextile shall be anchored with key trench or apron at crest, toe of the slope and upstream and downstream limits of installation.

TABLE 2
MAXIMUM SPACING FOR SECURING PINS

EMBANKMENT	SPACING, feet
STEEPER THAN 1V ON 3H	2
1V ON 3H TO 1V ON 4H	3
FLATTER THAN 1V ON 4H	5

2.2 MANUFACTURING QUALITY CONTROL SAMPLING AND TESTING

The Manufacturer shall be responsible for establishing and maintaining a quality control program to assure compliance with the requirements of the specification. Documentation describing the quality control program shall be made available upon request. Manufacturing quality control sampling and testing shall be performed in accordance with the manufacturer's approved quality control manual. As a minimum, geotextiles shall be randomly sampled for testing in accordance with ASTM D 4354, Procedure A. Acceptance of geotextile shall be in accordance with ASTM D 4759. Tests not meeting the specified requirements shall result in the rejection of applicable rolls.

2.3 QUALITY ASSURANCE SAMPLES AND TESTS

2.3.1 Quality Assurance Samples

The Contractor shall provide assistance to the Contracting Officer in the collection of quality assurance samples. Samples shall be collected upon delivery to the site for quality assurance testing at the request of the Contracting Officer at a frequency of one per 100,000 square feet. Samples shall be identified with a waterproof marker by manufacturer's name, product identification, lot number, roll number, and machine direction. The date and a unique sample number shall also be noted on the sample. The outer layer of the geotextile roll shall be discarded prior to sampling a roll. Samples shall then be collected by cutting the full-width of the geotextile sheet a minimum of 3 feet long in the machine direction. Rolls which are sampled shall be immediately resealed in their protective covering.

2.3.2 Quality Assurance Tests

The Contractor shall provide quality assurance samples to an Independent Laboratory. Samples will be tested to verify that geotextile meets the requirements specified in Table 1. Test method ASTM D 4355 shall not be performed on the collected samples. Geotextile product acceptance shall be based on ASTM D 4759. Tests not meeting the specified requirements shall result in the rejection of applicable rolls.

PART 3 EXECUTION

3.1 SURFACE PREPARATION

Surface on which the geotextile will be placed shall be prepared to a relatively smooth surface condition, in accordance with the applicable portion of this specification and shall be free from obstruction, debris, depressions, erosion feature, or vegetation. Any irregularities will be removed so as to insure continuous, intimate contact of the geotextile with all the surface. Any loose material, soft or low density pockets of material, will be removed; erosion features such as rills, gullies, etc. must be graded out of the surface before geotextile placement.

3.2 INSTALLATION OF THE GEOTEXTILE

The geotextile shall be placed at the locations shown. It shall be laid flat and smooth so that it is in direct contact with the subgrade. The geotextile shall also be free of tensile stresses, folds, and wrinkles. 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.

3.3 SEAMS

3.3.1 Overlap Seams

Geotextile panels shall be continuously overlapped a minimum of 12 inches at all longitudinal and transverse joints. Where seams must be oriented across the slope, the upper panel shall be lapped over the lower panel. If approved, sewn seams may be used instead of overlapped seams.

3.4 PROTECTION

The geotextile shall be protected during installation from clogging, tears, and other damage. Damaged geotextile shall be repaired or replaced as directed. Adequate ballast (e.g. sand bags) shall be used to prevent uplift by wind. The geotextile shall not be left uncovered for more than 14 days after installation.

3.5 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

3.6 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. Cover soil material type, compaction, and testing requirements are described in Section 31 00 00 EARTHWORK. Equipment placing cover soil shall not stop abruptly, make sharp turns, spin their wheels, or travel at speeds exceeding 5 mph.

-- End of Section --

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SECTION 31 11 00

CLEARING AND GRUBBING

PART 1 GENERAL

1.1 SCOPE

Work covered by this section consists of furnishing all labor, equipment, and materials; and performing all operations in connection with clearing, grubbing and disposing of all materials and debris as described. The area to be cleared and grubbed is shown on the drawings and described in this section.

1.2 ENVIRONMENTAL PROTECTION

All work and Contractor operations shall comply with the requirements of Section 01 57 20.02 10, ENVIRONMENTAL PROTECTION.

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 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Disposal Agreement; G, C-C

Permission to dispose of such products of beneficial use as covered in the Clearing and Grubbing paragraphs on private property shall be in writing; and the permit shall be approved and filed with the Contracting Officer, prior to commencement of work.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 CLEARING

Clearing shall consist of the removal of brush and other vegetation; the felling, trimming, and cutting of trees into sections; and the satisfactory disposal of trees and other vegetation designated for removal, including down timber, snags, brush, and rubbish occurring in the areas to be cleared. Clearing operations shall also consist of the complete removal, and disposal of all obstructions above the ground surface that obtrude, encroach upon, or otherwise obstruct the work.

3.2 GRUBBING

Grubbing shall consist of the removal and disposal of stumps, roots larger than 3 inches in diameter, and matted roots 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 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.

3.2.1 Levees

All trees, stumps, down timber, snags, brush, vegetation, and stone shall be cleared within the work limits as shown on the drawings. In addition, abandoned structures such as fencing, existing drainage structures, and similar debris shall be cleared within the work limits as shown on the drawings. Trees, stumps, roots, brush, and other vegetation in areas to be cleared shall be cut off flush with or below the original ground surface, except such trees and vegetation as may be indicated or directed to be left standing.

3.2.2 Trees

Certain trees, as designated by the Contracting Officer, may be left standing. Protection of trees to be left standing is specified in paragraph 3.5 PROTECTION OF TREES. Trees shall be felled in such a manner as to avoid damage to trees left standing and existing structures, and with regard for the safety of employees and others. All felled trees shall be removed by the Contractor.

3.2.3 Vegetation

Vegetation to be removed shall consist of all heavy growth of grasses and weeds.

3.2.4 Borrow Areas

Clearing of borrow areas to the extent necessary to provide materials free from objectionable matter shall be performed by the Contractor. This may include removal of trees.

3.3 GRUBBING

Grubbing shall consist of the removal of all stumps, roots, buried logs, and other objectionable matter. Material indicated 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 ground surface level. Topsoil shall be removed in accordance with the applicable provisions of subparagraph entitled Topsoil in Section 31 00 00, EARTHWORK. Metallic debris recognizable as drums or partial drums that do not contain unknown (liquid or solid) materials should be disposed of properly. However, the area of the drum location should be surveyed for material that may have leaked from the drums. If there is an indication of soil contamination as indicated by discolored soil, presence of a free liquid, and odor, notify the Contracting Officer, so that appropriate actions can be taken. If the drums or partial drums contain unknown material, or if the area surrounding the drums appears to be contaminated, STOP WORK IMMEDIATELY IN THE VICINITY, and notify the Contracting Officer, so that appropriate actions can be taken.

3.3.1 Levee and Structures

The levee foundation areas and areas within the limits of all structures shall be thoroughly grubbed. All tap roots, lateral roots, or other projections over 1.5 inches in diameter within the levee foundation area shall be removed to a depth of 3 feet below the natural surface of the ground. A zone of 15 feet beyond any floodwall or levee on the landside and riverside shall be grubbed.

3.3.2 Optimist Lake-Southern Bank

The southern bank of Optimist Lake shall be thoroughly grubbed. All tap roots, lateral roots, or other projections over 1.5 inches in diameter shall be removed to a depth of 3 feet below the natural surface of the ground. The work shall be addressed in the Contractors, "ACCIDENT PREVENTION PLAN".

3.3.2 Ditches

All stumps, exposed roots and other obstructions shall be removed from within the limits of all ditches to be constructed under this contract. Grubbing of areas located outside of the levee proper, including areas which are to be occupied by ditch fill, will not be required.

3.3.3 Borrow Areas

Contractor shall grub borrow areas only to the extent necessary to provide materials free from objectionable matter.

3.3.4 Filling of Holes

All holes caused by grubbing operations except in borrow areas shall be filled with material corresponding to the adjacent undisturbed material so as to maintain the continuity of the natural blanket (foundation) soils. The backfill shall be placed in layers to the level of adjacent ground; and each layer shall be tamped to a density equal to the adjoining undisturbed material.

3.4 DISPOSAL OF MATERIALS

3.4.1 Salable Timber

All felled timber from which saw logs, pulpwood, posts, poles, ties, mine props, cordwood, wood chips, or mulch can be produced shall be considered as salable timber, and shall be the Contractor's responsibility for disposal.

3.4.1.1 Disposal Options for the salable timber are listed below

A. The Contractor may sell all of the timber,

B. The Contractor shall not leave chipped material on site.

3.4.1.2 Landfill Disposal

The Contractor shall not dispose of salable timber in a landfill.

3.4.2 Materials other than Salable Timber

Logs, stumps, roots, brush, rotten wood, miscellaneous structures, and other refuse from the clearing and grubbing operations, except for salable timber and woody material that can be chipped and placed in stock piles within the work limits as indicated on the drawing, or sold as mulch, shall be removed from the site and disposed in an approved commercial disposal site. However, if the Contractor wishes to dispose of such materials on private property, it shall have written permission from the property owner and submit the permit to the COR for approval. The Contractor shall be responsible for compliance with all Federal and State laws and regulations. As indicated in Section 01 57 20.02 10, disposal of refuse and debris and any accidental loss or damage attendant thereto shall be the Contractor's responsibility.

3.5 PROTECTION OF TREES

Trees indicated by the Contracting Officer to be preserved shall be clearly identified by markings, fencing or wrapping with boards, or any other approved techniques.

3.6 QUALITY CONTROL

3.6.1 Quality Control System

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 including, but not limited to the following:

(1) Clearing,
(2) Grubbing,
(3) Disposal of materials, and
(4) Protection of trees

3.6.2 RECORDS

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 or Contracting Officer's Representative. See Section 01 45 04.00 03, CONTRACTOR QUALITY CONTROL.

-- End of Section --

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SECTION 31 36 00

WIRE MESH GABION MATTRESSES

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.

ASTM INTERNATIONAL (ASTM)

ASTM A 313/A 313M	(2003) Stainless Steel Spring Wire
ASTM A 370	(2005) Mechanical Testing of Steel Products
ASTM A 641/A 641M	(2003) Zinc-Coated (Galvanized) Carbon Steel Wire
ASTM A 764	(1995; R 2001) Metallic Coated Carbon Steel Wire, Coated at Size and Drawn to Size for Mechanical Springs
ASTM A 853	(2004) Steel Wire, Carbon, for General Use
ASTM A 856/A 856M	(2003) Zinc-5% Aluminum-Mischmetal Alloy-Coated Carbon Steel Wire
ASTM A 974	(1997; R 2003) Welded Wire Fabric Gabion and Gabion Mattresses (Metallic Coated or Polyvinyl Chloride (PVC) Coated)
ASTM A 975	(1997; R 2003) Double-Twisted Hexagonal Mesh Gabions and Revet Mattresses (Metallic-Coated Steel Wire or Metallic-Coated Steel Wire With Poly(Vinyl Chloride) (PVC) Coating)
ASTM B 117	(2002) Operating Salt Spray (Fog) Apparatus
ASTM C 136	(2005) Sieve Analysis of Fine and Coarse Aggregates
ASTM D 1499	(1999) Filtered Open-Flame Carbon-Arc Type Exposures of Plastics
ASTM D 2240	(2005) Rubber Property - Durometer Hardness
ASTM D 412	(1998a; R 2002e1) Vulcanized Rubber and Thermoplastic Elastomers - Tension
ASTM D 638	(2003) Tensile Properties of Plastics

ASTM D 746	(2004) Brittleness Temperature of Plastics and Elastomers by Impact
ASTM D 792	(2000) Density and Specific Gravity (Relative Density) of Plastics by Displacement
ASTM G 152	(2000ae1) Operating Open Flame Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials

1.2 GENERAL REQUIREMENTS

The work under this specification includes furnishing, assembling, filling and tying open wire mesh rectangular compartmented gabion mattresses placed on a prepared surface of geotextile, as specified, and in accordance with the lines, grades, and dimensions shown or otherwise established in the field.

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 01 33 00 SUBMITTAL PROCEDURES:

SD-04 Samples

Mattresses
Alternative Wire Fasteners

Samples of the materials, used to fabricate the mattresses, shall be furnished to the Contracting Officer 60 days prior to assembly of units onsite so that testing may be performed by the Government in accordance with either ASTM A 974 or ASTM A 975 depending on which system is being furnished by the Contractor.

SD-06 Test Reports

Mattresses
Alternative Wire Fasteners

For each shipment of wire mattresses delivered to the site, the Contractor shall furnish the Contracting Officer, in duplicate, test reports or records that have been performed during the last year on all material contained within the shipment meets the composition, physical, and manufacturing requirements stated in this specification.

1.4 DESCRIPTION

Gabions and mattresses are wire mesh containers of variable sizes, uniformly partitioned into internal cells, interconnected with other similar units, and filled with stone at the project site to form flexible, permeable, monolithic structures. Gabions and mattresses shall be manufactured with all components mechanically connected at the production facility with the exception of the mattress lid, which is produced separately from the base. The supply to the jobsite of unassembled

individual wire mesh components (panels) forming gabions and mattresses will not be permitted. Definitions of terms specific to this specification and to all materials furnished on the jobsite, with the exception of the rock to fill the baskets and the filter material, shall refer and be in compliance with ASTM A 975 for double twisted wire mesh gabions and gabion mattresses, or with ASTM A 974 for welded wire fabric gabions and gabion mattresses.

1.5 DEFINITIONS

1.5.1 Double twisted wire mesh gabions and mattresses

They are classified according to the wire coating, which is applied prior to manufacturing the mesh. Coating styles are as follows:

Style 1, consists of wire mesh made from wire which is zinc coated before being double twisted into mesh. Fasteners, lacing wire, and stiffeners are produced from zinc-coated wire;

Style 2, consists of wire mesh made from wire which is coated with Zn-5Al-MM before being double twisted into mesh. Fasteners, lacing wire, and stiffeners are also produced from Zn-5Al-MM coated wire;

Style 3, consists of wire mesh, lacing wire, and stiffeners as Style 1 and overcoated with PVC. Fasteners shall be of stainless steel wire;

Style 4, consists of wire mesh made from wire which is aluminum-coated before being double twisted into mesh. Fasteners, lacing wire, and stiffeners are also produced from aluminum-coated wire.

Style 1 for the wire coating is normally recommended for:

a. permanent gabion or mattress structures, for works installed in non-aggressive or non-polluted environments, and this condition remains unaltered over time;

b. temporary gabion or mattress structures, for works in moderately aggressive environments, depending on the minimum design life of the structure.

Style 2 for the wire coating is normally recommended for:

(1) permanent gabion or mattress structures, for works installed in moderately aggressive environments;

(2) temporary gabion or mattress structures, for works in aggressive environments, depending on the minimum design life of the structure.

Style 3 for the wire coating is normally recommended for both permanent and temporary gabion structures, for works installed in aggressive or polluted environments, or when the aggressiveness of the site is moderately unpredictable or variable from low to high.

Style 4 for the wire coating is very seldom used in the gabion industry. Its life expectancy shall be adequately documented to

guarantee its consistency and reliability.

The determination of the rate of aggressiveness (non-aggressive, moderately, or highly aggressive) shall be made on a project-to-project basis, due to the many variables involved and the lack of criteria of general validity. It is normally recommended for the choice to be based on all the available data and on the experience of existing gabion structures in similar environments.

1.5.2 Welded Wire Fabric Gabions and Mattresses

They are classified according to wire coating styles as follows:

Style 1, consists of welded wire fabric made from wire which is zinc coated before being welded into fabric. Spiral binders, lacing wire, and stiffeners are produced from zinc-coated wire;

Style 2, consists of welded wire fabric which is made from uncoated wire and the fabric is subsequently zinc-coated after fabrication. Spiral binders, lacing wire, and stiffeners are produced from zinc-coated wire;

Style 3, consists of welded wire fabric made from wire which is coated with zinc-5% aluminum-mischmetal alloy (Zn-5Al-MM) before being welded into fabric. Spiral binders, lacing wire, and stiffeners are also produced from zinc-5% aluminum-mischmetal alloy (Zn-5Al-MM) coated wire;

Style 4, consists of welded wire fabric made from wire which is aluminum-coated before being welded into fabric. Spiral binders, lacing wire, and stiffeners are also produced from aluminum-coated (aluminized) wire;

Style 5, consists of welded wire fabric, spiral binders, lacing wire, and stiffeners as Styles 1, 2, 3, or 4, and overcoated with PVC.

Style 1 for the wire coating is normally recommended for temporary gabion or mattress structures, for works in non-aggressive or non-polluted environments;

Style 2 for the wire coating is normally recommended for permanent gabion or mattress structures, for works installed in non-aggressive or non-polluted environments, and this condition remains unchanged over time;

Style 3 for the wire coating is normally recommended for:

(1)permanent gabion or mattress structures, for works installed in moderately aggressive environments;

(2)temporary gabion or mattress structures, for works in aggressive environments, depending on the minimum design life of the structure.

Style 4 for the wire coating is very seldom used in the gabion industry. Its life expectancy shall be adequately documented to guarantee its consistency and reliability.

Style 5 for the wire coating is normally recommended for both permanent and temporary gabion structures, for works installed in aggressive or polluted environments, or when the aggressiveness of the site is moderately unpredictable or variable from low to high.

The determination of the rate of aggressiveness (non-aggressive, moderately, or highly aggressive) shall be made on a project-to-project basis, due to the many variables involved and the lack of criteria of general validity. It is normally recommended for the choice to be based on all the available data and on the experience of existing gabion structures in similar environments.

1.6 Government Testing and Studies

1.6.1 Samples

Samples of materials used to fabricate the Mattresses shall be furnished to the Contracting Officer 60 days prior to start of installation. Samples will be tested in accordance with specification and either ASTM A 974 or ASTM A 975 depending on which system is being furnished by the Contractor. The Government reserves the right to test additional samples to verify the submitted test records at the Government's expense. When the first test results indicate that the fasteners do not meet the specified requirements, the additional test will be at the Contractor's expense. The fasteners will be rejected after two tests failing to meet the requirements.

1.6.2 Test Report or Documents

Copies of all test results shall be furnished to the COR.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Double twisted wire mesh Mattresses

Double twisted wire mesh Mattresses shall be Style 1 manufactured with a non-raveling mesh made by twisting continuous pairs of wires through three half turns (commonly called double twisted) to form a hexagonal-shaped opening. Mattress sizes, wire diameters, mesh opening sizes, and tolerances shall comply with the requirements of ASTM A 975 (Tables 1, 3, 4, 5, 6, and Sections 9). Mattresses shall meet the following test requirements:

a. Metallic coating - The coating weights shall conform to the requirements of ASTM A 641/A 641M, Class 3 (Style 1).

b. PVC for Coating - The PVC coating shall show no cracks or breaks after the wires are twisted in the fabrication of the mesh. The initial properties of PVC coating material shall have a demonstrated ability to conform to the following requirements:

1). Specific Gravity - In the range from 1.30 to 1.35 dN/dm3, when tested in accordance with test method ASTM D 792;

2). Tensile Strength - Not less than 2985 psi when tested in accordance with test method ASTM D 412;

3). Modulus of Elasticity - Not less than 2700 psi when tested in

accordance with test method ASTM D 412;

4). Hardness - Shore "D" between 50 and 60, when tested in accordance with test method ASTM D 2240;

5). Brittleness Temperature - Not higher than 15 degrees F, or lower temperature when specified by the purchaser, when tested in accordance with test method ASTM D 746.

6). Resistance to Abrasion - The percentage of the weight loss shall be less than 12%;

7). Salt Spray Exposure and Ultra Violet Light Exposure - The PVC shall show no effect after 3,000 h of salt spray exposure in accordance with ASTM B 117. The PVC shall show no effect of exposure to ultra violet light with test exposure of 3,000 h, using apparatus Spectral Irradiance of Open Flame Carbon Arc with Daylight Filters and 145 degrees F, when tested in accordance with practice ASTM D 1499 and ASTM G 152;

8). Evaluation of Coating After Salt Spray and Ultraviolet Exposure Test - After the salt spray test and exposure to ultraviolet light, the PVC coating shall not show cracks nor noticeable change of color, or blisters or splits. In addition, the specific gravity, tensile strength, hardness and resistance to abrasion shall not change more than 6%, 25%, and 10% respectively, from their initial values.

c. Wire Tensile Strength - The tensile strength of the wire used for the double twisted mesh, lacing wire, and stiffener, when tested in accordance with Test Methods and definitions ASTM A 370, shall be in accordance with the requirements of ASTM A 641/A 641M (Style 1) for soft temper wire.

d. Mesh strength and panel to panel joint strength - The minimum strength requirements of the mesh, selvedge wire to mesh connection, panel to panel connection, and punch test, when tested in accordance with ASTM A 975 Section 13.1, shall be as shown in Table 1. The strength values reported in lb/ft are referred to the unitary width of the specimen. The panel to panel test shall demonstrate the ability of the fastening system to achieve the required strength, and indicate the number of wire revolutions for the lacing wire or the ring spacing for ring fasteners used. The same number of wire revolutions or ring spacing shall be used in the field installation. Pleating the based panel to obtain internal panels is prohibited.

TABLE 1

Minimum Strength Requirements of Mesh and Connections

Test description	Gabions, metallic coated lb/ft	Gabions, PVC coated lb/ft	Revet mattresses metallic and PVC coated lb/ft
Tensile strength parallel to twist	3500	2900	2300
Tensile strength perpendicular to twist	1800	1400	900
Connection to selvedges	1400	1200	700

TABLE 1

Minimum Strength Requirements of Mesh and Connections

Test description	Gabions, metallic coated lb/ft	Gabions, PVC coated lb/ft	Revet mattresses metallic and PVC coated lb/ft
Panel to panel (using lacing wire or ring fasteners	1400	1200	700

Test description	Gabions, metallic coated lb	Gabions, PVC coated lb	Revet mattresses metallic and PVC coated ib
Punch Test	6000	5300	4000

2.1.2 Welded Wire Fabric Mattresses

Welded wire fabric Mattresses shall be Style 2 manufactured with a welded wire mesh composed of a series of longitudinal and transverse steel wires arranged substantially at right angles to each other, and welded together at the points of intersection by electrical resistance welding to form fabricated sheets. Gabion and mattress sizes, wire diameters, mesh opening sizes, physical properties of the PVC for coating, and tolerances shall comply with the requirements of ASTM A 974 (Table 1, 2, 3, and Sections 9). Mattresses shall meet the following test requirements:

a. Metallic coating - The coating weights shall conform to the requirements of ASTM A 856/A 856M (Style 2).

b. PVC for Coating - PVC adhesion test shall be PVC coating shall show no cracks or breaks after the wires are twisted in the fabrication of the mesh. The initial properties of the PVC coating on the wire and welded wire fabric shall have a demonstrated ability to conform to the following requirements:

1). Adhesion - The PVC coating shall adhere to the wire such that the coating breaks rather than separates from the wire, in accordance with test method ASTM A 974 Section 13.3;

2). Mandrel bend - The PVC-coated wire when subjected to a single 360 bend at 0 degrees F around a mandrel ten times the diameter of the wire, shall not exhibit breaks or cracks in the PVC coating;

3). Specific Gravity - In the range from 1.20 to 1.40 dN/dm3, when tested in accordance with test method ASTM D 792;

4). Tensile Strength - Not less than 2275 psi when tested in accordance with test method ASTM D 638;

5). Modulus of Elasticity - Not less than 1980 psi at 100% strain, when tested in accordance with test method ASTM D 638;

6). Hardness - Shore "A" not less than 75, when tested in accordance with test method ASTM D 2240;

7). Brittleness Temperature - Not higher than 15 degrees F, or

lower temperature when specified by the purchaser, when tested in accordance with test method ASTM D 746.

8). Resistance to Abrasion - The percentage of the weight loss shall be less than 12%;

9). Salt Spray Exposure and Ultra Violet Light Exposure - The PVC shall show no effect after 3,000 h of salt spray exposure in accordance with ASTM B 117. The PVC shall show no effect of exposure to ultra violet light with test exposure of 3,000 h, using apparatus Spectral Irradiance of Open Flame Carbon Arc with Daylight Filters and 145 degrees F, when tested in accordance with practice ASTM D 1499 and ASTM G 152;

10). Evaluation of Coating After Salt Spray and Ultraviolet Exposure Test - After the salt spray test and exposure to ultraviolet light, the PVC coating shall not show cracks nor noticeable change of color, or blisters or splits. In addition, the specific gravity, tensile strength, hardness and resistance to abrasion shall not change more than 6%, 25%, and 10% respectively, from their initial values.

c. Wire Tensile strength - The tensile strength of the wire used for the welded wire fabric, spiral binders, lacing wire and stiffeners shall be hand drawn in accordance with ASTM A 853 (Style 2). The cross-sectional area of the test specimen shall be based on the diameter of the metallic coated wire. All the wires used in the fabrication of gabion mattresses must use the same temper wire per given order.

d. Weld Shear Strength - The minimum average shear value in pounds-force shall be 70% of the breaking strength of the wire or as indicated in the table as follows, whichever is greater, when tested in accordance with ASTM A 974 Section 13.4. Typical minimum average shear strengths as specified are as follows:

TABLE 2

Minimum average shear strength values for the welded mesh

Wire Diameter inch	Min. Av. Shear Strength lbs	Min. Shear Strength lbs
0.087	292	225
0.106	472	360
0.120	584	450

The material shall be deemed to conform with the requirements for weld shear strength if the average of the test results of the first four specimens or if the average of the test results for all welds tested comply with TABLE 2.

Panel to Panel Joint Strength - The minimum strength of the joined panels, when tested as described in ASTM A 974 Section 13.5, shall be as follows:

TABLE 3

Panel to panel joint strength for welded gabions

Test Description	Gabions, Metallic coated lb/ft	Gabions, PVC coated lb/ft	Revet mattresses metallic and PVC coated lb/ft
Connection to selvedges	1400	1200	700
Panel to panel (using lacing wire or ring fasteners	1400	1200	700

The strength values reported in lb/ft are referred to the unitary width of the specimen. The panel to panel test shall demonstrate the ability of the fastening system to achieve the required strength, and indicate the number of wire revolutions for the lacing wire used. The same number of wire revolutions shall be used in the field installation.

2.1.3 Alternative Wire Fasteners for Gabion Mattresses

Subject to approval of the Contracting Officer, alternative fastening systems may be used in lieu of lacing wire. Alternative fasteners to lacing wire recommended for woven wire gabions and mattresses, according to ASTM A 975, are steel ring fasteners for metallic coated gabions and mattresses, or stainless steel rings for PVC coated gabions and mattresses. Ring fasteners for woven wire mattresses shall comply with the minimum requirements indicated in paragaph Ring Fasteners below, and they shall develop a minimum panel to panel joint strength as indicated in TABLE 1. Alternative fasteners to lacing wire for welded wire gabions and mattresses, according to ASTM A 974, are spiral binders. Spiral binders for welded wire gabions and mattresses shall comply with the minimum requirements indicated in paragraph Spiral Binders below. Ring fasteners may alternatively be used for welded wire gabions or mattresses, provided that they comply with the minimum specified requirements (salt spray and pull-apart resistance). Connections panel to panel for welded gabions and mattresses with ring fasteners shall develop a minimum joint strength as indicated in TABLE 3. The Contractor shall provide a complete description of the fastener system and a description of a properly installed fastener, including drawings or photographs if necessary. The Contractor shall provide test results that demonstrate that the alternative-fastening system meets the requirements of the specifications, according to the following criteria:

a. That the proposed fastener system can consistently produce a panel to panel joint strength as indicated in the TABLE 1 for double twisted wire mesh gabions and TABLE 3 for welded wire mesh gabions;

b. That the proposed fastener system does not cause damage to the protective coating on the wire;

c. That the Contractor has the proper equipment and trained employees to correctly install the fasteners;

d. That proper installation can be readily verified by visual inspection.

Samples of wire fasteners with their certified test records shall be submitted at least 60 days in advance to the Contracting Officer for approval. The Government reserves the right to test additional samples to verify the submitted test records at the Government's expense. When the first test results indicate that the fasteners do not meet the specified requirements, the additional test will be at the Contractor's expense. The fasteners will be rejected after two tests failing to meet the requirements.

2.1.3.1 Ring Fasteners

The tensile strength of the zinc-coated steel wire, zinc-5% aluminum coated mischmetal alloy-coated steel wire and aluminum-coated steel wire used for fasteners shall be in accordance with the requirements of ASTM A 764, Type A, B, or C, Table 2 or Table 3. The tensile strength of stainless steel wire used for fasteners shall be in accordance with the requirements of ASTM A 313/A 313M, Type 302, Table 2. Any fastener system shall give the number of fasteners required to comply with TABLE 1, in accordance with ASTM A 975 (Section 13.1.2) for woven wire gabions and mattresses, and TABLE 3, in accordance with ASTM A 974 (Section 7.3), for welded wire mattresses. Ring fasteners shall not be installed more than 4 inches apart. Each fastener type shall be closed and the free ends of the fastener shall overlap a minimum of 1 inch. The manufacturer or supplier shall state the number of fasteners required for all vertical and horizontal connections for single and multiple basket joining. Approved ring fasteners including fasteners made of stainless steel shall be subject to the salt spray test and pull-apart resistance test and shall be documented by actual testing of panel to panel connections within the last year by validated laboratories.

a. Salt Spray Test - A set of two identical rectangular gabion panels, each with a width about 10-1/2 mesh openings along a selvedge wire, shall be joined by properly installed wire fasteners along the two selvedge wires so that each fastener confines two selvedge and two mesh wires. If the fasteners are also to be used to joint two individual empty gabion baskets, two additional selvedge wires which are each mechanically wrapped with mesh wires shall be included so that each fastener confines four selvedge and four mesh wires. The set of the jointed panels shall be subject to salt spray test, ASTM B 117, for a period of not less than 48 hours. At the end of the test, the fasteners, the selvedge, or mesh wires confined by the fasteners shall show no rusty spots on any part of the surface excluding the cut ends. A properly installed fastener shall meet the following requirements:

1). Each interlocking fastener shall be in a locked and closed position.

2). Each ring fastener shall be closed, and the free ends of the fastener shall overlap a minimum of 1 inch.

b. Pull-Apart Resistance Test - A new set of the jointed panels, which are prepared by the same method as specified in the salt spray test but without being subject to the 48-hour salt spray test, shall be mounted on a loading machine with grips or clamps such that the panels are uniformly secured along the full width. The grips or clamps shall be designed to transmit only tension forces. The load will then be applied at a uniform rate of 50 lbs/sec until failure occurs. The failure is defined as when the maximum load is reached and a drop of strength is observed with subsequent loading or the opening between any two closest selvedge wires, applicable to a fastener confining either

two or four selvedge wires, becomes greater than 2 inches at any place along the panel width. The strength of the jointed panels at failure shall have a minimum as indicated in TABLE 1 or TABLE 3.

2.1.3.2 Spiral Binders

Spiral binders are defined as a length of metallic coated steel wire or metallic coated steel wire with PVC coating preformed into a spiral, used to assemble and interconnect empty mattress units, and to close and secure stone-filled units. Spiral binders shall be fabricated with the same wire and coating style as the wire mesh. Test requirements for spiral binders shall refer to TABLE 3 regarding Metallic Coating, PVC for coating, Tensile Strength, and Panel to Panel Joint Strength.

.2.1.4 Testing

Test records made within one year by certified laboratories and Government agencies will be used to determine the acceptability of the fastening system. Samples of wire fasteners and samples of material for fabricating the mattresses with their certified test records shall be submitted at least 60 days in advance to the Contracting Officer for approval. The Government reserves the right to test additional samples to verify the submitted test records at the Government's expense. When the first test results indicate that the fasteners do not meet the specified requirements, the additional test will be at the Contractor's expense. The fasteners will be rejected after two tests failing to meet the requirements.

2.1.5 Stone Fill

2.1.5.1 General

For mattresses, the ability to function properly depends upon their stability, which is partly depending upon the rocks filling them. Rock sizes should be chosen to prevent them from falling through the mesh of the gabions or mattresses. The rock has also to withstand natural weathering processes during the life of the project that would cause it to breakdown to sizes smaller than the wire mesh opening dimensions. Rock to fill mattresses shall be durable and of suitable quality to ensure permanence in the structure and climate in which it is to be used.

2.1.5.2 Gradation

Gradation of stone for gabions shall meet the requirements as specified in subparagraph 2.2.2 in Section 31 37 16.00 03 RIP-RAP FOR EROSION CONTROL. be performed every 1000 tons placed under this contract in accordance with ASTM C 136.

TABLE 4

Required rock gradation for gabion mattresses

Type of structure	Thickness (height) inch	Rock sizes inch
Mattresses	12	4 - 8

2.1.6 Filter Material

Filter fabrics shall meet the provisions of Section 31 05 19.13 GEOTEXTILES

USED AS FILTERS AND UNDERLAYS.

PART 3 EXECUTION

3.1 MATERIAL DELIVERY

Mattresses shall be delivered with all components mechanically connected at the production facility. All gabions and mattresses are supplied in the collapsed form, either folded or bundled or rolled, for shipping. Bundles are banded together at the factory for ease of shipping and handling.

a. Mattress lids may be supplied either as individual units (bundled) or in roll form. Lacing wire shall be shipped in coils with a diameter of the coil approximately 2 feet. Fasteners shall be shipped in boxes. Preformed stiffeners shall be shipped in bundles.

b. Mattresses shall be delivered to the jobsite labeled in bundles. Labels shall show the dimensions of the mattresses included, the number of pieces and the color code.

3.2 FOUNDATION PREPARATION

Foundation preparation shall not take place on frozen or snow-covered ground. After excavation or stripping, to the extent indicated on the drawings or as directed by the Contracting Officer, all remaining loose or otherwise unsuitable materials shall be removed. All depressions shall be carefully backfilled to grade. If pervious materials are encountered in the foundation depressions, the areas shall be backfilled with free-draining materials. Otherwise, the depressions shall be backfilled with suitable materials from adjacent required excavation, or other approved source, and compacted to a density at least equal to that of the adjacent foundation. Any debris that will impede the proper installation and final appearance of the gabion layer shall also be removed, and the voids carefully backfilled and compacted as specified above. Immediately prior to placing the material, the Contracting Officer shall inspect the prepared foundation surface, and no material shall be placed thereon until that area has been approved.

3.3 GEOTEXTILE PLACEMENT

Geotextile shall be placed according to Section 31 05 19.13 GEOTEXTILES USED AS FILTERS AND UNDERLAYS.

3.4 ASSEMBLY

3.4.1 Double Twisted Wire Mesh Revet Mattresses

The mattress shall be laid on a flat, hard surface. When the units are unfolded for assembly, depending on their length, they will have one or two shipping folds, which must be removed. The double flap of the side panel shall be folded in and wired to the diaphragm. At the corners, the end flaps shall be folded along the sides and the joint laced up. Each Revet mattress shall be assembled individually, by erecting the sides, ends and diaphragms, ensuring that all creases are in the correct position and the tops of all sides are level.

3.4.2 Welded wire fabric gabion mattresses

The Gabion mattresses shall be opened and unfolded on a flat, hard surface. The units shall be rotated into position and the edges joined with fasteners for assembly. Where spiral fasteners are used, the ends shall be crimped to secure them in place. Where lacing wire is used, the wire shall be wrapped with alternating double and single loops with spacings not to exceed 6 inches. Ends shall be secured with two complete revolutions and finished with a one-half hitch. The same fastening procedures shall be used to secure interior diaphragms and end panels. When two gabions are placed side by side, the two end panels may be connected along the vertical edges with a single spiral fastener.

3.5 LACING OPERATIONS

3.5.1 Double Twisted Wire Mesh Revet Mattresses

Either lacing wire or ring fasteners are permitted to lace double twisted wire mesh revet mattresses.

a. When using lacing wire, a piece of wire 1.2 to 1.5 times the length of the edge to be laced shall be cut off. If the edge of the basket is 3 foot long, no more than 4 to 5 feet of wire shoul be uses at a time to lace. For vertical joints, starting at the bottom end of the panel, the lacing wire shall be twisted and wrapped two times around the bottom selvedge and double and single loops shall be alternated through at intervals not bigger than 4 to 6 inches. The operation shall be finished by looping around the top selvedge wire. The use of pliers to assemble the units with lacing wire is normally recommended.

b. When steel wire ring fasteners are used, the rings shall be installed at the top and bottom connections of the end and center diaphragms. The ring spacing shall be based on the minimum pull apart strength as specified in TABLE 1. In any case, the maximum ring spacing along the edges shall not exceed 6 inches. The use of either a mechanical or a pneumatic fastening tool for steel wire ring fasteners is required. Ring fasteners shall be galvanized, stainless steel or Zn-5% aluminum-mischmetal alloy coated.

3.5.2 Welded Wire Mesh Gabion Mattresses

Either lacing wire or spiral binders are permitted to lace welded wire mesh gabion mattresses. The empty units shall be placed on the geotextile and foundation and interconnected with the adjacent unit along the top, bottom and vertical edges using spiral fasteners. Lacing wire may be used in lieu of spiral binders for the interconnection of mattresses as specified above. The connection with lacing wire or spiral binders shall be based on the minimum panel to panel joint strength as specified in TABLE 3. Spiral binders shall be screwed along the connecting edges, and then each end crimped to secure the spiral in place. Each layer of gabion mattresses shall be interconnected to the underlying layer along the front, back and sides.

3.6 INSTALLATION AND FILLING

Empty mattress units shall be assembled individually and placed on the approved surface to the lines and grades as shown or as directed, with the

sides, ends, and diaphragms erected in such a manner to ensure the correct position of all creases and that the tops of all sides are level. Finished mattress structures shall have no gaps along the perimeter of the contact surfaces between adjoining units. All lacing wire terminals shall be securely fastened. All joining shall be made through selvedge-to-selvedge or selvedge-to-edge wire connection; mesh-to-mesh or selvedge-to-mesh wire connection is prohibited except in the case where baskets are offset or stacked and selvedge-to-mesh or mesh-to-mesh wire connection would be necessary. As a minimum, a fastener shall be installed at each mesh opening at the location where mesh wire meets selvedge or edge wire.

a. The initial line of basket units shall be placed on the prepared geotextile surface and adjoining empty baskets set to line and grade, and common sides with adjacent units thoroughly laced or fastened. They shall be placed in a manner to remove any kinks from the mesh and to a uniform alignment. The basket units then shall be partially filled to provide anchorage against deformation and displacement during the filling operation. The stone shall be placed in the units as specified in paragraph Stone Fill, subparagraph Gradation.

b. Undue deformation and bulging of the mesh shall be corrected prior to further stone filling. Care shall be taken, when placing the stone by hand or machine, to assure that the PVC coating on gabions will not be damaged. All visible faces shall be filled with some hand placement to ensure a neat and compact appearance and that the void ratio is kept to a minimum.

c. Mattresses shall be uniformly overfilled by about 1 to 2 inches to compensate for future rock settlements. Mattresses can be filled by any kind of earth-filling equipment, such as a backhoe, gradall, crane, etc. The maximum height from which the stones may be dropped into the baskets shall be 3 to 4 feet. If PVC coated materials are used, no work shall take place unless the ambient temperature is above 20 degrees F.

3.6.1 Double Twisted Wire Mesh Revet Mattresses

After being assembled, the Revet mattresses shall be placed in their proper location and securely attached to the adjacent units. For structural integrity, all adjoining empty units shall be connected by means of lacing wire or ring fasteners along the edges of their contact surfaces in order to form a monolithic structure. Revet mattresses shall be placed and securely connected while empty. The filling shall be done unit by unit; however, several units can be pre-assembled prior to filling the units. Revet mattress units shall be filled with hard, durable, clean stone having a gradation as indicated in paragraph Gradation. Care shall be taken to ensure that diaphragm tops are accessible for wiring. On slopes, the Revet mattress shall be laid with the 6 foot dimension (width) longitudinally to the slope and progressing up the slope, except for small ditches or where otherwise specified in the project. When the installation is performed on a slope, the filling of the baskets shall start from the lower side of the bank. Where Revet mattresses are to be placed on steep slopes (3H to 2V), the units shall be secured by hardwood pegs driven into the ground just below the upper end panel, at 6 foot centers, or as specified in the project. When the Revet mattress is to be placed over a geotextile, care shall be taken to ensure that any projecting ends of wire are bent upward to avoid puncturing or tearing the cloth. Lids shall be securely connected to the ends of the mattress and to the top sides and diaphragms using alternate double and single loops, or steel wire ring fasteners, as indicated in paragraph FOUNDATION PREPARATION. In case that more adjacent bases are to be covered at one time, mesh rolls shall be used in place of

unit size lids. Revet mattresses shall be uniformly overfilled by about 1 to 2 inches to compensate for future rock settlements.

3.6.2 Welded Wire Fabric Gabion Mattressses

After being assembled, the gabion mattresses shall be placed in their proper location and securely attached to the adjacent units. For structural integrity, all adjoining empty units shall be connected by means of lacing wire or spiral binders along the edges of their contact surfaces in order to form a monolithic structure. Gabion mattresses shall be placed and securely connected while empty. The filling shall be done unit by unit; however, it is recommended that several units be pre-assembled prior to filling the units. Gabion mattress units shall be filled with hard, durable, clean stone having a gradation as indicated in paragraph Gradation. Care shall be taken to ensure that diaphragm tops are accessible for wiring.

a. On slopes, the Gabion mattress shall be laid with the 6 foot dimension (width) longitudinal to the bank, with the exception of small ditches or when otherwise specified in project. When the installation is performed on a slope, the filling of the units shall start from the lower side of the bank. Where gabion mattresses are to be placed on steep slopes (3H to 2V), the units shall be secured by galvanized pipes driven into the ground inside the upper end panel, at 6 foot centers, or as specified in the project.

b. When the Gabion mattress is to be placed over a geotextile, care shall be taken to ensure that any projecting ends of wire are bent upward to avoid puncturing or tearing the cloth.

c. Lids shall be securely connected to the ends of the mattress and to the sides and diaphragms using alternate double and single loops, or steel wire ring fasteners, as indicated in paragraph FOUNDATION PREPARATION. In case that more adjacent bases are to be covered at one time, mesh rolls can be used in place of unit size lids. Gabion mattresses shall be uniformly overfilled by about 1 to 2 inches to compensate for future rock settlements.

3.6.3 Non-rectangular Shapes

Mattress units can conform to bends up to a radius of curvature of 60 to 70 feet without alterations. Units shall be securely connected together first, and be placed to the required curvature, holding them in position by staking the units to the ground with hardwood pegs before filling. For other shapes, bevels and miters can be easily formed by cutting and folding the panels to the required angles.

3.7 CLOSING

Lids shall be tightly secured along all edges, ends and diaphragms in the same manner as described for assembling. Adjacent lids may be securely attached simultaneously. The panel edges shall be pulled to be connected using the appropriate closing tools where necessary. Single point leverage tools, such as crowbars, may damage the wire mesh and shall not be used. All end wires shall then be turned in.

-- End of Section --

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SECTION 31 37 16.00 03

RIP-RAP FOR EROSION CONTROL

PART 1 GENERAL

1.1 SCOPE

This section covers bedding and riprap.

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

Sources and Evaluation Testing

Gradation and Shape Testing Procedures

1.3 SOURCES AND EVALUATION TESTING

Unless approved otherwise, materials shall be procured from an active commercial supplier. If the Contractor proposes to furnish materials from another source, the Contracting Officer will make such investigations and evaluations as necessary to determine whether or not materials meeting the contract requirements could be produced from the proposed source. Sources from which Contractor proposes to obtain the materials shall be selected and submitted for approval at least 60 calendar days in advance of the proposed date when the material shall be delivered to the project work site.

1.4 GRADATION AND SHAPE TESTING

1.4.1 General

Sampling and testing shall be performed by and at the expense of the Contractor at no additional cost to the Government. Unless specified or approved otherwise, suitable samples of stone shall be obtained prior to delivery of stone material to the work site. Unless otherwise approved, samples shall be obtained by the Contractor in the presence of the Contracting Officer.

1.4.2 Bedding for Riprap and Riprap Material

Acceptability of riprap and bedding material shall be based on visual inspection, available test results, and service records. Available test results to be used to determine acceptability include petrographic analysis, specific gravity, abrasion, absorption, wetting and drying, freezing and thawing, and such other tests as may demonstrate to the satisfaction of the Contracting Officer that the materials meet the requirements for gradation and quality and are acceptable for use in the work.

1.4.3 Testing Results

When required, testing results shall be submitted to the Contracting Officer within 2 calendar days after completion of each testing. The minimum sample size for tests and number of tests shall be as follows:

Material	Sample Size	Minimum Number of Test
Bedding for riprap	300 pounds	1 Test per 300 CY per each type
Riprap	4.5 tons	1 Test per 800 CY per each type

The Contractor shall take as many additional tests under the Contractor's quality control program as is needed to insure that the gradation is being met.

1.4.4 Corrective Action

If materials fail to meet gradation and shape requirements, the Contractor shall adjust its operations and verify with necessary tests that acceptable materials are being produced, or it shall propose another source and verify with necessary tests that acceptable materials can be produced from that source. Failure to meet gradation may result in removal of the riprap already in place, which the failed test represented.

PART 2 PRODUCTS

2.1 BEDDING FOR RIP RAP

Bedding for riprap material shall consist of cobbles, gravel and sand, or crushed stone, meeting the characteristics of "Class F" aggregate or better as defined in the State of Indiana Department of Transportation - Standards and Specifications, and shall be well graded. The material shall be composed of tough, durable particles; shall be free of thin, flat, and elongated pieces; and shall contain no organic matter or soft friable particles in quantities considered by the Contracting Officer to be objectionable. Bedding for riprap shall be graded within the limits presented in the gradation curves included at the end of this section.

2.2 RIPRAP

Riprap shall be durable quarried or field stone of a quality suitable to ensure permanence in the structure and in the climate in which it is to be used. Material shall meet the characteristics of "Class F" aggregate or better as defined in the State of Indiana Department of Transportation - Standards and Specifications. The stone shall be well graded within the required limits and shall be free from cracks, seams, and other defects that would unduly increase deterioration from natural causes. The inclusion of objectionable quantities of dirt, sand, clay, or rock fines will not be permitted. Neither the breadth nor the thickness of any piece of stone shall be less than one third of its length. Occasional pieces of stone slightly larger than the maximum weight will be permitted, provided the gradation and voids are not unduly affected and that surface tolerances are met.

2.2.1 Specific Gravity

Stone shall have a specific gravity between 2.50 and 2.80.

2.2.2 Gradation

Riprap shall meet the gradation requirements of "Revetment" riprap as specified in the State of Indiana Department of Transportation (INDOT) - Standards and Specifications in all areas except those designated as Riprap 'A' in the vicinity of the Hart Ditch Control Structure where "Class 2" gradataion will be used and also in the area of the Hart Ditch and Little Calumet River confluenance . Fill for the gabion mattresses will be "Uniform A" gradation, as defined in the INDOT Standards and Specfications.

2.2.3 Processing

The Contractor shall submit for approval a method of processing riprap and rockfill at the quarry that shall preclude the inclusion of objectionable amounts of fines. At a minimum all riprap shall be handled once with an approved rock fork or shall be processed over an approved grizzly. Riprap shall be processed in accordance with the method(s) approved.

PART 3 EXECUTION

3.1 FOUNDATION PREPARATION

Each foundation area shall be excavated or filled to lines and grades shown, or otherwise established, within a tolerance of plus or minus 2 inches for areas at or above the river water surface and plus or minus 3 inches for areas below the river water surfaces. Fill such areas, at no additional expense to the Government, with: material similar to adjacent undisturbed in-place material and well compacted; or with bedding material. Immediately prior to placing geotextile, bedding, and/or riprap, the prepared subgrade will be inspected by the Contracting Officer and no material shall be placed thereon until that area has been approved.

3.2 PLACEMENT

3.2.1 Bedding for Riprap

3.2.1.1 Bedding for Riprap Materials

Bedding for riprap materials shall be spread uniformly on geotextile to the lines and grades shown on the drawings. The placing of material by methods of which could segregate particle sizes will not be permitted. All damage to the surface of the subgrade shall be repaired before proceeding with the work. Except where bedding is used to repair damage to the subgrade, compaction will not be required but bedding shall be finished to a uniform surface, free from mounds and windrows.

3.2.1.2 Bedding for Riprap Materials Placed Under Water

Bedding for riprap materials placed under water shall be discharged from a bucket or other suitable container, resting on the subgrade, as close to its final position as practicable so as to avoid segregation. Bedding material shall not be cast across, or dumped through, the water. Placed bedding material shall be spread to a uniform thickness by dragging a bucket or other suitable device over the surface of placed material.

3.2.2 Riprap

3.2.2.1 Riprap Sections

Riprap sections shall be dumped or dropped from a height not greater than 1.5 feet onto the bedding material or geotextile. Riprap sections shall be constructed to the lines and grades shown or established within a tolerance of 6 inches above and 0 inches below the required grade, except either extreme shall not be continuous over an area greater than 200 square feet. Riprap shall be placed to the full surface course thickness in one operation and in such a manner as to avoid displacing the underlying material. Placing riprap in layers will not be permitted. The finished mass shall be free from pockets of small stones, clusters, or larger stones and excessive voids. Placing riprap by dumping into chutes or by similar methods likely to cause segregation will not be permitted. Distribution of various sizes of stones shall be obtained during final placing, or by methods which will produce the required results. Rearranging of individual riprap stones by mechanical equipment or by hand will be required to obtain a reasonably well graded distribution of stone sizes. The Contractor shall maintain the stone protection until accepted, and displaced material shall be replaced by the Contractor at no additional cost to the Government.

3.2.2.2 Underwater Placement

Stone for riprap to be placed under water shall meet gradation requirements in the bucket or container used for placing, and shall be placed in a systematic manner directly on the subgrade, bedding for riprap, riprap, or rockfill so as to assure a continuous and uniform layer of well graded rock of that required thickness. Rock to be placed under water shall not be cast across the surface of the water.

3.2.3 Bridge Piers

Riprap shall be placed to a horizontal distance of 3 times the diameter of the bridge pier on geotextile and bedding for riprap. The riprap blanket shall be placed in a circle around the pier. Riprap sections shall be constructed to the lines and grades shown.

3.3 QUALITY CONTROL

The Contractor shall establish and maintain quality control for work under this section to assure compliance with contract requirements and maintain quality control for all construction operations including, but not limited, to the following:

(1) Quality,
(2) Testing for gradation and shape,
(3) Foundation preparation,
(4) Elevations of underlying materials,
(5) Layer thickness,
(6) Uniformity of in place materials,
(7) Finish elevations of in-place materials.

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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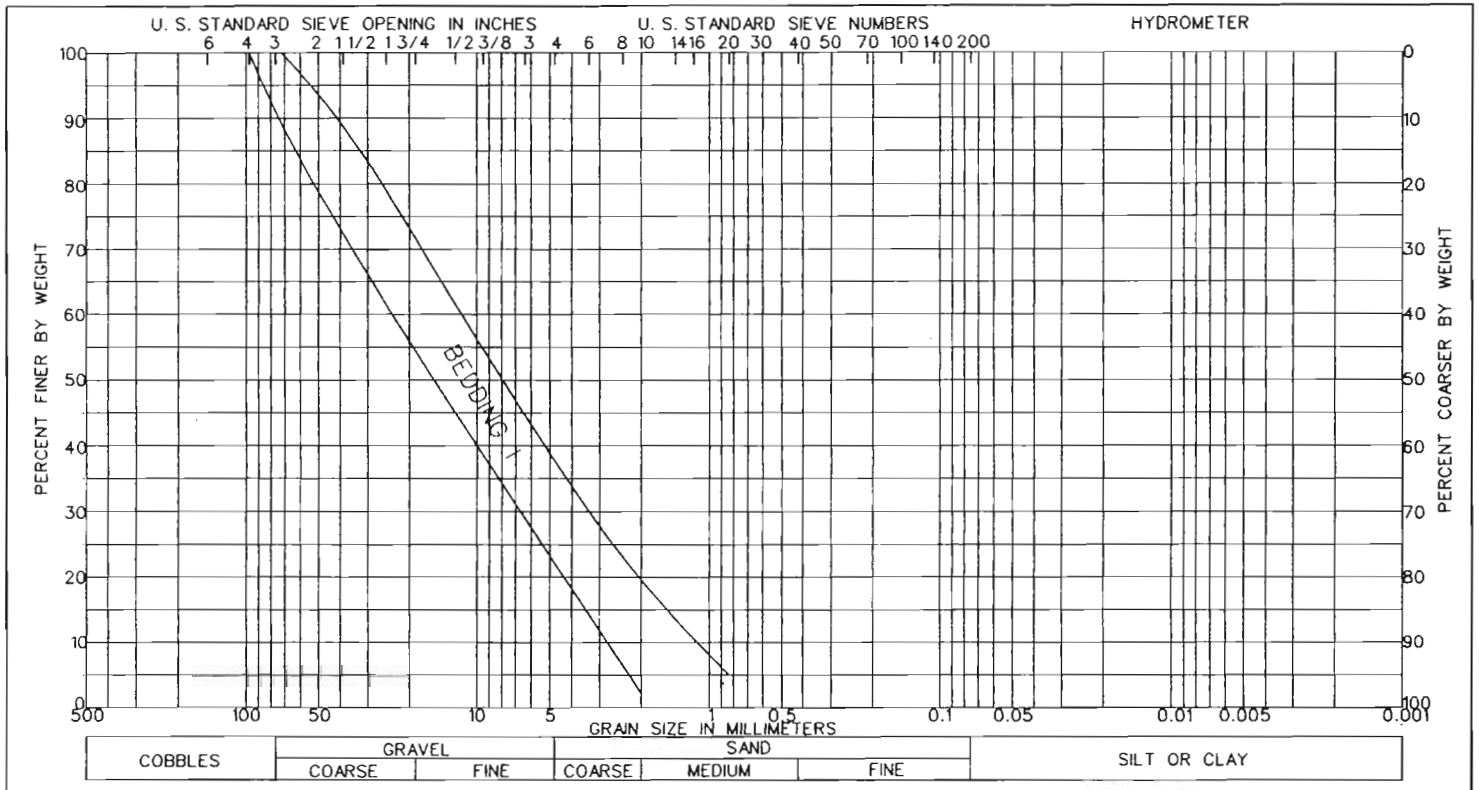

SAMPLE NO.	ELEV. OR DEPTH	CLASSIFICATION	Nat w%	LL	PL	PI

GRADATION CURVES

PROJECT LITTLE CALUMET

AREA STAGE V-2

BORING NO.

DATE

ENG FORM 1 MAY 63 2087

o PLOTTING POINTS

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SECTION 31 62 16.00 10

STEEL H-PILES

PART 1 GENERAL

1.1 SCOPE

The work of this section consists of furnishing and driving steel H-Piles.

1.2 REFERENCES

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

ASTM INTERNATIONAL (ASTM)

ASTM A 572/A 572M	(2001) High-Strength Low-Alloy Columbium-Vanadium Structural Steel

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;

Piledriving equipment;

The Contractor shall submit descriptions of all pile driving equipment to be employed in the work, at least 30 days prior to commencement of pile installations. The submittal shall include details of the pile hammer, power plant, leads, cushion material, and helmet. At a minimum, the submittal shall contain the following information which will allow the Contracting Officer to perform a wave equation analysis on the pile driving equipment.

Hammer Information;

The following hammer information shall be submitted:
* Manufacturer
* Model
* Type
* Serial No.
* Rated Energy
* Modifications

Capblock (Hammer Cushion) Information;

The following capblock information shall be provided:

* Material
* Thickness
* Area
* Modulus of Elasticity
* Coefficient of Restitution

Pile Cap Information;

The weight of the helmet, bonnet, anvil block, and drivehead shall be provided.

Pile Cushion Information;

The following pile cushion information shall be provided:
* Material
* Thickness
* Area
* Modulus of Elasticity
* Coefficient of Restitution

Power Plant and Leads;

A description of the power plant and leads shall be provided.

SD-06 Test reports

Mill Test Reports; G,CS

Certified copies of mill test reports for structural steel prior to commencement of pile installations.

Driving Records;

A complete and accurate record of each vertical and batter pile driven shall be submitted within 1 day 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. The record shall also include the type and size of the hammer used, the rate of operation, and the type and dimensions of driving helmet and cushion block used. Any unusual conditions encountered during pile installation such as delays during driving, damage to pile resulting from driving, or heave in adjacent piles shall be recorded and immediately reported to the Contracting Officer.

Pile Placement Plan; G,CS

Submit pile placement plan at least 30 days prior to delivery of piles to the job site. Pile placement plan shall include installation sequence, methods for controlling the location and alignment of piles, and driving template design and configuration.

Wave Equation Analysis; G,DG

Submit wave equation analysis report sealed by a Licensed Professional Engineer. This report shall include all input

parameters assumed in the analysis and complete results of the analysis including items required in this specification. The wave equation analysis shall be performed using commercially available computer software. A separate analysis shall be performed for piles of different tip elevations. The limiting penetration rates and ultimate pile capacities shall be submitted in both tabular and graphical formats and shall be in a manner that can be readily used by field personnel.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Piles shall be one piece lengths of the sections, sizes, materials, and weights indicated. Steel shall conform to ASTM A 572/A 572M Grade 50.

2.2 EQUIPMENT

2.2.1 Pile Driving Hammers

Pile driving hammers shall be of the impact type. 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. The hammer used shall have a delivered energy suitable for the total weight of the pile, the character of subsurface material to be encountered, the design length, and the pile batter. The selected hammer shall be such that it does not damage the piles. Vibratory hammers shall not be used. In selecting the appropriate hammer, the Contractor shall perform a wave equation analysis for both the vertical and batter piles. The wave equation analysis shall be performed by a registered professional and shall be based on the specific equipment to be used in this contract. For each hammer to be used by the Contractor, the Contractor shall perform a bearing graph analysis as part of the wave equation analyses. Bearing graph analyses shall be performed and submitted in both graphical and tabular form for one foot depth increments starting at the existing ground surface and continuing to a depth 10 feet below the required pile tip elevation shown on the contract drawings. The results of bearing graph analyses shall be used to determine limiting penetration rates (blows/inch) such that axial stresses in the piles do not exceed 90 percent of the pile yield stress. The bearing graph analyses shall provide ultimate pile capacities versus blow counts for each hammer being used. The Contractor shall submit a summary table for each hammer he proposes to use. The table shall contain for each one foot of depth as described above the blow count rates corresponding to 90 percent of the pile yield stress and the required ultimate pile capacities specified in paragraph 3.1.1.

2.2.2 Driving Helmets and Pile Cushions

A driving helmet or cap including a pile cushion shall be used between the top of the pile and the ram to prevent impact damage to the pile. The driving helmet or cap and pile cushion combination shall be capable of protecting the head of the pile, minimizing energy absorption and dissipation, and transmitting hammer energy uniformly over the top of the pile. The driving helmet or cap shall fit loosely around the top of the pile so that the driving cap does not restrain the pile if the pile tends to rotate during driving. The pile cushion may be made of solid wood or of laminated construction using plywood, softwood, or hardwood boards or other cushion material as approved by the Contracting Officer. The pile cushion shall completely cover the top surface of the pile and shall be retained by

the driving helmet. The minimum thickness of the pile cushion shall be 3 inches and the thickness shall be increased so as to be suitable for the size and length of pile, character of subsurface material encountered, hammer characteristics, and required driving resistance.

2.2.3 Pile Points

2.2.3.1 No commercial points or tips shall be used on the battered piles. Pile tips as driven shall be square and blunt as received from the mill. At the Contractor's expense, Contractor may opt to cut points on the ends of piles.

2.2.3.2 Commercial points may be used on vertical piles as necessary to prevent damage to piles. Pile points shall be a commercially available product specifically manufactured for use with H-piles.

2.2.4 Driving Template

The correct relative position of all piles shall be maintained by the use of templates.

2.3 DELIVERY, STORAGE, AND HANDLING

2.3.1 Delivery and Storage

Piles shall be stacked during delivery and storage so that each pile is maintained in a straight position and is supported every 10 feet or less along its length (ends inclusive). Piles shall not be stacked more than 5 feet high.

2.3.2 Handling

Piles shall be lifted using a cradle or multiple points pick-up except that a one-point pick-up may be used for lifting piles that are not extremely long into the driving leads. Point pick-up devices shall be of the type that clamps to both pile flanges at each pick-up point. Holes may be burned in the flanges or webs of piles above the cutoff length for lifting piles into the leads. Piles shall not be dragged across the ground. The Contractor shall inspect piles for excessive camber and sweep and for damages before transporting them from the storage area to the driving area and immediately prior to placement in the driving leads. Camber, curvature in the pile in the direction normal to the pile flanges, shall be measured with the pile flange base laying on a flat surface and shall be the distance between the flange base at the mid-length of the pile and the flat surface. Sweep, curvature in the pile in the direction parallel to the pile flanges, shall be measured with the pile flange tips laying on a flat surface and shall be the distance between the flange tips at the mid-length of the pile and the flat surface. The maximum permissible camber and sweep shall be 2 inches over the length of the pile. Piles having excessive camber or sweep will be rejected.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Pile Driving

Existing stone, debris and rubble shall be cleared as required to allow proper pile installation. Piles shall be driven to or below the tip

elevation shown on the drawings except as directed otherwise by the Contracting Officer. The Contractor may be directed by the Contracting Officer to drive the piles to a different tip elevation, change the pile spacing, or add additional piles based on review of the driving records and the results of the Contractor's wave equation analyses. The pile driving operation shall allow for installation of additional piles or deepening of pile tips by splicing. Each hammer used shall have a limiting penetration rate (blows/inch) as determined by the Contractor from the results of his approved wave equation analysis. The limiting penetration rate shall be such that axial stresses in the piles do not exceed 90 percent of the pile yield stress. If and when the Contractor ever reaches the limiting penetration rate, he shall immediately stop driving the pile and inform the Contracting Officer, who will then instruct the Contractor to either stop or continue driving the particular pile. If any vertical pile reaches its required ultimate capacity (130 tons) based on the Contractor's wave equation analyses prior to reaching its specified tip elevation, the Contractor shall stop driving the pile and inform the Contracting Officer. As only directed so by the Contracting Officer, the Contractor shall either cut off any excess pile at the point its required ultimate capacity is reached or continue driving the pile to its specified tip elevation. If any pile has not reached its required ultimate capacity when driven to its specified tip elevation, the Contractor shall continue driving the pile deeper as directed by the Contracting Officer. Hammers shall be operated at the rate recommended by the manufacturer throughout the entire driving period. A pile cushion shall be used at the start of driving for each pile and the cushion shall be replaced whenever it has become highly compressed, charred, burned, or deteriorated in any manner during driving. 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. Corrective measures may consist of lengthening adjacent piles and/or adding additional piles.

3.1.1.1 Pre-drilling of piles will not be permitted except that the contractor may pre-drill a hole through existing rubble and capstones to reach the top of the first soil strata.

3.1.1.2 Jetting of piles will not be permitted

3.1.1.3 Piles shall be handled and driven carefully to prevent overstress or leaning from a true position. The pile-driving rig shall have sufficiently rigid supports so that the leads remain accurately aligned. Templates or guide frames shall be erected at or close to the ground or water surface.

3.1.1.4 Field splices shall not be used for lengths of pile under 60 feet. When authorized by the Contracting Officer, splices shall of the full penetration butt-weld type. Only one splice shall be permitted per length of pile, unless otherwise approved by the Contracting Officer. Splices shall be designed and constructed to maintain the true alignment and position of the pile sections. Splices shall develop the full strength of the pile in bearing, tension, and bending.

3.1.1.5 Piles shall be cut off at the elevations indicated by a method approved by the Contracting Officer.

3.1.1.6 Pilings shall not be driven within 100 feet of concrete less than seven days old.

3.1.1.7 Driven battered H-Piles shall not interfere with Vertical H-Piles supporting the landside promenade slab. The Vertical H-Piles may be moved up to two feet in a direction parallel to the sheet pile wall to avoid the battered piles.

3.1.2 Pile Placement and Templates

3.1.2.1 Pile Placement

A pile placement plan which shows the installation sequence and the methods proposed for controlling the location and alignment of piles shall be developed and submitted in accordance with paragraph SUBMITTALS. Piles shall be placed accurately in the correct location and alignments, both laterally and longitudinally, and to the vertical or batter lines indicated. The Contractor shall establish a permanent base line to provide for inspection of pile placement by the Contracting Officer during pile driving operations. The base line shall be established prior to driving permanent piles and shall be maintained during the installation of the permanent piles. A final lateral deviation from the correct location at the cutoff elevation of not more than 3 inches will be permitted for vertical and batter piles. A final variation in alignment of not more than 1/4 inch per foot of longitudinal axis will be permitted. A final variation in rotation of the pile about the center line of the web of not more than 7.5 degrees will be permitted. A vertical deviation of not more than 1 inch from the correct cut off elevations shown will be permitted. Piles not located properly or exceeding the maximum limits for rotation, lateral deviation, or variation in alignment shall be pulled and redriven at a location directed at no additional cost to the Government. Manipulation of piles to force them into position will not be permitted. Piles damaged, misaligned, heaved, or driven outside the above tolerances shall be replaced at locations specified by the Contracting Officer at no expense to the Government.

3.1.2.2 Templates

The correct relative position of all piles shall be maintained by the use of templates. Templates shall remain in place as long as required to ensure proper alignment and connection of piles to other components. Since the contractor may be directed by the COR to drive the piles to a different tip elevation, change the pile spacing, or add additional piles, all templates shall be designed and detailed to accommodate driving of additional pile or pile length at any spacing.

3.2 QUALITY CONTROL

3.2.1 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. Mill certifications; and
b. Driving depth or depth of refusal.

3.2.2 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 COR in accordance with Section 01312, QUALITY CONTROL SYSTEM and Section 01451, CONTRACTOR QUALITY CONTROL.

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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.

INDIANA DEPARTMENT OF TRANSPORTATION (INDOT)

INDOT	Indiana Department of Highways Standard Specifications (2004) and Current Supplemental Specifications

1.2 SUBMITTALS

The following shall be submitted in accordance with Section 01 33 00, "Submittal Procedures."

Job mix formulas
The Contractor shall be responsible for having bituminous job mix formulas prepared by a testing laboratory acceptable to the Contracting Officer. Submit job mix formula for each bituminous mixture in accordance with INDOT

PART 2 PRODUCTS

2.1 PRIME COAT

The type and grade of bituminous material shall be medium curing liquid asphalt. After base preparation to the required grade and section, the bituminous material shall be applied uniformly at the rate of 0.25 to 0.80 gallons per square yard. The bituminous priming material shall be applied to the full width of the base course and shall be allowed to cure.

2.2 BITUMINOUS MIXTURES

2.2.1 Requirements

The bituminous mixture shall consist of fine aggregate, coarse aggregate and asphalt cement. All bituminous mixture materials shall conform to the requiremnets of INDOT, Section 403, for the mixture number indicated on the drawings.

2.2.2 Materials

The bituminous mixtures shall be composed of the following materials: fine aggregates, coarse aggregates, mineral filler (if needed), and bituminous materials. The bituminous mixture shalle be prepared in a batch type or continuous type mixing plant. The heated aggregates, mineral filler and asphalt cement shall be mixed for a period not less than 45 seconds (longer, if necessary) to produce a homogenous mixture in which all

particles of aggregate are coated uniformly.

2.2.3 Surface Course

Bituminous concrete surface course shall be INDOT Mixture 11 HV.

2.2.4 Binder Course

Bituminous concrete binder course shall be INDOT Mixture 8 or 9 HV.

PART 3 EXECUTION

3.1 CONSTRUCTION REQUIREMENTS

3.1.1 Requirements

All pavement construction shall conform to the following requirements of the INDOT:

a. Preparation and Priming of Aggregate Bases: Section 408.

b. Preparation of Bituminous Mixtures: Section 403.04.

c. Construction Requirements: Section 403.05 thru Section 403.11.

d. Subbase Materials: Section 903.04.

After the base has been prepared to the required grade and section, prime coat shall be applied uniformly at the rate of 0.25 to 0.80 gallon per square yard. The priming material shall be applied to the full width of the base course and shall be allowed to cure.

3.2 QUALITY CONTROL

The Contractor shall establish and maintain a quality control system under this section to assure compliance with contract requirements and maintain records of his quality control for all contruction operations.

A copy of these records and tests, as well as the records of the corrective action taken shall be furnished to the Government as directed by the Contracting Officer.

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SECTION 32 11 23.00

GRADED CRUSHED AGGREGATE BASE COURSE

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.

ASTM INTERNATIONAL (ASTM)

ASTM C 117	(2004) Standard Test Method for Materials Finer than 75-um (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C 131	(2003) Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C 136	(2005) Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM D 75	(2003) Sampling Aggregates
ASTM D 1556	(2000) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 2487	(2006) Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 2922	(2004) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017	(2004) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
ASTM D 698	(2000ae1) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu. ft. (600 kN-m/cu. m.))

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

ISO/IEC 17025	(2006) General requirements for the competence of testing and calibration laboratories

1.2 DEGREE OF COMPACTION

Degree of compaction is a percentage of the maximum density obtained by the Standard Proctor Test procedure presented in ASTM D 698.

1.3 EQUIPMENT

All plant, equipment, and tools used in the performance of the work shall be maintained in satisfactory working condition at all times. The equipment shall be adequate and shall have the capacity of producing the required compaction, meeting grade controls, thickness control, and smoothness requirements as set forth herein.

1.4 SAMPLING AND TESTING

1.4.1 General

Sampling and 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 of his own, approval of such facilities shall be based on compliance with ISO/IEC 17025, and no work requiring testing will be permitted until the Contractor's facilities have been inspected and approved. The first inspection of the facilities shall be at the expense of the Government and any subsequent inspections required because of failure of the first inspection will be at the expense of the Contractor. Such costs will be deducted from the total amount due the Contractor. The materials shall be tested to establish compliance with the specified requirements. Copies of test results shall be furnished to the Contracting Officer.

1.4.2 Samples

Samples for material gradation tests shall be taken in conformance with ASTM D 75. When deemed necessary, the sampling will be observed by the Contracting Officer.

1.5 SCHEDULE OF TESTS (MINIMUM)

1.5.1 Sieve Analysis

Sieve Analysis (ASTM C 117 and ASTM C 136) - One per 1000 SY placed but not less than 2 tests per base course.

1.5.2 Moisture Density Relation

Moisture Density Relation (ASTM D 698) - One for each type of base course material and/or for each base course.

1.5.3 Field Density Test

Field Density Test (ASTM D 1556, or ASTM D 2922 and ASTM D 3017) - One per lift per location.

1.5.4 Wear Test

Wear Test ASTM C 131 - One for each type of base course material.

1.6 APPROVAL OF MATERIAL

The source of the material to be used for producing aggregates shall be selected by the Contractor. Tentative approval of the source will be based on an inspection by the Contracting Officer. Tentative approval of material will based on tests of samples for the specific job. Final approval of both the source and the material will be based on tests for

gradation, performed on samples taken from the completed and compacted subbase course.

1.7 WEATHER LIMITATION

Base courses shall be placed when the atmospheric temperature is above 35 degrees Fahrenheit. Areas of completed base course that are damaged by freezing, rainfall, or other weather conditions shall be replaced to meet specified requirement.

PART 2 PRODUCTS

2.1 AGGREGATES AND GRADATION

2.1.1 Aggregates

Aggregates shall consist of clean, sound, durable particles of crushed stone, crushed slag or crushed gravel, and screenings. The Contractor shall obtain materials from an approved commercial material supplier that meet the specifications and can be used to meet the grade and smoothness requirements specified herein, after all compaction operations have been completed. Slag shall be an air-cooled, blast-furnace product having a dry weight of not less than 65 pcf as determined by ASTM D 2487. The portion retained on the No. 4 sieve shall be known as course aggregate.

2.1.2 Gradation

The aggregate base course shall be Coarse Aggregate Class A, B, C or D, CA No. 53, as listed in Section 904.02, and the limestone screening for the nature trail shall be fine aggregate size 23 or 24 as listed in Section 904.01(g), of the Indiana Department of Highways Standard Specifications (1993)..

PART 3 EXECUTION

3.1 STOCKPILING MATERIAL

If material will be stockpiled on the site, the locations of the stockpiles must be approved by the Contracting Officer. Prior to stockpiling of material, storage sites shall be cleared and leveled by the Contractor so as to prevent segregation. Materials obtained from different sources shall be stockpiled separately.

3.2 PREPARATION OF UNDERLYING COURSE

3.2.1 Crushed Aggregate Base Course

Prior to constructing the crushed-aggregate base course, the underlying course shall be cleaned of all foreign substances. At the time of construction of the base course, the underlying course shall contain no frozen material. Ruts or soft, yielding spots in the underlying courses, areas having inadequate compaction, and deviations of the surface from the requirements set forth herein shall be corrected by loosening and removing soft or unsatisfactory material and by adding approved material, reshaping to line and grade, and recompacting to specified density requirements.

3.2.2 Limestone Screenings

The screenings shall be unwashed INDOT FA23 or FA24, compacted to a final

thickness of 3.5".

3.2.3 Cohesionless Underlying Courses

For cohesionless underlying courses containing sands or gravels as defined in ASTM D 2487 the surface shall be stabilized prior to placement of the graded-crushed-aggregate base course. Stabilization shall be accomplished by mixing graded-crushed-aggregate base material into the underlying courses and compacting by approved methods. The stabilized material shall be considered as part of the underlying course and shall meet all requirements of the underlying course. The finished underlying course shall not be disturbed by traffic or other operations and shall be maintained by the Contractor in a satisfactory condition until the base course is placed.

3.3 GRADE CONTROL

During construction, the lines and grades including crown and cross slope indicated for the base course shall be maintained by means of line and grade stakes placed by the Contractor.

3.4 MIXING OF MATERIALS

The coarse and fine aggregates shall be mixed in a stationary plant, or in a traveling plant or bucket loader on an approved paved working area. The Contractor shall make such adjustments in mixing procedures or in equipment as may be directed to obtain true grades, to minimize segregation or degradation, to obtain the required water content, and to insure a satisfactory base course meeting all requirements of this specification.

3.5 PLACING

3.5.1 Graded Crushed Aggregate

The mixed material shall be placed on the prepared subgrade or subbase in layers of uniform thickness with an approved spreader. When a compacted layer 6 inches or less in thickness is required, the material shall be placed in a single layer. When a compacted layer in excess of 6 inches is required, the material shall be placed in layers of equal thickness. No layer shall exceed 6 inches or be less than 3 inches when compacted. The layers shall be so placed that when compacted they will be true to the grades or levels required with the least possible surface disturbance. Where the base course is placed in more than one layer, the previously constructed layers shall be cleaned of loose and foreign matter by sweeping with power sweepers, power brooms, or hand brooms, as directed. Such adjustments in placing procedures or equipment shall be made as may be directed to obtain true grades, minimize segregation and degradation, adjust the water content, and insure an acceptable base course.

3.6 COMPACTION

3.6.1 Equipment

Compaction shall be accomplished by vibratory steel drum rollers.

3.6.2 Requirements

Each layer of base course and limestone screenings shall be compacted as specified to produce an average field-measured density, through the full

depth, of at least 95 percent of maximum density obtained in the laboratory using ASTM D 698. Water content shall be maintained during the compaction procedures. Water content during compaction of limestone screenings shall be between minus 2 and plus 2 percent of optimum moisture content for the limestone screenings. In all places not accessible to the rollers, the base course material shall be compacted with mechanical tampers. Field density tests shall be performed in accordance with subparagraph 1.5.3 Field Density Test.

3.7 FINISHING

The limestone screening surface or top layer of base course shall be finished after final compaction by cutting any overbuild to grade and rolling with a steel-wheeled roller. In no case shall thin layers of material be added to the top layer of base course to meet grade. If the elevation of the limestone screenings surface or top layer of base course is 1/2 inch or more below the grade, the top layer of base shall be scarified to a depth of at least 3 inches, new material shall be added, and the layer shall be blended and recompacted to bring to grade. Adjustments in rolling and finishing procedures shall be made as may be directed to obtain grades, minimize segregation and degradation of base course material, adjust the water content, and insure an acceptable base course. Material found unacceptable shall be removed and replaced with acceptable material, as directed by the Contracting Officer.

3.8 EDGES OF BASE COURSE

Acceptable materials shall be placed along the edges of the base course in such quantity as will compact to the thickness of the course being constructed. When the course is being constructed in two or more layers, at least a 1-foot width of the shoulder shall be rolled and compacted simultaneously with the rolling and compacting of each layer of the base course, as directed.

3.9 SMOOTHNESS TEST

The surface of the top layer shall not deviate more than 3/8 inch when tested with a 10-foot straightedge applied parallel with and at right angles to the centerline of the area. Deviations exceeding 3/8 inch shall be corrected as directed.

3.10 THICKNESS CONTROL

The completed thickness of the course shall be within 1/2 inch of the thickness indicated. The thickness of the base course shall be measured at intervals providing at least one measurement for at least each 500 square yards of base course or at least one (1) test per location. The depth measurement shall be made by test holes at least 3 inches in diameter. Where the measured thickness of the base course is more than 1/2 inch deficient, such areas shall be corrected by excavating to the required depth and replacing with new material. Where the measured thickness of the base course is 1/2 inch more than indicated, it will be considered as in conformance if the base course is within 1/2 inch of established grade. The average job thickness shall be the average of the job measurements as specified above but within 1/4 inch of the thickness indicated.

3.11 MAINTENANCE

The base course shall be maintained in a condition that will meet all

specification requirements until accepted.

3.12 QUALITY CONTROL

3.12.1 Quality Control System

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, including but not limited to the following:

(1) Aggregate materials;
(2) Underlying course preparation;
(3) Layer thickness;
(4) Moisture control;
(5) Compaction;
(6) Lines, grades, and tolerances; and
(7) Test results.

3.12.2 Copies

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 01 45 04.00 03, CONTRACTOR QUALITY CONTROL.

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SECTION 32 31 13

CHAIN LINK FENCES AND GATES

PART 1 GENERAL

1.1 REFERENCES

This specification section will be used for installation and removal of temporary security fencing and permanent fencing as designated in the drawings.

ASTM INTERNATIONAL (ASTM)

ASTM A 116	(2000) Standard Specification for Metallic-Coated, Steel Woven Wire Fence Fabric
ASTM A 121	(2004) Standard Specification for Metallic-Coated Carbon Steel Barbed Wire
ASTM A 153/A 153M	(2005) Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A 390	(2001) Standard Specification for Zinc-Coated (Galvanized) Steel Poultry Fence Fabric (Hexagonal and Straight Line)
ASTM A 702	(1989; R 2000) Standard Specification for Steel Fence Posts and Assemblies, Hot Wrought
ASTM A 780	(2001) Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
ASTM A 90/A 90M	(2001) Standard Test Method for Weight of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings
ASTM C 94/C 94M	(2004a) Standard Specification for Ready-Mixed Concrete
ASTM F 1043	(2004) Strength and Protective Coatings on Metal Industrial Chain-Link Fence Framework
ASTM F 1083	(2004) Standard Specification for Pipe, Steel, Hot-Dipped Zinc Coated (Galvanized) Welded, for Fence Structures
ASTM F 626	(1996a; R 2003) Standard Specification for Fence Fittings

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

FS RR-F-191/3D	(2001) Fencing, Wire and Pest, Metal (Chain Link Fence Posts, Top Rails and Braces) (Detail Specification)

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. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Erection/Installation Drawings shall be submitted for the following items in accordance with paragraph entitled, "Assembly and Installation," of this section.

Fence Assembly
Gate Assembly
Gate Hardware and Accessories

SD-03 Product Data

Manufacturer's catalog data shall submitted for the following items:

Fence Assembly
Gate Assembly
Gate Hardware and Accessories

SD-04 Samples

Contractor shall submit the following samples described within this section:

Heavy Duty Breathable Mesh/Windscreen; G, C

A colored sample of the Mesh/Windscreen compliant shall be delivered prior to installation.

SD-07 Certificates

Certified copies of test reports demonstrating conformance to applicable specifications shall be delivered to the Contracting Officer before fencing is installed.

SD-08 Manufacturer's Instructions

Manufacturer's instructions shall be submitted for the following items:

Fence Assembly
Gate Assembly
Hardware Assembly
Accessories

1.3 ASSEMBLY AND INSTALLATION

Contractor shall provide manufacturer's instructions that detail proper assembly and materials in the design for fence, gate, hardware and accessories.

Erection/Installation drawings shall be submitted along with manufacturer's catalog data for Complete fence assembly, gate assembly, hardware assembly and accessories.

PART 2 PRODUCTS

2.1 GENERAL

Fencing materials shall conform to the requirements of ASTM A 116, ASTM A 121, ASTM A 390, ASTM A 702, ASTM F 626, and as specified.

2.2 ZINC COATING

Ferrous-metal components and accessories, except as otherwise specified, shall be hot-dip galvanized after fabrication.

Weight of zinc coating shall not be less than 1.8 ounces per square foot, as determined from the average result of two specimens, when tested in accordance with ASTM A 90/A 90M.

Zinc coating shall conform to the requirements of the following:

Pipe: FS RR-F-191/3D Class 1 Grade A in accordance with ASTM F 1083.

Hardware and accessories: ASTM A 153/A 153M, Table 1

Surface (ASTM F 1043):

External: Type B-B surface zinc with organic coating, 0.9 ounce per square foot minimum thickness of acrylated polymer.

Internal: Surface zinc coating of 0.9 ounce per square foot minimum.

Galvanizing repair material shall be a cold-applied zinc-rich coating conforming to ASTM A 780.

2.3 FABRIC

Fabric shall consist of No. 9-gage wires woven into a 2-inch diamond mesh, with dimensions of fabric and wire conforming to ASTM A 116, ASTM A 121, ASTM A 390, ASTM A 702 and ASTM F 626, with 1.2 ounces per square foot zinc galvanizing.

Fence heights to 12 feet shall have one-piece fabric widths.

2.4 TOP AND BOTTOM SELVAGES

Fabric with 2 inch mesh and up to 60 inches high shall be knuckled on both top and bottom selvages, over if 60 inches high, it shall be twisted and barbed on the top selvage and knuckled on the bottom selvage.

Top and bottom selvages shall be knuckled for 1-3/4-inch and 1-inch mesh fabric.

2.5 LINE POSTS

Minimum acceptable line posts shall be as follows:

Up to 6-feet high:

Grade A: 1.900 inch O.D. pipe weighing 2.72 pounds per linear foot.

Grade B: 2.375 inch O.D. pipe weighing 3.12 pounds per linear foot.

Over 6-feet high:

2.0 inch O.D. pipe weighing 3.65 pounds per linear foot.

2.6 END, CORNER, AND PULL POSTS

Minimum acceptable end, corner, and pull posts shall be as follows:

Up to 6 feet high:

Grade A: 2.375 inch O.D. pipe weighing 3.65 pounds per linear foot.

Grade B: 2.375 inch O.D. pipe weighing 3.12 pounds per linear foot.

Over 6 feet high:

Grade A: 2.875 inch O.D. pipe weighing 5.79 pounds per linear foot.

Grade B: 2.875 inch O.D. pipe weighing 4.64 pounds per linear foot.

2.7 SLEEVES

Sleeves for setting into concrete construction shall be of the same material as post sections. Size shall be 1-inch greater than the diameter or dimension of the post. Flat plates shall be welded to each sleeve base to provide anchorage and prevent intrusion of concrete.

2.8 TOP RAIL

Rails shall be a minimum of 1.660 inches O.D. pipe Grade B weighing 1.82 pounds per linear foot. Expansion couplings 6-inches long shall be provided at each joint in top rails.

2.9 CENTER RAILS BETWEEN LINE POSTS

For fencing over 6-feet high, center rails shall be 1.660 inches O.D. pipe Grade B weighing 1.82 pounds per linear foot.

2.10 POST-BRACE ASSEMBLY

Bracing shall consist of 1.660 inches O.D. pipe Grade B weighing 1.82 pounds per linear foot and 3/8 inch adjustable truss rods and turnbuckles.

2.11 TENSION WIRE

Wire shall be galvanized, No. 7-gage, coiled spring wire, provided at the bottom of the fabric only. Zinc Coating shall weigh not less than 1.6 ounces per square foot.

2.12 STRETCHER BARS

Bars shall be one-piece lengths equal to the full height of the fabric with a minimum cross section of 3/16 by 3/4 inch, in accordance with ASTM A 116, ASTM A 121, ASTM A 390, ASTM A 702 and ASTM F 626.

2.13 POST TOPS

Tops shall be steel, wrought iron, or malleable iron designed as a weathertight closure cap. One cap shall be provided for each post, unless equal protection is provided by a combination post-cap and barbed-wire supporting arm. Caps shall have an opening to permit through passage of the top rail.

2.13.1 BARBED WIRE SUPPORTING ARMS

Supporting arms for barbed wire shall be steel, wrought iron, or malleable iron, complete with provisions for anchorage to posts and for attaching 3 rows of barbed wire to each arm. Supporting arms may either be attached to posts or integral with the post top weather cap.

2.13.2 BARBED WIRE

Wire shall conform to ASTM A 116, ASTM A 121, ASTM A 390, ASTM A 702 and ASTM F 626, two-strand, 12-1/2-gage wire with 14-gage 4-point round barbs spaced 5 inches on center.

2.14 STRETCHER BAR BANDS

Bar bands for securing stretcher bars to posts shall be steel, wrought iron, or malleable iron spaced not over 15 inches on center. Bands may also be used in conjunction with special fittings for securing rails to posts. Bands shall have projecting edges chamfered or eased.

2.15 GATE POSTS

Contractor shall provide a gate post for supporting each gate leaf as follows:

Up to 6-feet wide:

2.875 inch O.D. pipe
Grade A weighing 5.79 pounds per linear foot.
Grade B weighing 4.64 pounds per linear foot.

Over 6 feet wide and up to 13 feet wide:

2.875 inch O.D. pipe
Grade A weighing 5.79 pounds per linear foot.
Grade B weighing 4.64 pounds per linear foot.

Over 13-feet and up to 18-feet wide:

Provide 6.625 inch O.D. pipe weighing 18.97 pounds per linear foot.

Over 18-feet wide:

Provide 8.625 inch O.D. pipe weighing 24.70 pounds per linear foot.

2.16 GATES

For gate leaves up to 6-feet high or 6-feet wide, perimeter gate frames shall be 1.66 inch O.D. pipe

Grade A weighing 2.27 pounds per linear foot.
Grade B weighing 1.82 pounds per linear foot.

For gate leaves over 6 feet high or 6 feet wide, perimeter gate frames shall be 1.90 inch O.D. pipe

Grade A weighing 2.72 pounds per linear foot.
Grade B weighing 2.28 pounds per linear foot.

Gate frame assembly shall be welded or assembled with special malleable or pressed-steel fittings and rivets to provide rigid connections. Fabric shall be installed with stretcher bars at vertical edges; stretcher bars may also be used at top and bottom edges. Stretcher bars and fabric shall be attached to gate frames on all sides at intervals not exceeding 15 inches. Hardware shall be attached with rivets or by other means that will provide equal security against breakage or removal.

Where barbed wire is indicated above gates, the end members of gate frames shall be extended approximately 1-foot above the top member with provision for attaching the wire. Vertical support arms shall be provided at intermediate points, spaced the same as line posts.

Diagonal cross-bracing, consisting of 3/8-inch diameter adjustable-length truss rods on welded gate frames, shall be provided where necessary to obtain frame rigidity without sag or twist. Nonwelded gate frames shall have diagonal bracing.

2.17 GATE HARDWARE AND ACCESSORIES

Gate hardware and accessories shall conform to ASTM A 116, ASTM A 121, ASTM A 390, ASTM A 702, ASTM F 626, and be as specified:

Hinges shall be malleable iron, forged steel, or pressed steel to suit gate size, non-lift-off type, offset to permit 180-degree opening.

Latch shall permit operation from either side of the gate, with a padlock eye provided as an integral part of the latch.

Stops and holders of malleable iron shall be provided for vehicular gates. Stops shall automatically engage the gate and hold it in the open position until manually released.

Double gates shall be provided with a cane bolt and ground-set keeper, with latch or locking device and padlock eye designed as an integral part.

Manufacturer's standard heavy-duty track ball-bearing hanger sheaves, overhead framing and supports, guides, stays, bracing, and accessories shall be provided as required for easy operation of manual sliding gates.

2.18 MISCELLANEOUS HARDWARE

Miscellaneous hardware shall be provided as required and shall be hot-dip galvanized.

2.19 WIRE TIES

Wires for tying fabric to line posts shall be 16-gage galvanized steel wire spaced 12 inches on center. For tying fabric to rails and braces, wire ties shall be spaced 24 inches on center. For tying fabric to tension wire, 0.105-inch hog rings shall be spaced 24 inches on center.

Manufacturer's standard procedure will be accepted if of equal strength and durability.

2.1.8 HEAVY DUTY BREATHABLE MESH/WINDSCREEN

Mesh/Windscreen shall be Poly "Closed Mesh" Polypropylene material, 5% ventilation, 7 oz. closed mesh woven polypropylene, 3-ply hems sewn with two rows of heavy-duty polyester threads. Brass grommets shall be spaced 15 inches on center on all four sides, providing wind vents as required.

2.20 CONCRETE

Concrete shall conform to ASTM C 94/C 94M. Mix shall be designed to obtain concrete with a minimum 28-day compressive strength of 2,500 psi.

PART 3 EXECUTION

3.1 GENERAL

Contractor shall coordinate with the COR prior to fence installation. Fence shall be installed to the lines indicated on the drawings unless directed by the COR. Line post shall be spaced equidistant at intervals not exceeding 10 feet. Terminal (corner) posts shall be set at abrupt changes in vertical and horizontal alignment. Where denoted on the drawings, fabric shall be continuous between terminal (corner) posts.

3.2 EXCAVATION

Footings shall be spaced for line posts 10 feet on center maximum and at closer intervals when indicated.

Bottoms of the holes shall be approximately 3-inches below the bottoms of the posts. Bottom of each post shall be set not less than 36-inches below finished grade when in firm, undisturbed soil. Posts shall be set deeper, as required, in soft and problem soils and for heavy, lateral loads.

Soil from excavations shall be spread uniformly adjacent to the fence line or on areas of Government property, as directed.

When solid rock is encountered near the surface, the Contractor shall drill into the rock at least 12 inches for line posts and at least 18 inches for end, pull, corner, and gate posts. Holes shall be drilled at least 1 inch greater in diameter than the largest dimension of the placed post.

If solid rock is below the soil overburden, Contractor shall drill to the full depth required except that penetration into rock need not exceed the minimum depths specified above.

3.3 SETTING POSTS

Loose and foreign materials shall be removed from holes and the soil moistened prior to placing concrete.

Tops of footings shall be trowel finished and sloped or domed to shed water away from posts. Hold-open devices, sleeves, and other accessories shall be set in concrete.

Exposed concrete shall be kept moist for at least 7 calendar days after placement or cured with a membrane curing material, as approved.

Posts set in concrete construction shall be set vertically, with tops aligned and held in position until concrete has set.

3.4 CONCRETE STRENGTH

Concrete shall have attained at least 75 percent of its minimum 28-day compressive strength, but in no case sooner than 7 calendar days after placement, before rails, tension wires, barbed wire, or fabric are installed. Fabric and wires shall not be stretched or gates hung until the concrete has attained its full design strength.

3.5 TOP RAILS

Top rails shall run continuously through post caps or extension arms, bending to radius for curved runs. Expansion couplings shall be provided as recommended by the fencing manufacturer.

3.6 CENTER RAILS

Center rails shall be one piece between posts set flush with posts on the fabric side, using special offset fittings where necessary.

3.7 BRACE ASSEMBLY

Contractor shall provide bracing assemblies at end and gate posts and at both sides of corner and pull posts, with the horizontal brace located at midheight of the fabric.

Brace assemblies shall be installed so posts are plumb when the diagonal rod is under proper tension.

Two complete brace assemblies shall be provided at corner and pull posts where required for stiffness and as indicated.

3.8 TENSION WIRE INSTALLATION

Tension wires shall be installed by weaving them through the fabric and tying them to each post with not less than 7-gage galvanized wire or by securing the wire to the fabric with 10-gage ties or clips spaced 24 inches on center.

3.9 FABRIC INSTALLATION

Fabric shall be provided in single lengths between stretch bars with bottom barbs placed approximately 1-1/2-inches above the ground line. Fabric shall be pulled taut and tied to posts, rails, and tension wires with wire

ties and bands.

Fabric shall be installed on the security side of fence, unless otherwise directed.

Fabric shall remain under tension after the pulling force is released.

3.10 STRETCHER BAR INSTALLATION

Stretcher bars shall be threaded through or clamped to fabric 4 inches on center and secured to posts with metal bands spaced 15 inches on center.

3.11 BARBED WIRE INSTALLATION

Three parallel strands of barbed wire shall be installed on the security side of the fence as specified or indicated. Wire shall be pulled taut and fastened securely to each support arm.

3.12 GATE INSTALLATION

Gates shall be installed plumb, level, and secure, with full opening without interference. Ground-set items shall be installed in concrete for anchorage as recommended by the fence manufacturer. Hardware shall be adjusted for smooth operation and lubricated where necessary.

3.13 TIE WIRES

Tie wires shall be U-shaped to the pipe diameters to which attached. Ends of tie wires shall be twisted not less than two full turns and bent so as not to present a hazard.

3.14 FASTENERS

Nuts for tension bands and hardware shall be installed on the side of the fence opposite the fabric side. Ends of bolts shall be peened to prevent removal of nuts.

3.15 ZINC-COATING REPAIR

Galvanized surfaces damaged by welding or abrasions, and cut ends of fabric, barbed wire, or other cut sections shall be cleaned and repaired with specified galvanizing repair material applied in strict conformance with the manufacturer's printed instructions.

3.15.1 HEAVY DUTY BREATHABLE MESH/WINDSCREEN

Mesh/Windscreen shall be installed on the interior face of the chain link fence. The Mesh shall be black or dark green in color. The contractor shall maintain the mesh/windscreen after installation. Maintenance shall include but not limited to repairing damaged screens and posts.

3.16 TOLERANCES

Posts shall be straight and plumb within a vertical tolerance of 1/4 inch after the fabric has been stretched. Fencing and gates shall be true to line with no more than 1/2 inch deviation from the established centerline between line posts. Defects shall be repaired as directed.

3.17 GROUNDING

Fences shall be grounded at intervals not exceeding 500 feet and there shall be a ground within 100 feet of gates in each section of the fence adjacent to the gate. Ground conductor shall consist of No. 8 AWG solid copper wire. Grounding electrodes shall be 19mm (3/4-inch) by 3.05m (10-foot) long copper-clad steel rod. Electrodes shall be driven into the earth so that the top of the electrode is at least 152mm (6 inches) below the grade. Where driving is impracticable, electrodes shall be buried a minimum of 300mm (12 inches) deep and radially from the fence. The top of the electrode shall be not less than 0.6m (2 feet) or more than 2.4m (8 feet) from the fence. Ground conductor shall be clamped to the fence and electrodes with bronze grounding clamps to create electrical continuity between fence posts, fence fabric, and ground rods. After installation the total resistance of fence to ground shall not be greater than 25 ohms.

3.17.1 Resistance Training

Perform resistance testing of all ground rods and fence components to assure safe, adequate grounding has been achieved.

3.18 FENCE REPAIR

Fences that are damaged during construction must be repaired to pre-damaged condition. The tie wire used to fix the fence should be of the same gauge as the tie wire used to install the fence (9-gauge aluminum or 11-gauge galvanized steel) or heavier, and when fixing a break, each chain link in the break should be connected to its corresponding chain link with the tie wire. In addition, buckled fence posts, braces, and truss rods should be replaced, not bent back into shape. Inspection, maintenance and repair of windscreen fabric (if applied) is to be performed for the duration of the project. The Contractor shall perform regular inspections and maintenance of the fence during the entire life of the contract.

3.19 QUALITY CONTROL

The Contractor shall establish and maintain a quality control system for the work under this section in accordance with Section 01 45 04.00 03 CONTRACTOR QUALITY CONTROL including, but not limited to, the following:

a. Fence Materials and Installation.
b. Fence Repair.
c. Grounding.

-- End of Section --

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SEGMENTAL CONCRETE BLOCK RETAINING WALL

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 M 252	(2002) Corrugated Polyethylene Drainage Pipe
AASHTO M 288	(2005) Geotextile Specifications for Highway Applications

ASTM INTERNATIONAL (ASTM)

ASTM C 1262	(1998e1) Evaluating the Freeze-Thaw Durability of Manufactured Concrete Masonry Units and Related Concrete Units
ASTM C 136	(2005) Sieve Analysis of Fine and Coarse Aggregates
ASTM C 1372	(2004e1) Segmental Retaining Wall Units
ASTM C 140	(2005) Sampling and Testing Concrete Masonry Units and Related Units
ASTM C 920	(2005) Elastomeric Joint Sealants
ASTM D 1241	(2000) Materials for Soil-Aggregate Subbase, Base, and Surface Courses
ASTM D 1556	(2000) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 2487	(2000) Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 2488	(2000) Description and Identification of Soils (Visual-Manual Procedure)
ASTM D 2922	(2004) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 4355	(2002) Deterioration of Geotextiles from Exposure to Light, Moisture and Heat in a Xenon-Arc Type Apparatus

ASTM D 448	(2003a) Sizes of Aggregate for Road and Bridge Construction
ASTM D 4491	(1999; R 2004) Water Permeability of Geotextiles by Permittivity
ASTM D 4595	(1986; R 2001) Tensile Properties of Geotextiles by the Wide-Width Strip Method
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 4873	(2002) Identification, Storage, and Handling of Geosynthetic Rolls and Samples
ASTM D 5321	(2002) Determining the Coefficient of Soil and Geosynthetic or Geosynthetic and Geosynthetic Friction by the Direct Shear Method
ASTM D 6638	(2001) Determining Connection Strength Between Geosynthetic Reinforcement and Segmental Concrete Units (Modular Concrete Blocks)
ASTM D 698	(2000ae1) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu. ft. (600 kN-m/cu. m.))

GEOSYNTHETIC INSTITUTE (GSI)

GSI GRI GT6	(1992) Geotextile Pullout

NATIONAL CONCRETE MASONRY ASSOCIATION (NCMA)

NCMA TR127	(1997) Design Manual for Segmental Retaining Walls

U.S. FEDERAL HIGHWAY ADMINISTRATION (FHWA)

FHWA NHI-00-043	(2004) Mechanically Stabilized Earth Walls and Reinforced Soil Slopes Design and Construction Guidelines (ISDDC)

1.2 DEFINITIONS

a. Blocks. Segmental concrete retaining wall units will be referred to as blocks.

b. Drainage Aggregate. Granular soil or aggregate which is placed within, between, and/or immediately behind segmental concrete units.

c. Fill. Soil or aggregate placed in, behind, or below the wall will be referred to as fill.

d. Reinforced Fill. Soil which is placed and compacted within the neat line volume of reinforcement as outlined on the plans.

e. Retained Fill. Soil which is placed and compacted behind the reinforced fill.

f. Reinforcement. Reinforcement shall consist of a geogrid or a geotextile product manufactured for use as reinforcing. Reinforcement shall not include steel products.

g. Long Term Design Strength. The long term design strength (LTDS) is:

$$LTDS = T_{ult} / (RF_D * RF_{ID} * RF_{CR})$$

where:

T_{ult} is the ultimate strength
RF_D is the reduction factor for chemical and biological durability
RF_{ID} is the reduction factor for installation damage
RF_{CR} is the reduction factor for creep

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 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Shop Drawings; G

Fabrication and installation drawings. The shop drawings shall include all items described under paragraph SEGMENTAL RETAINING WALL DESIGN.

SD-03 Product Data

Components and Equipment

Descriptive technical data on the blocks, wall caps, masonry adhesive, reinforcement, geotextile filter materials and equipment to be used. The submittal shall include all material properties specified under PART 2 PRODUCTS. The submittal shall also include a copy of any standard manufacturer's warranties for the products.

Supplier Qualifications
Manufacturer's Representative

Documentation showing that the installer and supplier meet the qualifications listed.

Soil Testing; G
Reinforcement Testing; G

Testing data specific to the blocks and reinforcement to be supplied.

a. The shear strength between blocks shall be established in accordance with NCMA TR127.

b. The connection strength between the blocks and the reinforcement shall be established in accordance with ASTM D 6638. If the FHWA design method is used, the modifications in FHWA NHI-00-043 shall be implemented.

c. The coefficient for direct shear of the reinforcement on a soil similar in gradation and texture to the material that will be used for fill in the reinforced zone shall be established in accordance with ASTM D 5321.

d. The coefficient of interaction for pull-out resistance of the reinforcement in a soil similar in gradation and texture to the material that will be used for fill in the reinforced zone shall be established in accordance with GSI GRI GT6.

Calculations; G

Calculations of the long term design strength for the reinforcement in accordance with the NCMA or FHWA design method. The ultimate strength or index strength shall be based on the minimum average roll value tensile strength of the product using the wide width strength test in ASTM D 4595. The calculation shall itemize each reduction factor and include backup data to justify each reduction factor.

Design calculations, including computer output data and program documentation. The calculations shall include all items described under PARAGRAPH: SEGMENTAL RETAINING WALL DESIGN.

SD-04 Samples

Segmental Concrete Units; G

Two samples of each proposed block. Each sample shall be typical of the size, texture, color, and finish.

Reinforcement; G

Samples of each type of reinforcement. The samples shall be labeled and have a minimum size 8 by 10 inches. Geogrid shall include at least 2 apertures (3 junctions) in each direction.

SD-07 Certificates

Reinforcement

Affidavit certifying that the reinforcement meets the project specifications. The affidavit shall be signed by an official authorized to certify on behalf of the manufacturer and shall be accompanied by a mill certificate that verifies physical properties were tested during manufacturing and lists the manufacturer's quality control testing. If the affidavit is dated after award of the contract and/or is not specific to the project, the supplier shall attach a statement certifying that the affidavit addressed to the wholesale company is representative of

the material supplied. The documents shall include a statement confirming that all purchased resin used to produce reinforcement is virgin resin. The mill certificate shall include the tensile strength tested in accordance with ASTM D 4595.

1.4 SEGMENTAL RETAINING WALL DESIGN

This work element includes engineering services in addition to the construction requirements. The Contractor is responsible for engineering services that include design of the wall in accordance with the National Concrete Masonry Association design method, and providing shop drawings indicating all features of the complete design.

1.4.1 Design Requirements

The Contractor shall complete all stability analyses in accordance with either the NCMA TR127, or the Federal Highway Administration/AASHTO method detailed in FHWA NHI-00-043. Only one method shall be followed for the complete design, including reinforcement design strength, layout, stability calculations, and seismic effects. The segmental retaining wall system shall be designed under the direction of, and be signed by, a professional engineer. The engineer shall visit the job at least once during the construction.

1.4.2 Design Parameters

Calculations shall include determination of long term design strength of reinforcement specific to this project in accordance with the NCMA TR127 or FHWA NHI-00-043. Calculations shall include analysis of all failure modes listed in the NCMA TR127. Design calculations shall include a clear outline of material properties and assumptions.

1.4.2.1 External Stability Design Requirements

As a minimum requirement, the length of the reinforcing at the base of the wall shall not be less than 0.7 times the total height of the blocks.

1.4.3 Layout

Shop drawings shall reflect all information needed to fabricate and erect the walls including the leveling pad elevations; the shape and dimensions of wall elements; the number, size, type, and details of the soil reinforcing system and anchorage; and identification of areas requiring coping. The design and layout of the internal reinforcement shall be subject to the following:

a. All features indicated in the contract documents shall be incorporated in the final design and construction.

b. The leveling pad elevations may vary, but shall be no higher than the embedment depth profile shown.

c. Each reinforcement level shall run as continuous as practical throughout the profile. If a geotextile filter is present, the reinforcement shall be laid out so that interference with the geotextile is minimized.

d. Any reinforcement not placed with the machine direction as the design reinforcement direction shall be identified on the shop drawings.

e. Reinforcement attached to the wall facing shall not combine geogrid and geotextile, nor products from different manufacturers, within one wall. The number of reinforcement products shall be limited to avoid confusion in placement. For walls under 12 feet high, all reinforcement shall be the same grade and strength (i.e. design with one reinforcement strength).

1.5 CONTRACTOR QUALIFICATIONS

The Contractor shall furnish Components and equipment that are standard products of a manufacturer regularly engaged in the manufacturing of products that are of a similar material, design and workmanship. The standard products shall have been in satisfactory commercial or industrial use for 2 years before bid opening. The job foreman or the company directly responsible for the wall installation shall have at least 2 years experience.

1.6 SUPPLIER QUALIFICATIONS

Suppliers of segmental retaining wall system components shall have demonstrated experience in the supply of similar size and types of segmental retaining walls on previous projects.

1.7 MANUFACTURER'S REPRESENTATIVE

The Contractor shall have a qualified and experienced representative from the block or reinforcement manufacturer available on an as-needed basis during the wall construction. The representative shall visit the site for consultation as requested by the Contracting Officer.

1.8 DELIVERY, STORAGE AND HANDLING

The Contractor shall check products upon delivery to assure that the proper material has been received and is undamaged. For geosynthetics, the guidelines presented in ASTM D 4873 shall be followed.

1.8.1 Segmental Concrete Units and Wall Caps

The Contractor shall protect blocks from damage and exposure to cement, paint, excessive mud, and like materials. The Contractor shall check materials upon delivery to assure that the block dimensions are within the tolerances specified.

1.8.2 Geosynthetic Labeling

Each roll shall be labeled with the manufacturer's name, product identification, roll dimensions, lot number, and date manufactured.

1.8.3 Geosynthetic Handling

Geosynthetic rolls shall be handled and unloaded by hand, or with load carrying straps, a fork lift with a stinger bar, or an axial bar assembly. Geosynthetic rolls shall not be dragged, lifted by one end, lifted by cables or chains, or dropped to the ground.

1.8.4 Geosynthetic Storage

Geosynthetics shall be protected from cement, paint, excessive mud,

chemicals, sparks and flames, temperatures in excess of 160 degrees F, and any other environmental condition that may degrade the physical properties. If stored outdoors, the rolls shall be elevated from the ground surface. Geosynthetics, except for extruded grids, shall be protected with an opaque waterproof cover. Geosynthetics shall be delivered to the site in a dry and undamaged condition. Geotextiles shall not be exposed to direct sunlight for more than 7 days.

PART 2 PRODUCTS

2.1 SEGMENTAL CONCRETE UNITS

2.1.1 Architectural requirements

a. Face color - Natural Limestone.

b. Face Texture - split face typical of broken mortar.

c. Face Appearance - sculptured with 3-surface beveled face.

d. Batter - Blocks shall be engaged to the block below by use of keys, lips, pins, clips, or other reliable mechanism to provide a consistent wall batter .

e. Block Size - a minimum of 2/3 square feet of face area, and minimum 6 inch height.

f. Bond configuration - No bond configuration is required for straight face blocks. Beveled or sculptured face blocks shall be designed to stack with a half-bond (joints located at midpoint of vertically adjacent blocks). The block edges shall be finished so that vertical joints are flush.

2.1.2 Structural requirements

The blocks shall be manufactured to the requirements of ASTM C 1372, except for the following modifications:

a. Minimum 28-day compressive strength of 4500 psi, based on net area in accordance with ASTM C 140.

b. A maximum moisture absorption rate of 9 pcf, in accordance with ASTM C 140.

c. The minimum oven dry density of concrete shall be 125 pcf.

d. The blocks shall provide a minimum of 80 psf of wall face area (determined without void filling).

e. For freeze-thaw durability tested in accordance with ASTM C 1262, specimens shall comply with either of the following: (1) the weight loss of each of 5 specimens after 100 cycles shall not exceed 1 percent; or (2) the weight loss of each of 5 specimens after 150 cycles shall not exceed 1.5 percent.

2.1.3 Wall Caps

Segmental concrete block units shall be placed as caps on top of all segmental concrete retaining walls. The cap blocks shall have a color and

texture on exposed faces to match that of the other blocks and meet the requirements for the other blocks except that the minimum height shall be 3 inches. Each cap block shall have abutting edges saw cut or formed to provide tight, flush abutting joints with no gaps in the joints when placed end to end in the alignment shown on the drawings.

2.2 REINFORCEMENT

2.2.1 Geogrid Reinforcement

Geogrid shall be a geosynthetic manufactured for reinforcement applications. The geogrid shall be a regular network of integrally connected polymer tensile elements with aperture geometry sufficient to permit significant mechanical interlock with the surrounding soil, aggregate, or other fill materials. The geogrid structure shall be dimensionally stable and able to retain its geometry under manufacture, transport and installation. The geogrid shall be manufactured with 100 percent virgin resin consisting of polyethylene, polypropylene, or polyester, and with a maximum of 5 percent in-plant regrind material. Polyester resin shall have a minimum molecular weight of 25,000 and a carboxyl end group number less than 30. Polyethylene and polypropylene shall be stabilized with long term antioxidants.

2.2.2 Geotextile Reinforcement

Geotextile shall be a pervious sheet of polymeric material and shall consist of long-chain synthetic polymers composed of at least 95 percent by weight polyethylene, polypropylene, or polyesters. The geotextile shall be manufactured with 100 percent virgin resin, and with a maximum of 5 percent in-plant regrind material. Geotextile shall be formed into a network such that the filaments or yarns retain dimensional stability relative to each other, including the selvages. Polyester resin shall have a minimum molecular weight of 20,000 and a carboxyl end group number less than 50. Polyethylene and polypropylene shall be stabilized with long term antioxidants.

For survivability during installation, and in addition to installation damage used in calculating the long term design strength, the geotextile shall meet the minimum requirements in AASHTO M 288 Class 1, and shall have a minimum mass per unit area of 8 oz/sy.

2.2.3 Reinforcement Properties

The reinforcement shown in the approved shop drawing submittal shall meet the long term design strength requirements used in the design, and shall meet the properties listed in Table 1. Reinforcement strength requirements represent minimum average roll values in the machine direction.

TABLE 1. REINFORCEMENT PROPERTIES

PROPERTY	REQUIREMENT	TEST DESIGNATION
Permittivity (geotextiles)	0.5 per second	ASTM D 4491
UV Resistance	70 percent after 500 hours	ASTM D 4355

2.2.3.1 Long Term Design Strength

The long term design strength shall be based on reduction factors for installation damage and durability that are applicable to the fill that will be used. Minimum reduction factors for durability include: 1.1 for polyethylene and polypropylene geosynthetics, 1.15 for coated polyester geogrids, and 1.6 for polyester geotextiles. The creep reduction factor must be consistent with the test procedure used for determining the ultimate strength.

2.3 GEOTEXTILE FILTER

Geotextiles used as filters shall meet the requirements specified in Table 2. The property values (except for AOS) represent minimum average roll values (MARV) in the weakest principal direction. For survivability during installation, the geotextile shall meet the minimum requirements in AASHTO M 288 Class 2, and shall have a minimum mass per unit area of 8 oz/sy.

TABLE 2. GEOTEXTILE PHYSICAL PROPERTIES

PROPERTY	TEST REQUIREMENT	TEST METHOD
Grab Tensile, lbs.	160 nonwoven 250 woven	ASTM D 4632
Apparent Opening Size (U.S. Sieve)	70 - 100	ASTM D 4751
Permittivity, sec-1	0.5	ASTM D 4491

2.4 SOILS AND AGGREGATES

All material placed as fill shall consist of material classified by ASTM D 2487 as GW, GP, GC, GM, SP, SM, SC, CL, ML, or SW. The material shall be free of ice; snow; frozen earth; trash; debris; sod; roots; organic matter; contamination from hazardous, toxic or radiological substances; or stones larger than 3 inches in any dimension. Each material shall be obtained entirely from one borrow source, unless the Contracting Officer determines that quality control is adequate and the alternate source produces material that is similar in gradation, texture, and interaction with the reinforcement. The Contractor shall supply any testing required by the Contracting Officer to evaluate alternate sources. All materials shall be of a character and quality satisfactory for the purpose intended.

a. Drainage Aggregate shall meet the requirements of ASTM D 448, size No.7.

b. Aggregate Base material for the wall leveling pads shall meet the requirements of ASTM D 1241, gradation C.

c. Reinforced Fill. Soil placed in the reinforced fill zone shall consist of granular material with less than 5 percent passing the No. 200 sieve.

c. Retained Fill. Soil placed in the retained fill zone shall meet the minimum requirements above.

2.5 MASONRY ADHESIVE

The masonry adhesive shall meet the following requirements:

a. ASTM C 920, Type S, Grade NS, Class 25
b. expected 30 year life
c. meet the recommendations of the block manufacturer

2.6 DRAINAGE PIPE

The drainage pipe shall be corrugated polyethylene pipe meeting requirements of AASHTO M 252.

PART 3 EXECUTION

3.1 CLASSIFICATION OF SOIL MATERIALS

Classification of soil materials shall be performed by the Contractor in accordance with ASTM D 2488. The Contracting Officer reserves the right to revise the Contractor classifications. In the case of disagreement, the Contracting Officer's classification will govern unless the soils are classified in accordance with ASTM D 2487. All testing completed by the Contractor in conjunction with soil material classification will be considered incidental to the contract work.

3.2 EARTHWORK

The leveling pad and reinforced fill zone shall bear on undisturbed native soils, or acceptably placed and compacted fill. In the event that it is necessary to remove material to a depth greater than specified or to place fill below the leveling pad not otherwise provided for in the contract, the Contracting Officer shall be notified prior to work and an adjustment in the contract price will be considered in accordance with the contract. Additional work not authorized by the Contracting Officer shall be at the Contractor's expense.

3.2.1 Excavation

Foundation soil shall be excavated as required for leveling pad dimensions and reinforcement placement shown on the construction drawings. Material for backfilling shall be stockpiled in a neat and orderly manner at a sufficient distance from the banks of the excavation to avoid overloading and to prevent slides or caving. Excavation and fill shall be performed in a manner and sequence that will provide proper drainage at all times. The Contractor is responsible for disposal of surplus material, waste material, and material that does not meet specifications, including any soil which is disturbed by the Contractor's operations or softened due to exposure to the elements and water.

3.2.2 Stockpiles

Stockpiles of all material to be incorporated into the work shall be kept in a neat and well drained condition, giving due consideration to drainage at all times. The ground surface at stockpile locations shall be cleared, grubbed, and sealed. Topsoil shall be stockpiled separately from suitable backfill material. Stockpiles of aggregates and granular soils shall be protected from contamination which may destroy the quality and fitness of the stockpiled material. If the Contractor fails to protect the stockpiles, and any material becomes frozen, saturated, intermixed with

other materials, or otherwise out of specification or unsatisfactory for the use intended, such material shall be removed and replaced with new material from approved sources at no additional cost to the Government.

3.3 LEVELING PAD

3.3.1 Aggregate Base Leveling Pad

The subgrade below the leveling pad shall be compacted with at least 3 passes with a vibratory plate compactor with an operating weight not less than 450 pounds. The aggregate base material shall be placed in lifts not exceeding 6 inches and compacted with at least 3 passes with a vibratory plate compactor. If the subgrade or aggregate base pumps, bleeds water, or cracks during compaction, the Contracting Officer shall be notified and, if no other changes are directed, the aggregate shall be replaced with a concrete leveling pad.

3.3.2 Concrete Leveling Pad

Tolerances in screeding shall be sufficient to place the blocks directly on the leveling pad without mortar, pointing, or leveling course between the blocks and leveling pad.

3.4 BLOCK INSTALLATION

The wall system components shall be constructed in accordance with the wall supplier's recommendations and construction manual. Damaged blocks shall not be incorporated in the retaining wall.

a. Block placement shall begin at the lowest leveling pad elevation. The blocks shall be in full contact with the leveling pad. Each course of block shall be placed sequentially for the entire wall alignment to maintain a level working platform for layout of reinforcement and placement of fill.

b. The grade and alignment of the first course shall be surveyed and the results furnished to the Contracting Officer prior to placing the second course. Survey control for alignment shall include a string line, offset from a base line, or suitable provisions that can be reproduced for quality assurance.

c. The blocks shall be placed with the edges in tight contact. The vertical joints shall be maintained with a minimum 4 inch overlap on the underlying block. Coping required to keep block alignment shall be done with a full depth saw cut. No splitting shall be allowed.

d. Stacking of blocks prior to filling any lower course of block with drainage aggregate will not be allowed.

e. Cap units shall be joined using masonry adhesive. Care shall be taken to keep adhesive from coming into contact with the face of wall units.

3.5 REINFORCEMENT INSTALLATION

a. Before placing reinforcement, the subgrade or subsequent lift of fill shall be compacted and graded level with the top of the blocks. The surface shall be smooth and free of windrows, sheepsfoot impressions, and rocks.

b. Reinforcement shall be placed at the elevations and to the extent shown on the construction drawings and the approved shop drawing submittal. Reinforcement shall be oriented with the design strength axis perpendicular to the wall face. Each segment of reinforcement shall be continuous. Spliced connections between shorter pieces of reinforcement will not be allowed. Reinforcement strips shall be placed immediately next to adjacent strips to provide 100 percent coverage.

c. The reinforcement shall be installed in tension. The reinforcement shall be pulled taut and anchored with staples or stakes prior to placing the overlying lift of fill. The tension shall be uniform along the length of the wall and consistent between layers.

d. All reinforcement shall be 100% covered by soil so that reinforcement panels do not contact in overlaps. Where the wall bends, a veneer of fill shall be placed to a nominal thickness of 3 inches to separate overlapping reinforcement.

3.6 FILL PLACEMENT

a. Fill placement, including drainage aggregate, shall be completed to the top of each course of facing blocks prior to stacking the subsequent course of blocks.

b. Reinforced fill shall be placed from the wall back toward the fill area to ensure that the reinforcement remains taut. Fill shall be placed, spread, and compacted in such manner that minimizes the development of wrinkles in or movement of the reinforcement.

c. A minimum fill thickness of 6 inches is required prior to operation of vehicles over the reinforcement. Sudden braking and sharp turning shall be avoided. Tracked equipment shall not turn within the reinforced fill zone to prevent tracks from displacing the fill and damaging the reinforcement. Construction equipment shall not be operated directly upon the reinforcement as part of the planned construction sequence. Rubber tired equipment may operate directly on the reinforcement if: the Contractor submits information documenting testing of equipment operating on a similar geogrid product on similar soils, the travel is infrequent, equipment travels slow, turning is minimized, and no damage or displacement to the reinforcement is observed.

d. Drainage aggregate shall be placed and tamped directly behind, between, and within the cells of the facing units. Compaction of the drainage aggregate shall be achieved by at least two passes on each lift with a vibratory plate compactor. Care shall be taken not to contact or chip the blocks with the compactor. Aggregate placed within the block cores and recesses shall be compacted by hand tamping and rodding.

e. At the end of each day, the Contractor shall slope the last lift of fill away from the wall in a manner that will allow drainage and direct runoff away from the wall face.

3.7 COMPACTION

Fill shall not be placed on surfaces that contain mud, frost, organic

soils, fill soils that have not met compaction requirements, or where the Contracting Officer determines that unsatisfactory material remains in or under the fill. Fill shall be spread and compacted in lifts not exceeding the height of one course of blocks.

3.7.1 Degree of Compaction

Degree of compaction required is expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D 698. The maximum density is hereafter abbreviated as the "Standard Proctor" value.

3.7.2 Moisture Control

Control of moisture in the fill shall be maintained to provide acceptable compaction. Disking and plowing will not be allowed in the reinforced fill zone. Moisture content of cohesive soils shall be adjusted at the borrow source before placement. Adding water directly to the reinforced fill zone shall only be conducted under conditions where the soil has sufficient porosity and capillarity to provide uniform moisture throughout the fill during compaction.

3.7.3 Compaction

Reinforced and retained fill shall be compacted to 95 percent of the Standard Proctor Density. Care shall be exercised in the compaction process to avoid misalignment of the facing blocks. Heavy compaction equipment (including vibratory drum rollers) shall not be used within3 feet from the wall face.

3.8 SOIL TESTING

3.8.1 General

All testing expenses shall be the Contractor's responsibility. Prior to sampling and testing the work, testing laboratories shall be inspected and approved in accordance with Section 01 45 04.00 10 CONTRACTOR QUALITY CONTROL. The Contracting Officer reserves the right to direct the location and select the material for samples to be tested and to direct where and when moisture-density tests shall be performed. Nuclear density testing equipment shall be used in general accordance with ASTM D 2922.

3.8.2 Transmittal

The Contracting Officer shall be informed of test results daily for direction on corrective action required. Draft copies of field testing results shall be furnished to the Contracting Officer on a frequent and regular basis, as directed.

3.8.3 Corrective Action.

Tests of materials which do not meet the contract requirements (failing test) will not be counted as part of the required testing. Each such failing test must be retaken at the same location as the failing test was taken. If testing indicates material does not meet the contract requirements, the material represented by the failing test shall not be placed in the contract work or shall be recompacted or removed. The quantity of material represented by the failing test shall be determined by the Contracting Officer up to the quantity represented by the testing frequency. The Contractor may increase testing frequency in the vicinity

of a failing test in order to reduce removal requirements, as approved by the Contracting Officer. Such increases in testing frequency shall be at the Contractor's expense and at no additional cost to the Government.

3.8.4 Testing Schedule

Moisture-Density Relations (ASTM D 698)

One test for each material variation.

In-Place Densities (ASTM D 1556 or ASTM D 2922)

Not less than 1 test for each 2 vertical feet per 100 linear feet along wall face.

Sieve Analysis, (ASTM C 136)

(1) Drainage Aggregate, 1 test for each source.

3.9 CONSTRUCTION TOLERANCES

a. Horizontal: The top of wall shall be within 3 inches of the plan location.

b. Vertical: The top of wall elevations shall be within 0.1 feet above to 0.1 feet below the prescribed top of wall elevations shown on the drawings.

c. Plumbness and Alignment: The wall batter and alignment offset measured as deviation from a straight edge shall be within plus or minus 1.25 inches per 10 feet section. The batter measured from vertical shall be within 2 degrees of the plan dimension.

d. Block Defects: The blocks will be accepted on the basis of tolerances specified in ASTM C 1372.

e. Block Gaps: Gaps between adjacent blocks shall not exceed 1/8 inches.

3.10 PROTECTION OF WORK

Work shall be protected against damage from subsequent operations. Disturbed or displaced blocks shall be removed and replaced to conform to all requirements of this section. Damaged material shall not be incorporated into the wall. Upon completion of wall erection, the Contractor shall clean the wall face to remove any loose soil deposits or stains.

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SECTION 32 34 00

FABRICATED BRIDGES

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) Standard Specifications for Highway Bridges
AASHTO GSDPB-1	(1997) Guide Specifications for Pedestrian Bridges

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1/D1.1M	(2006) Structural Welding Code - Steel
AWS D1.5	(2002) Bridge Welding Code

ASTM INTERNATIONAL (ASTM)

ASTM A 29/A 29M	(2005) Standard Specification for Steel Bars, Carbon and Alloy, Hot-Wrought General Requirements for
ASTM A 588/A 588M	(2005) High-Strength Low-Alloy Structural Steel with 50 ksi (345 MPa) Minimum Yield Point to 4 in. (100 mm) Thick

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

AISC 303	(2005) Code of Standard Practice for Steel Buildings and Bridges

AMERICAN WOOD-PRESERVERS' ASSOCIATION (AWPA)

AWPA C1	(2003) All Timber Products - Preservative Treatment by Pressure Processes

1.2 GENERAL REQUIREMENTS

1.2.1 Manufacturer's Instructions

Manufacturer's Instructions shall be submitted by the Contractor for all bridges, indicating splicing and erection procedures, warranty information, and inspection and maintenance procedures.

1.2.2 Design Criteria

The bridge superstructures shall be designed and fabricated in accordance with AISC 303, AWS D1.5, and conform to the rules and standards of AASHTO GSDPB-1 and applicable sections of AASHTO HB-17.

1.2.3 Design Analysis and Calculations

Design Analysis and Calculations for all bridges shall be prepared and certified by a registered professional structural engineer. These shall be submitted 45 days prior to construction of the abutments and piers to verify design requirements.

1.2.4 Manufacturer's Experience

Bridge Manufacturer shall have been in the business of design and fabrication of bridges for a minimum of five years.

1.2.5 Bridge System

The bridge system shall be structural steel, half-through truss system as approved by the contracting officer.

1.2.6 Camber

The bridge shall have a vertical camber dimension at midspan equal to 100% of the full dead load deflection plus a maximum of 0.1% of the full length of the bridge.

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 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Manufacturer's Instructions

Manufacturer's Instructions shall be submitted in accordance with paragraph entitled, "General Requirements," of this section.

Design Analysis and Calculations;G, LRH

Design Analysis and Calculations shall be submitted in accordance with paragrpah entitled, "General Requirements," of this section.

SD-02 Shop Drawings

Fabrication Drawings shall be submitted for all bridges.

Erection Drawings shall be submitted for all bridge abutments and piers.

SD-03 Product Data

Welding Procedure Qualifications; G, DS

Welder, Welding Operator, and Tacker Qualification; G, DS
Inspector Qualification; G, DS
Pre-qualified Procedures; G, DS

Copies of the welding procedure specifications; the procedure qualification test records; and the welder, welding operator, or tacker qualification test records.

Manufacturer's catalog data shall be submitted for the following items, including accessories and installation materials.

Structural Steel Truss
Bridge Bearings
Anchor Bolts

SD-04 Samples

Stamped and Dyed Concrete

SD-05 Design Data

Design analysis and calculations for all bridges shall be submitted in accordance with paragraph entitled, "General Requirements," of this section.

SD-06 Test Reports

Quality Control
Nondestructive Examination

A quality assurance plan and records of tests and inspections.

Concrete Mixture Proportions for Dyed Concrete; G, DS

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.

SD-07 Certificates

Certificates shall be submitted for the following items.

Materials
Equipment
Accessories

PART 2 PRODUCTS

2.1 STRUCTURAL STEEL TRUSS

2.1.1 Steel

Structural steel for the bridges shall conform to ASTM A 588/A 588M.

2.1.2 Connections

Splice connection plates shall not protrude beyond the safety rails. All

welds shall be smooth and free of any defects. All welding of tubular sections shall conform to AWS D1.1/D1.1M. All other welding shall conform to AWS D1.5.

2.1.3 Bearings

One end of each bridge shall be fixed with the opposite end allowing for thermal expansion. Bearing details and any modifications to the contract plans for the abutments and piers required to meet the bridge manufacturer's requirements shall be submitted 45 days prior to construction of the abutments and piers.

2.2 SAFETY RAILS

Safety rails shall be supplied to a height not less than 54" from the deck surface. Rails shall be spaced such that a 4" sphere can not pass through and shall be designed to withstand a 200 pound load in any direction at any location. A continuous toe plate shall also be provided 2" above the deck surface. Rails shall be treated wood conforming to AWPA C1, structural steel conforming to ASTM A 588/A 588M, or wrought iron conforming to ASTM A 29/A 29M as approved by the Contracting Officer.

2.3 DECK

Deck shall consist of treated wood planks conforming to AWPA C1 designed to meet the load requirements specified herein. Provisions shall also be made for future replacement with an asphalt paved surface. The East of Kennedy Bridge shall be designed for a 6" concrete deck with provisions for an asphalt overlay.

2.4 ABUTMENTS

2.4.1 Concrete

Concrete for the abutments, deck and piers shall be in accordance with Section 03 30 00.00 CONCRETE. The concrete deck shall be stamped and dyed to replicate brick pavers. The stamp pattern shall be a new brick - running bond. A 36 inch by 36 inch by 3 inch thick stamped and dyed concrete sample shall be submitted. A sample of the dyed concrete mixture shall be submitted for approval.

2.4.2 Reinforcing Steel

Reinforcing steel for the abutments and piers shall be in accordance with Section 03 30 00.00 CONCRETE.

2.4.3 H-Piles

Steel H-Piles for the abutments and piers shall be in accordance with Section 31 62 16.00 10 STEEL H-PILES.

2.4.4 Metal Sheet Piling

Metal sheet piling for the abutments and piers shall be in accordance with Section 35 49 13.10 03 METAL SHEET PILING.

PART 3 EXECUTION

3.1 ASSEMBLY AND ERECTION

Assembly and erection shall be on a prepared foundation in accordance with the manufacturer's instructions and recommendations.

Manufacturer shall furnish either templates or an anchor bolt layout drawing that must be used for the location of anchor bolts.

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SECTION 32 92 19.13

TURF

PART 1 GENERAL

1.1 SCOPE

This section includes the furnishing and planting of turf grass varieties as shown and specified.

1.2 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

Proof of Seed Order

Contractor shall submit proof of seed order for all seed mixes as specified within this section within 30 days of notice to proceed.

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.

Fertilizer

For chemical analysis composition percent.

SD-08 Manufacturer's Instructions

Manufacturer's Literature

Discussing physical characteristics, applications, guarantees, and installation.

SD-10 Operation and Maintenance Data

Maintenance Instructions

Three copies written instructions for long-term and year-round

care of turfed areas.

1.3 DELIVERY, STORAGE, AND HANDLING

1.3.1 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.

1.3.2 Storage

Materials shall be stored in areas provided by the Contractor. Seed and fertilizer shall be stored in cool, dry locations away from contaminants. Chemical treatment materials shall not be stored with other landscape materials.

1.3.3 Handling

Except for bulk deliveries, materials shall not be dropped or dumped from vehicles.

PART 2 PRODUCTS

2.1 SEED

2.1.1 INDOT 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 01, Federal Seed Act Regulations and applicable state seed laws.

2.1.2 Seed Mixtures

The drawings indicate which areas are to be seeded with the turf grass seed mix shown in Table 1 at the end of this section.

2.1.3 Weed Seed

Weed seed shall not exceed 1 percent by weight of the total mixture. Wet, moldy, or otherwise damaged seed will be rejected. Create field mixes on site in the presence of the Contracting Officer's Representative.

2.2 OTHER MATERIALS

2.2.1 Soil Amendments

Soil amendments shall consist of standard 12-12-12 fertilizer and soil conditioners meeting the following requirements: Commercial grade, free flowing, uniform in composition, and conforming to Article 913.03 of INDOT, Standard Specifications. Fertilizers shall be applied at the rate of 800 lbs per acre.

2.2.2 Mulches

Mulches shall be free from weeds, mold, and other deleterious materials.

2.2.3 Straw Mulch Materials

Straw mulch materials shall consist of wheat, oat, or rye straw, hay, grass cut from native grasses, or other plants approved by the Contracting Officer. The mulch material shall be air dry, reasonably light in color, and shall not be musty, moldy, caked, or otherwise of low quality. The mulch shall be seed free or fumigated to prevent introduction of weeds. The use of mulch that contains noxious weeds will not be accepted. Dry mulching material which breaks and does not bend is unacceptable. Mulch shall have a consistency for placing with commercial mulch blowing equipment.

2.2.4 Water

Water shall be of a quality suitable for irrigation.

2.2.5 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.

2.3 SOIL EROSION

Soil erosion control shall conform to the following:

2.3.1 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.

2.3.2 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.

2.3.3 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.

2.3.4 Erosion Control Anchor Material

Erosion control anchor material shall be as recommended by the manufacturer.

2.4 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 from April 15 to June 30 for spring planting and from September 1 to October 15 for fall planting.

3.2 SITE PREPARATION

3.2.1 Preparation of Seeding Areas

3.2.1.1 Grading

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 turfing.

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 Existing Ground Cover

Existing ground cover shall be mowed on both sides of levee. Herbicide shall be applied to the mowed areas.

3.2.3 Tilling

3.2.3.1 Minimum Depth

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.

3.2.3.2 Applying Fertilizer

For areas seeded with the seed mixture shown in Table 1, fertilizer, as specified herein, may be applied during tilling in accordance with the manufacturers recommendations.

3.2.4 Finished Grading

3.2.4.1 Preparation

Turf 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. Turf 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.

3.2.4.2 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.

3.2.4.3 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.

3.3.1 General

Seed shall be applied to the areas designated on the plans immediately following the completion of site preparation. Climatic conditions should be favorable for growth. Seed may be drilled using a Truax seed drill or other approved equipment, broadcast and raked into the soil, or hydroseeded. Other seeding methods are subject to approval. When drills are used, markers or other means shall be provided to insure that the successive seeded strips shall overlap or be separated by a space no greater than equipment row spacings. When delays in operations extend the work beyond the most favorable planting season, or when conditions are unsuitable due to drought, high winds, excessive moisture, or other factors so that satisfactory results are not likely to be obtained, work shall be halted as directed and resumed only when conditions are favorable or when approved alternate or corrective measures and procedures have been effected. If inspection during seeding operations or after germination indicates that strips wider than the space between the rows planted have been left unplanted, additional seed shall be sown as directed.

3.3.2 Broadcast Seeding

In areas inaccessible to drill seeding, seed shall be broadcast by hand. Seed shall be distributed uniformly over designated areas. Half of seed shall be sown with sower moving in one direction, and the remainder with sower moving at right angles to first sowing. Seed shall be covered to an average depth of 1/4 inch by brush harrow, spike-tooth harrow, chain harrow, cultipacker, hand rake with wood tines, or other approved device. Seed shall not be broadcast when wind speed exceeds 5 miles per hour.

3.3.3 Drill Seeding

Drill seeding shall be accomplished with approved equipment with drills set not more than 1-2 inches apart. Drill seeding shall occur across slopes parallel with the contours and not up and down slopes. Seed shall be uniformly drilled to a maximum 1/4-inch depth. When slopes exceed 1 vertical on 5 horizontal, baffle plates spaced not more than 6 inches apart shall be installed in the seed box.

3.3.4 Seeding Rate

Seed shall be uniformly mixed and applied at the rate stated in the seed mix table.

3.3.5 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.

3.3.6 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.

3.3.7 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.

3.3.8 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.

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, at no additional cost to the Government.

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 opreation 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 01 45 04.00 03, CONTRACTOR QUALITY CONTROL, including but not limited to the following:

A. Materials:

(a) Fertilizer
(b) Seed
(c) Mulch

B. Seeding, Sodding, 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.

TABLE 1 - TURF GRASS SEED MIX

Variety	Mixture Percent By Weight	Minimum Percent Pure Live Seed	Minimum Percent Germination
	Kentucky Blue Grass		
Blue Moon	20	95.0	85.0
Freedom III	20	95.0	85.0
	Perennial Rye Grass		
Goalkeeper	30	95.0	90.0
Top Gun	30	95.0	90.0

GRASS SEEDING RATE: 4 lbs. per 1000 sq.ft.

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STORM-DRAINAGE UTILITIES

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 the basic designation only.

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C 110 87	Ductile Iron and Gray Iron Fittings, 3 in. Through 48 in. for Water and Other Liquids
AWWA C 111-90	Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
AWWA C 115 88	Flanged Ductile-Iron Pipe with Threaded Flanges
AWWA C 150 91	Thickness Design of Ductile-Iron Pipe
AWWA C 151 91	Ductile Iron Pipe, Centrifugally Cast, for Water or Other Liquids

ASTM INTERNATIONAL (ASTM)

ASTM A 48	(1994ae1) Gray Iron Castings
ASTM C 270	(2003) Mortar for Unit Masonry
ASTM C 443	(2002) Joints for Concrete Pipe and Manholes, Using Rubber Gaskets
ASTM C 478	(2003) Precast Reinforced Concrete Manhole Sections
ASTM C 655	(2004e1) Reinforced Concrete D-Load Culvert, Storm Drain, and Sewer Pipe
ASTM C 76	(2003) Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
ASTM D 698	(2000a) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu. ft. (600 kN-m/cu. m.))

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO M 252	(2006) Corrugated Polyethylene Drainage Pipe

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI B16.5 88	Pipe Flanges and Flanged Fittings

INDIANA DEPARTMENT OF TRANSPORTATION (INDOT)

INDOT	Indiana Department of Highways Standard Specifications (2004) and Current Supplemental Specifications

1.2 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 01 33 00 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.

Installation Procedures; G

The Contractor shall submit to the Contracting Officer for approval details giving the method and equipment to be used for the installation procedures of the storm drainage system, 45 days prior to the start of construction;

SD-06 Test Reports

Certification

Certified copies of test reports demonstrating conformance to applicable pipe material and pipe joint specifications shall be delivered to the Contracting Officer 30 days before pipe is installed.

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 pipe and fittings shall be kept free of dirt and debris.

1.3.2 Handling

Materials shall be handled in such a manner as to insure delivery to the trench in sound, undamaged condition. Pipe shall be carried to the trench, not dragged.

PART 2 PRODUCTS

2.1 PIPE FOR CULVERT, STORM DRAINS, AND FRENCH DRAINS

Pipes shall be the sizes indicated on the plans and shall conform to the requirements for the following pertinent pipe types:

2.1.1 Reinforced Concrete D-Load Culvert, Storm Drain, and Sewer Pipe for Levee Crossings.

The pipe shall meet the requirements of ASTM C 655 with either steel or concrete bell-and-spigot surfaces and solid-ring rubber gaskets having a circular cross section.

2.1.2 Ductile Iron Pipe

2.1.2.1 Pipe Standards

Ductile iron pipe shall conform to AWWA C 150 91 and AWWA C 151 91, thickness Class 53 for flanged piping. Pipe sizes as indicated on the drawings.

2.1.2.2 Fittings

Material, thickness, and pressure rating shall be Class 150. A cement-mortar lining shall be applied. Linings, coatings, and wrappings shall be as specified for the pipe except hand applications may be used when machine application is not practicable. Fittings shall conform to AWWA C 110 87 and ANSI B16.5 88 as appropriate. Pipe shall be furnished with flanged ends, where shown, in accordance with AWWA C 115 88 Class 150. Flanges shall be ductile iron in accordance with AWWA C 110 87.

2.1.2.3 Push-On Joints

Push-on joints shall conform to AWWA C 111-90. Push-on joints shall allow a 5-degree deflection angle over a 20-foot laying length. Flex/ball joints shall conform to AWWA C 111-90. Flex/ball joints shall allow a 15-degree deflection over a 20-foot laying length. Flex/ball joints shall be American Flex-Lok boltless ball joint pipe or equal.

2.1.3 French Drain Pipe

AASHTO M 252, Type C, 8-inch diamter, Perforated Corrugated Polyethylene (PCPE) Drainage Tubing with geotextile wrap. Tubing may be supplied coiled from the manufacturer.

2.1.3.1 Perforations

Perforations shall be slotted holes not exceeding 1/8-inch wide by 7/8-inch

long each. The perforations shall provide a one square inch water inlet area per linear foot of tubing.

2.2 END SECTIONS

2.2.1 Reinforced Concrete End Sections

Reinforced concrete end sections shall be constructed in accordance with the requirements of ASTM C 76.

2.2.2 Trash Racks

Each end section is to be fitted with a trash rack. These features are also called safety guards. The drawings indicate the basic dimensions for the trash racks and some of the material sizes and shapes. It is intended that the trash racks be the standard product of a reputable manufacturer who is in the business of fabricating these trash rack for installation on precast end section.

2.3 DRAINAGE STRUCTURES

2.3.1 Catch Basins and Manholes

Construction shall be of precast reinforced concrete in accordance with ASTM C 478, complete with frames and gratings as shown on the plans.

2.3.2 Concrete Cradle

A concrete cradle shall be provided both upstream and downstream of the gatewell for the first length of pipe, dowelled to the gatewell, with allowance for slight deflection. Bedding that is disturbed by more than one foot along the pipe shall be backfilled with lean concrete, with allowance for rotation at the pipe joints. Compacting bedding under an installed pipe is not permitted.

2.3.3 Castings

Each manhole and catch basin is to be constructed with a gray iron casting on the top as indicated on the drawings. The castings shall be fabricated by a manufacturer whose normal business is the production of such castings. Metal used in the manufacture of the castings shall conform to ASTM A 48. All castings shall be manufactured true to pattern. Component parts shall fit together in a satisfactory manner. Round frames and covers shall have continuously machined bearing surfaces to prevent rocking and rattling.

2.4 MATERIALS FOR DRAINAGE STRUCTURES

2.4.1 Concrete

Concrete used for Gatewell structures shall conform to the requirements outlined in Section 03 30 00.00 CAST-IN-PLACE REINFORCED STRUCTURAL CONCRETE.

2.4.2 Mortar

Mortar for pipe joints and connections to other drainage structures, shall conform to ASTM C 270, Type M, except the maximum replacement time shall be 1 hour. The quantity of water in the mixture shall be sufficient to produce a stiff workable mortar. Water shall be clean and free of harmful

acids, alkalis, and organic impurities. The mortar shall be used within 30 minutes after the ingredients are mixed with water.

2.5 JOINTS

2.5.1 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.

2.5.2 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.

2.5.3 Ductile Iron Pipe

Joints for ductile iron pipe shall conform to the requirements of AWWA C 111-90.

2.6 ANNULAR FILTER

Annular Filter placed around the pipes as indicated on the drawings shall be a clean pit-run gravelly-sand obtained by the Contractor from an approved off-site source meeting the following gradation requirements:

Sieve Designation	Percent Passing By Weight
1 Inch	100
No. 4	65-100
No. 40	5-45
No. 100	0-23
No. 200	0-5

PART 3 EXECUTION

3.1 GRAVITY FLOW OUTLETS AND PUMP STATION OUTLET

There are several gravity flow outlets and 1 pump station discharge outlet (24" Kennedy Ave. Apartment Pump Station) that will be replaced with new outlet pipes and other drainage structures. Temporary facilities, temporary bypass piping or temporary portable pumps shall be constructed and maintained as necessary to provide the gravity flow outlet capacity or pump station outlet capacity during the period of time when the existing outlet is out of service until the new outlet is complete. The capacity of the temporary feature shall be equal to the capacity of the existing outlet that is out of service. The bypass piping at the pump stations can be attached to the permanent discharge pipe within the outlet box and routed around the construction work as required.

3.1.1 Plans

Plans shall be submitted to Contracting Officer for approval detailing the temporary features to be constructed for each existing outlet to maintain the outlet capacity during construction of the permanent facility. The plans shall indicate the discharge capacity of each temporary feature and details for the construction of the temporary feature including materials to be used, design calculations, and the sequence of construction. The sequence of construction shall including removal of the existing outlet, construction of the temporary feature, construction of the permanent outlet and removal of the temporary feature. The plan for erosion protection shall also be included.

3.1.2 Discharge Capacity

The capacity of the gravity flow outlets is not known. The Contractor shall determine the discharge capacity of the existing outlet based on the type of pipe, the slope of the pipe, and other pertinent hydraulic features and include this information in the submittal.

3.2 EXCAVATION AND TRENCHING FOR PIPE CULVERTS, AND DRAINAGE STRUCTURES

Excavation of trenches and for appurtenances and backfilling for culverts and drainage structures and dewatering control measures shall be in accordance with Section 31 00 00, EARTHWORK, and the following requirements.

3.2.1 Trenching

The width of trenches at any point below the top of the pipe shall be less than the outside diameter of the pipe plus 48 inches to permit satisfactory jointing and thorough tamping of the bedding material under and around the pipe. Sheeting and bracing where required shall be placed within the trench width as specified. Care shall be taken not to over excavate. Where trench widths are exceeded, redesign with a resultant increase in cost of stronger pipe or special installation procedures shall be necessary. Cost of this redesign and increased cost of pipe or installation shall be borne by the Contractor without additional cost to the Government.

3.2.2 Removal of Unsuitable Material

Where wet or otherwise unsuitable soil incapable of properly supporting the pipe, as determined by the Contracting Officer,is encountered in the bottom of a trench, such material shall be removed to a depth to allow for construction of stable pipe bedding. When removal of unsuitable material is due to the fault or neglect of the Contractor in his performance of shoring and sheeting, water removal, or other specified requirements, resulting material shall be excavated and replaced at no additional cost to the Government.

3.2.3 Flow in Sewers

Contractor shall maintain flow in combined, storm, and sanitary sewers throughout the construction.

3.2.4 Pipes Crossing Beneath Levees

Excavation for pipes placed beneath the foundation of the levees shall extend to the depth shown on the drawings. The bottoms of trenches shall

be accurately graded to provide uniform bearing and support for the bottom quadrant of each section of pipe. Bell holes shall be excavated to the necessary size at each joint or coupling to eliminate point bearing. Stones of 3 inches or greater in any dimension, or as recommended by the pipe manufacturer, whichever is smaller, shall be removed to avoid point bearing. The trench width below the top of the 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.

3.2.5 Pipes Passing Through Levees

Pipes passing through the embankment of the levee shall be installed by the open cut method. The new levee shall be brought to a grade 2-feet above the crown of the pipe. The trench shall be excavated according to the "Excavation" paragraph. The excavated material shall be selectively stockpiled so that it can be replaced in a manner that will not alter the embankment zoning. In impervious zones, that backfill material should be compacted with mechanical compactors to be of comparable density to the surrounding soil or levee embankment. In lieu of compacted backfill, flowable fill may be used as shown on the drawings.

3.2.5.1 Bedding For Pipes Passing Through Levees

Bedding for pipes passing through levees shall be as shown on the plans. No granular bedding shall be used in the riverward 2/3 of the levee footprint.

3.3 BEDDING

The bedding surface for the pipe shall provide a firm foundation of uniform density throughout the entire length of the pipe and be bedded as shown on the plans. Hand-operated vibratory equipment shall be used for compaction. Each pipe section shall be firmly supported throughout the entire length, with recesses formed for bell joints. When necessary, the bedding shall be tamped. Bell holes and depressions for joints shall be only of such length, depth, and width as required for properly making the particular type of joint. It is required to shape the bedding to the pipe geometry.

3.4 PLACING PIPE

Each pipe shall be carefully examined before being laid, and defective or damaged pipe shall not be used. Pipelines shall be laid to the grades and alignment indicated on the plans. Proper facilities shall be provided for lowering sections of pipe into trenches. Lifting lugs in vertically elongated metal pipe shall be placed in the same vertical plane as the major axis of the pipe. Under no circumstances shall pipe be laid in water, and no pipe shall be laid when trench conditions are unsuitable. Diversion of drainage, dewatering of trenches, and construction of cofferdams during construction shall be provided as necessary. All pipe in place shall be inspected before backfilling, and those pipes damaged during placement shall be removed and replaced.

3.4.1 Pipe Length

Laying lengths for the Reinforced Concrete Pipe through the levee shall not exceed 8 feet. Two half lengths of pipe shall be used at location where there is a change in foundation condition. The lengths of the first sections of RCP into and out of gatewells shall be as indicated on the

drawings.

3.5 BACKFILLING

3.5.1 Backfilling Pipe in Trenches

After the pipe has been properly bedded and the joints and connections have been inspected and approved, selected material at a moisture content that will facilitate compaction shall be placed along both sides of pipe in layers not exceeding 6 inches in compacted depth. The backfill shall be brought up evenly on both sides of pipe for full length of pipe. Care shall be taken to insure thorough compaction of the fill under the haunches of the pipe. Flowable fill may be used as an alternative to compacted, impervious fill where shown on the drawings. Cohesive backfill shall be compacted with a mechanical tamper or rammer. Cohesionless backfill shall be compacted with a hand operated vibratory roller. This method of filling and compacting shall continue until the fill has reached an elevation of at least 12 inches above the top of the pipe. The remainder of the trench shall be backfilled in 8 inch lifts and compacted by spreading and rolling. Cohesive backfill shall be compacted with a mechanical tamper or rammer. Cohesionless backfill shall be compacted with vibratory compaction equipment. Tests for density will be made to insure conformance to the compaction requirements specified in the "Compaction" paragraph.

3.5.1.1 Backfill of Pipes Within the Foundation

Backfill of pipes within the foundation of the levee shall be done with impervious levee fill or flowable fill as shown on the drawings. An exception to this is the annular fill placed around the pipe as indicated on the drawing. All other pipe shall be backfilled with satisfactory materials as defined in Section 31 00 00.

3.5.2 Movement of Construction Machinery

In compacting by rolling or operating heavy equipment parallel with the pipe, displacement of or injury to the pipe shall be avoided. Movement of construction machinery over a culvert or storm drain at any stage of construction shall be at the Contractor's risk. Any pipe damaged thereby shall be repaired or replaced at no additional cost to the Government.

3.5.3 Compaction

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. Density of the backfill shall not be less than 95 percent of maximum dry density (ASTM D 698) within plus or minus 2 percent of optimum moisture for the material.

3.5.4 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 to insure that specified density is being obtained. A minimum of one (1) test shall be conducted at each culvert location.

3.6 CLEANING CULVERTS

Contractor shall clean the culvert of all silt, debris, and foreign matter to the satisfaction of the Contracting Officer. Diking and dewatering may be required if culvert is submerged.

3.7 JOINT TESTING

3.7.1 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.

3.7.2 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.

3.8 ANNULAR FILTER

3.8.1 Placing Filter Materials

At least 60 calendar days prior to placing filter materials, the Contractor shall notify the Contracting Officer of the proposed source. Prior to placing any filter materials, the Contractor shall submit two certified copies of gradation test results. The Contractor shall perform at least 2 gradation tests during placing operations and submit 2 certified copies of test results. Samples for gradation tests shall be taken from stockpiles or in-place materials as directed. Approval of the source and sampling prior to placing shall be as specified for bedding in SECTION 31 37 16.00 03 EROSION AND SEDIMENTATION CONTROL.

3.8.2 Installation

Annular filter material shall be placed as shown and as specified for backfilling in SECTION 31 00 00 EARTHWORK.

3.9 QUALITY CONTROL

3.9.1 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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VERTICAL PREFABRICATED DRAINAGE WICKS

PART 1 GENERAL

1.1 SCOPE

This section covers all plant, labor, equipment, and materials necessary for providing vertical plastic drainage wicks in accordance with details shown and the requirements of these specifications. Wicks shall consist of a band-shaped plastic core enclosed in a suitable filter material and shall be spaced and arranged as shown.

1.2 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 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Drawings and Schedule; G, DG

SD-04 Samples

Drainage wick samples

In addition to samples, the Contractor shall submit the name of the installer and experience demonstrating the installer's ability to perform this type of work.

PART 2 PRODUCTS

2.1 MATERIAL

Drainage wick shall be prefabricated type made up of a ribbed or corrugated plastic core wrapped in a filter of a non-woven synthetic material. The core shall be fabricated with suitable drainage channels. Drains shall be free of defects, rips, holes, or tears. During shipment and storage, drains must be wrapped in protective covering. Storage area shall protect the drain material from sunlight, mud, dirt, dust, debris, and detrimental substance. Gradation of the granular blanket shall be in accordance with manufacturer's recommendations.

2.2 SAMPLES

Drainage wick samples shall be submitted and the source of the proposed materials indicated prior to delivery to the site. The Contractor shall also submit the name of the wick drain installer and demonstrate the installer's experience with this type of work.

PART 3 EXECUTION

3.1 GENERAL

At least thirty (30) days prior to the installation of drainage wicks, the Contractor shall submit to the Contracting Officer Representative (COR) for review, details of the sequence and method of installation. Approval of submittal will not relieve the Contractor of its responsibility to install drainage wicks in accordance with these specifications.

3.2 INSTALLATION

3.2.1 Equipment

Drainage wicks shall be installed with approved modern equipment of a type that will cause minimal disturbance to the subsoil during the installation operation. Drainage wick shall be installed using a sleeve or mandrel that shall be inserted into the soil. The sleeve or mandrel shall protect the wick material from tears, cuts, and abrasions during installation and shall be extracted after each drainage wick is installed. A flat plate or pyramid-shaped plate of adequate size shall be used to anchor the vertical drains. Reinforcing bars may be used if the Contractor can demonstrate that the wick will stay in-place during withdrawal of the mandrel.

3.2.2 Test Section

Prior to the installation of drainage wicks within the designated areas, the Contractor shall demonstrate that his equipment, method, and materials produce a satisfactory installation in accordance with these specifications. For this purpose, trial wicks shall be installed at locations designated by the COR. Approval by the COR of the method and equipment used to install the trial wicks shall not necessarily constitute acceptance of the method for the remainder of the project. If the COR considers that the method of installation does not produce a satisfactory wick, methods and equipment shall be altered to comply with these specifications. Falling head impact hammers or jetting will not be permitted as a method to install the wick drains.

3.2.3 Location

Drainage wicks shall be located and staked out as shown. Reasonable precautions shall be taken to preserve the stakes during wick drain installation. Location of the drainage wicks shall not vary by more than 6 inches from the locations indicated. Drainage wicks shall be installed from the top of the granular blanket to the depth shown. COR may vary the depths, spacings, or the number of wicks to be installed, and may revise the plan limits for this work as necessary. Equipment shall be carefully checked for plumbness prior to advancing each wick. Driving mandrel or sleeve shall be as vertical as possible, and must not deviate more than 1/4 inch per foot from the vertical. Wicks that are out of their proper location by more than 6 inches, damaged in construction, or improperly completed do not meet the intent of these construction contract documents.

3.2.4 Depth

A suitable means for making a linear determination of the quantity of wick material used at each wick location shall be required. During installation of the wick, the Contractor shall provide suitable means of determining the depth of the drainage wick at any given time. Splices or connections in

the drainage wick material shall be done so as to insure continuity of wick material. The wick material shall be cut neatly at its upper end.

3.2.5 Obstructions

Augering or other methods to loosen stiff upper soils prior to the installation of the drainage wicks will be permitted, provided that such augering does not extend more than 2 feet into the underlying compressive soils. Where obstructions are encountered below the working surface and cannot be penetrated using normal, accepted procedures, the drain shall be completed from the elevation of the obstruction to the working surface and the COR notified. At the direction of the COR, a new drain shall be installed within 18 inches of the obstructed drain. Obstructed drains will be paid for at the contract unit price unless the drain is improperly completed.

3.2.6 Sequence

The wick drains, granular blanket drain, and filter fabrics beneath the pre-loading embankment shall be installed in the following sequence:

1. Install lower filter fabric and granular blanket.
2. Install wick drains.
3. Place upper filter fabric.
4. Construct pre-loading embankment.

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SLUICE GATES 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	(2003) Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished
ASTM A 126	(2004) Gray Iron Castings for Valves, Flanges, and Pipe Fittings
ASTM A 194/A 194M	(2006a) Carbon and Alloy Steel Nuts for Bolts for High Pressure or High Temperature Service or Both
ASTM A 276	(2005) Standard Specification for Stainless Steel Bars and Shapes
ASTM A 320/A 320M	(2005a)Alloy/Steel Bolting Materials for Low-Temperature Service
ASTM A 582/A 582M	(1995b; R 2000e1) Free-Machining Stainless Steel Bars
ASTM B 21/B 21M	(2001e1) Naval Brass Rod, Bar, and Shapes
ASTM B 584	(2004) 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) Stainless Steel Nuts

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C501	(1992) Cast Iron Sluice Gates

ASME INTERNATIONAL (ASME)

ASME B1.1	(1989; R 2001) Unified Inch Screw Threads (UN and UNR Thread Form)

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA MG 1	(2006) Motors and Generators

UNDERWRITERS LABORATORIES (UL)

UL 508	(2005) Standard for Industrial Control Equipment

1.2 GENERAL REQUIREMENTS

The contract drawings indicate the extent and general arrangement of the gate and pedestal (lift) system. 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 show on the drawings.

1.2.1 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.

1.2.2 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.

1.3 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 01 33 00 SUBMITTAL PROCEDURES.

SD-02 Shop Drawings

Sluice Gates; G,DM

Flap Gates; G,DM

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); G,DM
b. Flap gates; G,DM

SD-05 Design Data

Gate Stem and Pedestal (lift); G,DM

Appropriate design data and computations shall be submitted to substantiate the sizing of the gate stem and pedestal (lift).

SD-10 Operation and Maintenance Data

Maintenance and Operating Manuals; G,DM

The Contractor shall provide ten copies of installation, operation, maintenance, lubrication and repair manuals for all equipment installed.

Power Operating Device; G,DM

SD-11 Closeout Submittals

Warranty; G,DM

Tools; G,DM

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.

2.1.1 Iron Castings.

ASTM A 126, Class B.

2.1.2 Naval Brass.

ASTM B 21/B 21M, Copper Alloy UNS No. C 46400 or 48200 temper, optional.

2.1.3 Manganese Bronze.

ASTM B 584, high-strength yellow brass, Copper Alloy No. C 86500.

2.1.4 Cold Rolled Steel.

ASTM A 108, Grades 1010 through 1020.

2.1.5 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.

2.1.6 Bolting Materials.

a. ASTM A 320/A 320M, Grade B8 (ANSI 304) or B8F (ANSI 303).
b. ASTM A 194/A 194M, Grade 8 (ANSI 304) or 8F (ANSI 303).

2.1.7 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 practice.

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 0.35 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.

2.3 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 0.35 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 AWWA C501. Upon installation gates shall be watertight as specified in AWWA 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.

2.4.1 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).

2.4.2 Components

2.4.2.1 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.

2.4.2.2 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 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.

2.4.2.3 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 and shall be machined to a smooth finish 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. Side wedges shall be 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.

2.4.2.4 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 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.

2.4.2.5 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.

2.4.2.6 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.

2.4.2.7 Operating Pedestal (Lift)

Sluice gates shall be provided with operating pedestal (lift) as shown.

2.4.2.8 General

The operating pedestal (lift) shall be totally enclosed gear type with center stem lubrication system, pedestal (lift) indicator, 2" square manganese bronze lifting nut, ball bearings or tapered roller bearings above and below the flange, and machined friction surfaces. 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 25 pounds and the lever arm (hand crank radius) shall not exceed 15 inches. Cranks shall be equipped with a smooth brass grip rotating freely on the handle of the crank. Cranks shall be removable. The stand shall be capable of being driven by a portable operator, if one were used in the future. The operating stand system shall be capable of opening and closing the gate within 5 minutes using portable operator. Pedestal (lift) shall be made of fabricated steel or cast iron with smooth exterior surfaces, equipped with stem covers and vandal proof position indicators. 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.

2.4.2.9 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.

2.4.2.10 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.

2.5 FLAP GATES

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 as indicated.

2.5.1 Gravity Flow Flap Gate Components

2.5.1.1 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.

2.5.1.2 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.

2.5.1.3 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.

2.5.1.4 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.

2.5.1.5 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.

2.5.1.6 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.

2.5.1.7 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 593, ASTM F 594

2.6 POWER OPERATING DEVICE

A power operating device shall be provided, one at each structure where a sluice gate is present. The operator shall be capable of opening and closing the sluice gates at the speed and torque requirements recommended by the sluice gate manufacturer and approved by the COR. The operator shall be portable, consisting of an electric motor operated wrench in accordance with NEMA MG 1, UL 508

2.6.1 Heavy Electric Wrench

The wrench shall have a reversing switch for raising and lowering the gate for 15 minute operation under full load. The wrench shall be suitable for all weather service and designed for operation on two different sources of power, a portable generator or a 110 V.A.C commercial power. The wrench shall be capable of providing a minimum of 30 foot-pounds of torque for continuous duty while operating at a speed of not less than 140 rpm, and shall develop a stall torque not less than 250 foot-pounds.

2.6.2 Portable Cable

One 50-foot length of approved three conductor, No. 12 AWG, 600 volt heavy duty type SO portable cable shall be furnished for extension cord purposes. The cable shall be provided with a portable cable reel and equipped with a 3 wire, 3 pole, weather-proof, grounding type plug and receptacle rated 14 amperes, 125 volts, for connection to a portable generator.

2.6.3 Mechanical Torque Limiting Device

A detachable overload release clutch without a linit switch pin shall be furnished that will cause the wrench to run free if the turning torque at the gate hoist exceeds 600 inch-pounds. Integral drive adaptations shall be made so that it can be inserted between the wrench socket and the gate hoist shaft.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 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.

3.1.2 High Slump Concrete Grout

For high slump concrete grout fill mixture refer to concrete specification under structural sections.

3.1.3 Flap gate installation

Flap gates shall be installed in accordance with the approved shop drawings and the manufacturer's recommendations.

3.1.4 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.

3.2 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 and for the power operating device. 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.

3.3 TOOLS

One set of wrenches 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 facility of local sponsor.

3.4 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. 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.

a. Sluice gates including stems and operating pedestal (lift).
b. Flap gates.
c. Power Operating Device

3.5 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 35 49 13.10 03

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, in accordance with these specifications and applicable drawings.

1.2 RELATED WORK

MISCELLANEOUS METAL, Section 05 50 00.00 10.

1.3 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	(2001) High-Strength Low-Alloy Columbium-Vanadium Structural Steel

1.4 MATERIALS TESTS

Sheet piling and appurtenant materials shall be tested and certified by the manufacturer to meet the specified chemical, mechanical and section property requirements prior to delivery to the site. Testing of sheet piling for mechanical properties shall be performed after the completion of all rolling and forming operations.

1.5 SUBMITTALS

The contractor shall submit descriptions of driving equipment, shop drawings, test procedures, test reports and certificates, sheet piling driving records and other submittals to the Contracting Officer for Government Approval (GA) as required. Submittals not satisfactory to the Contracting Officer will be rejected.

SD-01 Preconstruction Submittals

Equipment Descriptions

Complete descriptions of driving equipment including hammers, extractors, protection caps and other installations appurtenances shall be submitted for approval prior to commencement of work.

SD-02 Shop Drawings

Shop Drawings

Shop drawings for sheet piling shall show complete piling dimensions and details, special pile section dimensions and details including connection details and other details of fabrication, driving sequence and location of installed piling. Shop drawings shall include details and dimensions of templates and other temporary guide structures for installing piling. Shop drawings shall provide details of the method of handling piling to prevent permanent deflection, distortion or damage to piling interlocks.

SD-07 Certificates

Materials Test Certificates; G,

Materials test certificates shall be submitted for each shipment and identified with specific lots prior to installing piling. Identification data should include piling type, dimensions, section properties, heat analysis number, chemical composition, mechanical properties and mill identification mark.

SD-09 Manufacturer's Field Reports

Driving Records

Records of the sheet piling driving operations shall be submitted after driving is completed. These records shall provide a system of identification which shows the disposition of approved piling in the work, driving equipment performance data, piling penetration rate data, piling dimensions and top and bottom elevations of installed piling.

1.6 DELIVERY, STORAGE AND HANDLING

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.

PART 2 PRODUCTS

2.1 METAL SHEET PILING

Steel for sheet piling shall conform to the requirements of ASTM A 572/A 572M, Grade 50. Piling shall be hot-rolled steel sections. Sheet piling shall be of the type indicated and the interlocks of 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. At the governments option, visual and ultrasonic testing of the sheet pile can be performed at the site prior to installation of the piling. Any defective sheet showing evidence of delamination or non-homogeneity shall be rejected and replaced as directed by the contracting officer and at no cost to the government. Sheet piling

shall consist of sections of the dimensions shown on the drawings. Sheet piling shall be provided with standard pulling holes. Piling substituted for those sections shown on the drawings shall have equivalent properties to those listed in the following table:

Section Shown on Drawing	Section Modulus (in3/ft of wall)	Section Depth (in)	Thickness (flanges or webs) (in)	Yield Strength (ksi)
PZ 22	18.4	9.0	0.375	50
PZ 27	31.0	12.0	0.375	50
PZ 35	48.9	15.0	0.500	50

Substituted sections for those indicated on the drawings shall be of the same type of section with a section modulus equal to or greater than that listed. 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. Complete shop drawings of the proposed sections showing all dimensions and details shall be submitted to the contracting officer for approval.

2.2 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.

2.3 APPURTENANT METAL MATERIALS

Metal plates, shapes, bolts, nuts, headed shear studs, and other appurtenant fabrication and installation materials shall conform to manufacturer's standards and to the requirements specified in the respective piling standards and in Section 05 50 00.00 10, MISCELLANEOUS METAL.

2.4 INTERLOCK SEALANT

Interlock sealant shall be a liquid type hydrophilic poured-in- place rubber waterstop. The contractor shall provide all other materials not specifically described, but required for a complete and proper installation of the sealant as recommended by the sealant manufacturer and as noted on the drawings. Interlock sealant is not required for sheet pile interlocks used to construct concrete I-Walls unless noted on the drawings.

PART 3 EXECUTION

3.1 PILING DRIVING EQUIPMENT - HAMMER

Driving Hammers. Hammers shall be steam, air, or diesel drop, single acting, double acting, or differential acting type. The driving energy of the hammers shall be as recommended by the manufacturer for the piling weights and subsurface materials to be encountered.

3.2 PLACING AND DRIVING

3.2.1 Placing

Any excavation required within the area where pilings are to be installed shall be completed prior to placing sheet piling. Pilings shall be carefully located as shown on the drawings or directed by the Contracting Officer. 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. At least two templates shall be used in placing each piling and the maximum spacing of templates shall not exceed 20 feet. Sheet 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

Vibratory driving of piles shall not be allowed. Pilings shall be driven with the proper size hammer and by approved methods so as not to subject the pilings to damage. Driving resistance in excess of 20 blows/in shall be considered practical refusal. If driving resistance approaches practical refusal to penetrate the layer, then the contractor shall notify the Contracting Officer and perform any corrective measures as directed by him. Insure proper sheet pile interlocking throughout their lengths. 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 insure 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 insure the plumbness of succeeding pilings. The maximum permissible taper for any tapered piling shall be 1/8 inch per foot of length. 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 insure the adequacy and stability of the structure. Pilings shall be driven to depths shown on the drawings and shall extend up to the elevation indicated on the drawings for the top of pilings. 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. 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 which will not damage the surrounding metal. Holes other than bolt holes shall be reasonably smooth and the proper size for rods and other items to be inserted.

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 method of pulling pilings must be approved by the Contracting Officer. 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 determine 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 QUANTITIES

The estimated quantities of steel sheet piling listed in the bidding schedule of the contract are furnished for bidding purposes only. Sheet pile quantities for payment shall consist of the square feet of piling acceptably installed. Installed quantities shall consist of all piling including fabricated sections driven between the required top and bottom elevations of pilings plus any additions thereto resulting from changes in design or alignment.

3.6 QUALITY CONTROL

The Contractor shall establish and maintain a quality control system for the work under this section, in accordance with SECTION 01 45 04.00 03, "CONTRACTOR QUALITY CONTROL".

-- End of Section --